Study Material for Students

Foundation Course in Food Production-I

(BHA-101)

National Council For Hotel Management and Catering Technology

(An Autonomous Body Under Ministry of Tourism, Govt. of India)

A-34, Sector-62, Noida -201309

NCHMCT

Title : **Foundation Course in Food Production-I**

Author: **Mr Bonophool Banerjee, Former HOD, IHM Kolkata**
Mr Sanjit Maji, HOD, IHM Gandhinagar
Dr T. Anantakrishnan, Sr Lecturer, IHM Chennai
Mr Yogesh Singh, Sr Lecturer, IHM Kurukshetra
Mr Saurabh Kataria, Lecturer, IHM Gurdaspur

Editor : **Dr. Priyadarshan Lakhawat, Director (Academics), NCHMCT**

Published by: **National Council for Hotel Management & Catering Technology**
A-34, Sector – 62, NOIDA, Uttar Pradesh - 201309
Phone No. 0120-2590620, Email: p.lakhawat@gov.in
Website: www.nchm.gov.in

Designed by: **M/s Bharti Publications,**
4819/24, 2nd Floor, Ansari Road,
Darya Ganj, New Delhi-110002
Phone No. 011-46172797

ISBN No : **978-81-973763-8-2**

First Edition - 2024

© NCHMCT 2024

Preface

Gyan Bhushan, IES
Sr Economic Advisor and CEO, NCHMCT
Ministry of Tourism, Govt of India

National Council For Hotel Management and Catering Technology
(An Autonomous Body Under Ministry of Tourism, Govt. of India)

Welcome to the exciting world of hotel management. This student handbook has been meticulously crafted to provide you with a comprehensive understanding of the principles, practices, and strategies that are essential for success in the dynamic hospitality industry. As the global hospitality landscape continues to evolve, the role of hotel managers become increasingly multifaceted. This handbook written as per the new curriculum based on NEP is a reflection of our commitment to equipping you with the knowledge and skills that will make you not just a successful hotelier but a true hospitality professional.

I would like to extend my gratitude to the dedicated team of educators and industry experts who have contributed their expertise to this textbook. Their collective wisdom ensures that you receive the most relevant and up-to-date information. Remember, in the world of hotel management, the guest is at the heart of everything we do. I invoke you to approach your studies with the same spirit of guest-centricity. It has been a deliberate effort to keep the language used in the student handbook as simple as possible. Necessary pictorial illustrations, formats and review questions have been included to help the learners understand the concept without any difficulty. I wish you a rewarding and enriching learning experience.

Comments and suggestions are welcome for further improvement of the book.

Gyan Bhushan, IES

Acknowledgements

Patron

Shri Gyan Bhushan, IES – Sr Economic Advisor MOT & CEO NCHMCT

Advisors

1. Shri L.K.Ganguli, Director- Administration & Finance
2. Dr. Satvir Singh, Director- Studies

Content Development Team

1. Mr Bonophool Banerjee, Former HOD, IHM Kolkata
2. Mr Sanjit Maji, HOD, IHM Gandhinagar
3. Dr T. Anantakrishnan, Sr Lecturer, IHM Chennai
4. Mr Yogesh Singh, Sr Lecturer, IHM Kurukshetra
5. Mr Saurabh Kataria, Lecturer, IHM Gurdaspur

Editing and Coordination

Dr. Priyadarshan Lakhawat, Director- Academics

Contents

1.	INTRODUCTION TO COOKERY	1-29
2.	ORGANIZATION STRUCTURE OF MODERN KITCHENS AND AIMS & OBJECTS OF COOKING FOOD	30-87
3.	BASIC COOKING PRINCIPLES	88-129
4.	PLANT-BASED CULINARY ART / SALADS / SOUPS / UNDERSTANDING EGGS AND FISH	130-171
5.	BASIC PRINCIPLES OF BREAD & CAKE MAKING	172-211

1 Chapter

INTRODUCTION TO COOKERY

1.0 UNIT OVERVIEW

Overview

This unit will equip the students with the ability to list down the practices followed for hygiene and safety in hotel kitchens. They will be able to appreciate the professional standards, attitude & personnel ethics required in Food Production Operations. The unit will also provide information about traditional & modern cookery of the world and Indian culinary history with an introduction to Ayurveda & vegetarianism.

Learning Objectives

S.No.	Sub Unit	Learning Topics	Key learning Objectives / At the end of the sub-unit, the learners will be able to:
1	1.2 Hygiene	• Definition • Importance in Food Production Operations	1. Define hygiene 2. Appreciate the importance of hygienic practices in kitchen operations
2	1.2.1 Personal Hygiene	• Hygiene routine • Do's & Don'ts of personal hygiene	1. Explain the importance of personal hygiene for food safety 2. List the salient factors that affect personal hygiene
3	1.2.2 Hygiene and Food	• Contamination in food • Food poisoning & role of bacteria in it • Contamination control	1. Differentiate between various types of contamination 2. List various types of bacteria responsible for food poisoning 3. Recognize the practices followed to prevent the contamination
4	1.2.3 Hygiene and Environment	• Planning the kitchen by hygiene practice • HACCP	1. Explain various features that need planning for a hygienic environment 2. Define HACCP
5	1.3 Uniforms and Protective Clothing	• Parts of the Chef's attire • Uses of Chef's attire	1. List all the parts of the chef's uniform 2. Appreciate the importance of a chef's uniform 3. Determine the uses of uniform parts
6	1.4 Safety Procedure in Handling Kitchen Equipment	• Factors that cause injuries • Guidelines for safety in handling equipment • Job hazard analysis & risk assessment in kitchens	1. List the factors that may cause injuries 2. Explain the procedures to be followed to safely handle the equipment 3. Identify the careless behavior that may jeopardize the safety

7	1.5 Food Production – Industry	• Various food production establishments in the industry • Types of kitchens in hotels	1. Identify the need for different food production businesses 2. Appreciate the vastness of food producing industry 3. Categorize various kitchens in hotels
8	1.6 Traditional Cookery & Origin of Modern Cookery	• Western cookery • Haute cuisine and cuisine classique • Nouvelle cuisine • New trends	1. Define the categories of traditional cookery 2. Appreciate the contribution made by chefs by standardizing the documenting the cuisine 3. Exemplify the new trends in gastronomy
9	1.7 Indian Culinary History	• Development of Indian cuisine • Factors contributing to the progress of Indian Culinary History	1. Put in sequence the gradual progression of Indian cuisine 2. Identify the factors that contributed to Indian cuisine 3. Appreciate the versatility of Indian Cuisine
10	1.8 Ayurveda & Vegetarianism	• Meaning and understanding of Ayurveda • Vegetarianism and its reputation	1. Define the term Ayurveda 2. Appreciate the importance of ancient texts in cultural development 3. Explain the qualities of vegetarian food

1.1 INTRODUCTION

The art of cookery has a significant impact on our journey from being hunter-gatherers to becoming the civilized humans of modern times. The commercial kitchens of today with very high standards of professionalism and spectacular features (which you must notice as a budding hospitality professional) have a history of pride when we talk of the development of the modern-day food industry.

The work in a commercial kitchen demands high professionalism and personal ethics. The hygiene practices and safety procedures for food handlers need to be accurate and uncompromising to keep the kitchen environment safe in all terms for the food creators and food consumers.

The Traditional Cookery & origin of Modern Cookery around the world have a lot many things in common with Indian Culinary History. From the grand feasts of the kings & the elites to the meals prepared in a common household have taken many folds with time based upon interesting factors. These range from the regional ingredients and geography to the global transfer of ingredients and recipes. The recent rise in the popularity of Vegetarianism around the globe doesn't surprise us, as the Indian culinary tradition finds its roots linked to Ayurveda which always stresses simpler cooking methods and healthy eating. Though the non-vegetarian diet was not banned in Ayurveda, however Indian culinary tradition always boasts of having a wide array of more pleasing vegetarian recipes when compared to non-vegetarian food.

Check-back Questions
What do the food production operations demand from the employees? What is the role of ancient trade and travel in the transfer of ingredients and recipes globally?

1.2 HYGIENE

According to the World Health Organization, "Hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases."

The word hygiene, at the end of the etymology trail, comes from the Greek *Hygieia*, the goddess of health, cleanliness, and sanitation. Food that is consumed by us to provide energy to the body and maintain good health has to be processed with utmost care so that it doesn't cause any spread of diseases.

The practices adopted for the maintenance of hygiene standards help the industry in getting frequent business. Since the food production department deals with perishables, repeat business is obligatory for us. Customers do not frequent the outlet which does not maintain proper hygiene and sanitation standards. A successful food industry can face closure if any outbreak of food poisoning occurs.

Therefore, we shall proceed to understand how hygienic practices can strengthen kitchen operations to prevent contamination. There are rules and procedures for kitchen staff to follow. These rules and procedures deal with maintaining the hygiene standards of the personnel, the handling of food at different stages, and maintenance of hygienic environment in food production operations.

1.1.1 Personal Hygiene

'*Hygiene is two-thirds of health*' this proverb stresses keeping the body clean and eating & drinking clean food & water. Most diseases are caused by micro-organisms that get spread through air, water, and food. The Chefs have this responsibility to keep their food safe from these infections. Chefs must follow a hygiene routine consistently so that they do not become a carrier of an infection that causes food-borne diseases. The salient points to consider are as under:

- Do not work in the kitchen when afflicted with an infection or communicable disease.
- Bath daily and also keep your body hair trimmed/shaven/neatly tied (as applicable).
- Take utmost care in keeping your uniform neat and clean and always wear a complete uniform. Remember that dirty or messed up uniform is not a sign of a hardworking employee, whereas it shows that the person is highly disorganized and unprofessional.

- Hands can cause transfer of contamination because there are numerous types of tasks performed by hands while being on duty in the kitchen, a habit of washing hands frequently is necessary. Also, make sure that you wash your hands after – using the toilets, using cleaning equipment, handling raw meat & vegetables, throwing dirty things into the garbage, touching your body parts, etc. This list can be any long depending on the type of kitchen operations a chef is dealing with. Usually, the hotel kitchens have proper Hand wash procedures displayed in food handling areas which are to be followed precisely. You may also visit the World Health Organization's website to seek further clarity on the hand wash procedure.
- Fingernails, if not trimmed regularly, may become a developing ground for bacteria and other infections. Always keep them short and clean. Do not apply any nail paint/varnish.
- No jewelry should be worn while working in food preparation areas.
- Do not chew gum/mouth-fresheners while working in the kitchen. Using any sort of tobacco products at work is to be avoided.
- Never cough or sneeze over the food. Avoid touching parts of the face like the nose, and mouth while preparing food.
- Any wounds/cuts are to be covered with clean bandages, and in case the wound/cut is at such a body part that touches food or equipment in the kitchen, one must not perform food handling tasks.

Check-back Questions

Fill in the blank spaces:

1. The hygiene practices help to maintain _____ and prevent the spread of _____.
2. Always wear _____ uniforms.
3. Do not chew _____ while working in kitchens.

1.1.2 Hygiene and Food

There is a huge chain of events 'from the farm to the table' that takes place to bring the food to any guest in a food-selling outlet. As the raw material passes through various steps, there are always chances of it being contaminated by different ways and means. The presence of dirt and stones from the farm in the vegetables, body hair on animal cuts, the presence of pesticides, the presence of pathogens, etc. are a few examples. For better understanding, we may classify the contamination as under:

Type of Contamination in Food	Examples under the category
Physical Contamination	Stones, metal pieces, packaging pieces, human hair, rodent droppings, insect bodies, etc.
Chemical Contamination	Cleaning chemicals, insecticides, excessively used – pesticides, fertilizers, preservatives, etc.,
Biological Contamination	Bacteria, viruses, fungi, parasites.

Food poisoning, which may be food-borne intoxication or food-borne infection, is caused by negligence on the part of food preparing person.

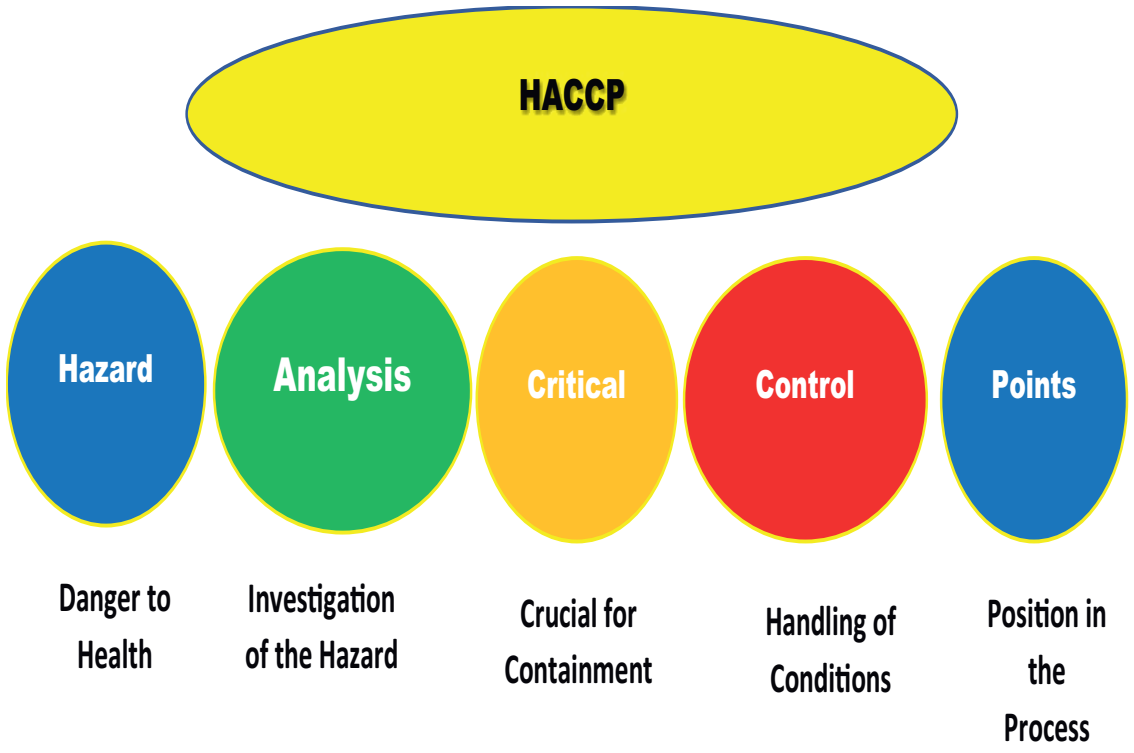
A chef should always adhere to very strict standards of hygiene. Some of the indicative examples of contamination control are mentioned here:

- The hotel/department should tie up with very reliable suppliers for the raw material.
- The inspection and storage procedures must be standardized with utmost care. An understanding of high-risk foods and their storage procedures is essential.
- Temperature plays a key role right from the transport of raw materials to the final presentation of food on a customer's table. There are food items that require cold-chain management. Some foods need precision while cooking to aim at taking the internal temperature above 75^0 C or hotter to kill most of the food-poisoning bacteria. A chef must also keep in mind the effect of temperature on bacterial growth and survival, for example, the 'Danger Zone' temperature range is 5^0 C to 63^0 C.
- Thawing of frozen foods/raw materials should be done to an adequate level using the correct procedure. Similarly, cooling the food before refrigeration is equally important.
- The food handler should be very well trained in the waste removal methods in the kitchen.

Check-back Questions	
1.	What are the different types of contamination in food?
2.	What is the 'Danger Zone' temperature range?

1.2.3 Hygiene and Environment

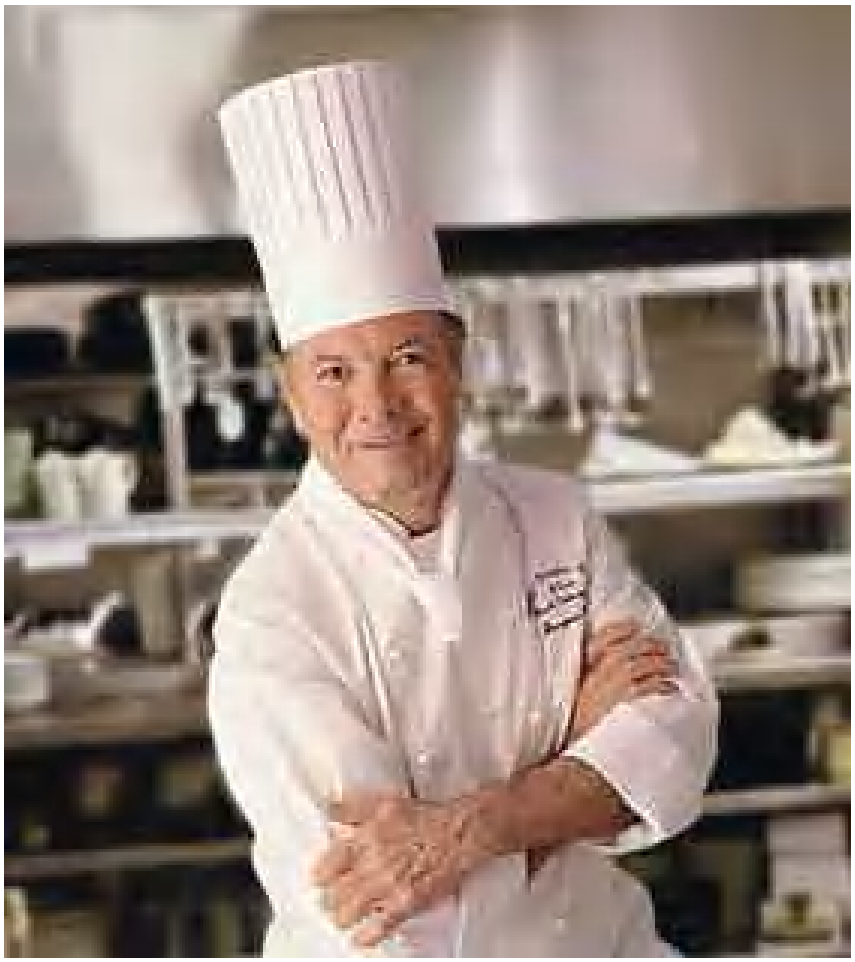
The environment of the food production area plays a vital role in the maintenance of hygiene. The design & layout of a professional kitchen are influenced by the need for the highest hygiene standards; the surfaces, equipment, wash-up and waste-disposal facilities are planned to maintain a hygienic environment. Kitchen disinfection procedures and effective pest control methods ensure the safety of food from contaminations. The quality of equipment should also be by hygiene standards; the food storage containers and food preparation equipment must always be kept clean and in good condition, and the material should be Food Grade. The dishwashing facilities for the equipment must adhere to the sanitizing guidelines either by the use of chemical cleansers or immersion in rinsing water heated above 83^0 C. The cleaning materials require a control mechanism to keep away from food. The unfit food and chemicals must be repudiated away from the food preparation area. There should also be strict control on visitors' entry into the food preparation area to ensure the upholding of exact hygiene standards about which the kitchen staff is well-trained.



The establishment should also be HACCP certified (HACCP is Hazard Analysis and Critical Control Points). HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement, and handling, to manufacturing, distribution, and consumption of the finished product.

Check-back Questions
1. What is the full form of HACCP?
2. Whether the kitchens should allow frequent entry to visitors?

1.3 UNIFORMS AND PROTECTIVE CLOTHING



People are usually familiar with the chef's attire. You can easily imagine the chef's attire while reading this text as you must have seen it many times either in events of your life or on the screen of your TVs or mobile phones. The uniqueness and recognisability of the chef's attire involves prestige, hence, the chefs must wear it with pride and keep the attire in a presentable state at all times. The chef's attire has developed with history keeping in mind the working environment of kitchens and the safety & comfort needs of employees. The traditional color for most of the chef's uniform components is white because it helps in determining cleanliness and also the white color absorbs less heat. To understand the components of chef's attire and their respective importance, we shall list them in the following manner:

- **Chef's Cap:** the *Toque Blanche* which is the tall, white, pleated hat is the most preferred style. Chef's cap prevents the hair from falling into food and also absorbs sweat. The tall design helps in keeping the head airy which facilitates keeping it cool. Disposable caps are also in practice nowadays for hygiene and economic purposes.

- **Neck Cloth/Scarf:** the main purpose of wearing the neck scarf is to absorb facial perspiration. A neatly knotted, close-fitting, or loose-fitting tie style may be chosen as per the temperature conditions of the work area.
- **Chef's Coat/Jacket:** the chef's jacket is always double-breasted. Its main purpose is to save the chef from the dangers of hot liquids, fire, and thermal shocks. Hence, the material is thick and heavy cotton. Long sleeves of the jacket act as a protection for arms against splashing hot liquids/oils and also save from the possible burns/scalds which may be caused by hot equipment in the kitchen.
- **Trousers:** the chef's trousers are of black & white chequered cotton material. The trousers are to provide safety in case of hot liquid spills. The use of elastic waistbands and the practice of wearing them without a belt are for added comfort and ease of removal in case of hot liquids spill.
- **Apron:** thick cotton material aprons having a length that goes below the knees are worn around the waist by chefs to protect themselves from spilling hot liquids. This part of the chef's uniform gets soiled very frequently during work. Many chefs reverse the apron once a side gets dirty and that is permissible once, however, one should not develop a habit of folding the apron at the waist to hide stains because that would eventually decrease the effective length, and a short apron would not be very protective.
- **Kitchen Cloth:** the linen kitchen cloth is tucked by a chef with an apron string. The uses of kitchen cloth may be numerous depending on the kitchen operations from lifting hot pans to moving other objects around heated equipment. One should always keep in mind that this cloth is not primarily designed for cleaning the work table or other surfaces in the kitchen, that purpose is usually solved by disposable paper towels.
- **Shoes:** considering the amount and type of work performed in a professional kitchen, the shoes must be comfortable enough. The shoes should have non-slip soles. The size and design of the shoes should support air circulation around the feet. Socks should be of sweat-absorbing cotton material.

Check-back Questions	
1.	What is the main purpose of wearing a Chef's Uniform?
2.	What is the use of Kitchen Cloth in chef's attire?

1.4 SAFETY PROCEDURE IN HANDLING KITCHEN EQUIPMENT

"First knife skills. Then knowing how to control heat. Most important is choosing the right product... the rest is simple." – Justin Quek

Safety is one of the major concerns in kitchen operations. As people perform the work in the kitchen while being surrounded by fuel supply pipes, hot equipment, food material, sharp tools, etc. any act of negligence may jeopardize the safety of self as well as of others at the workplace.

There are general considerations to be kept in mind while handling kitchen equipment:

- It starts with paying attention to properly wearing and carrying the chef's attire. Any loose ends or excessively hanging clothes may get stuck in different machines, may get dipped in hot oil or liquids, and maybe a cause of accidents.
- Professional kitchens are ergonomically designed. A chef should know the kitchen layout and all the equipment very well. Movement of food, equipment, and food materials keeps on taking place in kitchen operations. Movements should be safe to lower the possibility of accidents. The process used in moving is also a concern, for example, while moving a hot pan/vessel the chefs must use dry kitchen cloth because a wet cloth may scorch the hands while being used with hot equipment. Cross-traffic is to be avoided at all times. Never run in the kitchen, walk, and watch well where you are going.
- Cleaning of various kitchen equipment needs detailed attention. Electric equipment must be taken off from the current supply before cleaning. Most of the kitchen equipment are having sharp edges/blades; utmost care should be taken while cleaning such equipment. Using the correct/recommended cleaning agents while cleaning the equipment has to be the prime focus. Cleaning with hot detergent water, rinsing in water heated above 75^0 C, and drying immediately should be done as applicable. Use of abrasives should be limited because if the abrasives cause scars on equipment surfaces they may act as a developing ground for bacteria.
- Before and after use, the equipment must be cleaned immediately and placed at the designated place and as per the standard procedures. [Manufacturer's instructions must always be followed]

- While using the equipment, always follow the correct, prescribed procedure. Use the correct equipment for the task, for example, trying to open a can with a knife instead of a can opener is a direct invitation to an accident/ injury.
- Lifting heavy objects is a requirement in kitchen operations, use correct body posture to avoid injuries.
- Repetitive tasks performed at a fast pace may cause aches and stiffness in muscles, care should be taken by taking breaks, using the correct equipment, and performing the tasks at ergonomically designed designated areas.
- Use rubber gloves while working with cleaning agents and raw food materials that might cause allergies.
- Select and use the correct and sharp knife for a particular task. Using an incorrect knife or blunt knife may cause damage to the raw material and may injure the user also. While carrying and keeping a knife, the blade should be facing away from people.

Some of the examples of carelessness in behavior that hamper safety may be:

- Putting knives in sinks
- Trying to catch a falling knife
- Leaving the handles of pans on open flames of gas burners
- Not cleaning the greasy surfaces frequently
- Not reporting injuries and accidents to management
- Not turning off electrical equipment after use
- Trying to tamper with the equipment
- Not paying attention to the signs and labels placed on equipment for safety

Note: Also refer the attached Table 'Job Hazard Analysis and Risk Assessment – Kitchens' at the end of this unit.

Check-back Questions

Fill in the blanks:

1. The study of people's efficiency in working environment is known as _____.
2. A sharp knife cuts vegetables, whereas a blunt knife cuts _____.
3. Separate In and Outdoors should be used to avoid _____ traffic.

1.5 FOOD PRODUCTION – INDUSTRY

Chef Auguste Escoffier

The types of food that people consume are wide-ranging. The range or array is so vast that the food production industry has numerous elements working to meet the demands of the ever-evolving palates of humans. These elements may be of independent or interconnected nature depending on the type of food being produced. On any given day, a person may be having a steamed food breakfast at home, may have a packaged chocolate and bottled drink while driving towards the office, may order food from a popular outlet that is delivered to him during lunchtime, may consume coffee on the way while driving from office to the airport, may have RTE (ready to eat) food during the flight and finally may place a room service order late night in the hotel where he is staying for an official tour. Different groups of people also have different and specific demands; candies for children, packaged potato wafers for youngsters, and protein drinks for gym-goers are a few examples.

Chef Marie-Antoine Carême

When someone tries to paint a picture of the operations of the food production industry which already has a very vast canvas, it may be a cumbersome task to develop an understanding of the food production industry as a whole. Here, we should try to classify it based on the extent of processing by which the food passes through in various sectors of the food industry. We may categorize it– as unprocessed and minimally processed foods (which would include fresh fruits and milk etc.), processed culinary ingredients (like the masala mixes and proprietary sauce, etc.), and processed foods (that would include complex recipes). Furthermore, a classification may be done based on shelf-life also; there are food items that get spoiled in a few hours and there are others that keep for many days, weeks, months, and so on. The key components of the food production industry may be listed as Agriculture and Farming, Food Processing, Food Manufacturing, Food Packaging, Food Distribution and Logistics, Retail and Foodservice, Food Safety and Quality Assurance, Food Research and Development, Food Marketing and Advertising, and Food Regulations and Compliance.

The planning and design of the kitchen depends on the type of establishment/event it has to cater to. Cloud kitchens, satellite kitchens, and hotel kitchens are a few examples that are designed to serve freshly prepared food to customers. Packaged food-selling units/factories have entirely different set-ups and operations when compared to a restaurant or hotel's kitchen.

In a hotel's food production operations, there are sections like – Main kitchen, à la carte kitchen, Larder, Bakery & Confectionary, Banquet kitchen, Butchery, Live kitchen, etc.

Check-back Questions
1. What are the various sections of the Food Production Department in a hotel?
2. Write some of the components of the Food Production Industry.

1.6 TRADITIONAL COOKERY & ORIGIN OF MODERN COOKERY

People have always enjoyed the process of making and eating food. Food is an integral part of our lives. Food has been a part of all social gatherings since ancient times. Cookery has also evolved many folds with the progress of the human race. The most ancient cookery revolved around Spit-Roasted food. As people started advancing their living in the arrangement of cities, empires, etc. commercial outlets started showing up. Many old cultures had developed this system of eating food from markets as an alternative to homemade food. The development of travel and trade supported the development of cookery. By the end of the middle ages, inns serving food had sprung up, particularly in the larger towns and along thoroughfares.

In the middle of the seventeenth century, coffeehouses were established and the concept spread rapidly. In the development of modern cookery, the first great chef to be recognized was Marie-Antoine Carême, known as Antonin Carême (1783-1833); he had set standards for other chefs throughout Great Britain and France. His classic books on the art of the chef influenced cooks for generations. Chef Antonin Carême took the Cuisine Haute or Grand Cuisine (meticulously prepared by skilled craftsmen with expensive ingredients of superior quality) to a very different level through his published works on cooking. In 1829, the first true restaurant in the United States in New York City was opened, it was named Delmonico's. Charles Ranhofer, a chef from Delmonico's, wrote a famous cookbook called The *Epicurean* in 1894.

The last of the great chefs flourished in France. Auguste Escoffier (1846-1935) was considered the premier cook in the world, his ideas and techniques emphasizing 'exquisite simplify influenced cooks throughout the Western world. Chef Auguste Escoffier wrote a book called *Guide to Modern Cookery* which is still in use. Chef Escoffier explored and introduced the practices of serving meals in course-wise sequence in fine dining service. This was the cardinal feature of Cuisine Classique.

Around 1960, a group of chefs determined to change the customs set up by Chef Auguste Escoffier, and this marked the appearance of Nouvelle Cuisine which succeeded the Cuisine Classique. Nouvelle Cuisine deals with the approach of creativity by emphasizing delicate dishes with natural flavors, fresh ingredients, and simplified preparations with reduced cooking time. Heavy sauces were not given due importance and the presentations became the focus.

Trends like Molecular Gastronomy caught importance in the 21st century. People started paying more attention to the food that is prepared around the globe. The presence and popularity of cookery shows mark a revolution in the gastronomy world which may snowball to greater heights in the years to come. As a budding hospitality professional, you must pay attention to the fact that customers today are far more aware of exotic ingredients and recipes; the internet, accessibility to information, and Social Media have a huge impact on our day-to-day activities.

Check-back Questions
1. Name any two chefs from the era of haute cuisine and classic cuisine.
2. Name any two international cookery competition shows and also mention the chief chef-hosts of those respective shows.

1.7 INDIAN CULINARY HISTORY

Food in India has been an integral part of its glorious history and rich heritage. Indians cook not only for sensory delights but the food has also been an integral part of our socio-cultural life and rituals. Indian cuisine reflects the culture and tradition of the country which comprises countless landscapes, different languages, magnificent festivals, and multi-ethnicity. The presence of diverse climatic conditions has also helped the choice and availability of ingredients and spices. Indian food heritage is a mixture of art and science and is exceptionally vast and diverse. 'Annam Parabrahma Swaroopam' – loosely translated as 'Food is like God' is a part of our collective conscience and our ethos. Indian cuisine has evolved over some time, both, through a process of internal churning and also because of various foreign influences.

Indian cuisine draws out its history from about 4000 years old timeline on which the culture and geographical boundaries have changed tremendously. The Indus Valley civilization, the Harappa & Mohenjodaro excavation sites reveal the presence of granaries, storage jars, and carbonized grains indicate towards the dominance of wheat and barley in earlier times. The grain-pounding facilities and cooking equipment like *chulha & tandoor*, clay plates (like *tawa*), pots for boiling & copper frying pans, etc. indicate the making of bread and other meals also. Pulses and oil seeds were also available. Animal foods were consumed in abundance, and the earlier choice of wild animals shifted towards the use of domestic animals with time. Fruits like pomegranates and bananas also played a part in the composition of meals. These findings provide us an idea that cooking was eating were passions and people enjoyed versatile food.



Sweets have Always held a Special place in Indian Culinary Tradition

The Aryan civilization followed the Harappan civilization. This age of development of Vedas (between 1700 BC and 800 BC) and Vedic civilization developed as an agricultural, pastoral, and philosophical one. The development of the food habits of Aryans and Dravidians over time tells us about the increased use and introduction of versatile cooking ingredients with every passing generation. Rice arrives in this period and dominates the food system. Urad, mung, and Masur became popular pulses. Milk products, especially by cow-milk played an integral role in the food habits of the Vedic culture. The catalog of oilseeds (sesame, mustard, linseed, etc.) and oils, vegetables (yam, gourds, lotus root, bamboo leaves, spinach, etc.), and fruits (jackfruit, mango, banana, fig, grape, coconut, etc.) also increased. Salt, spices, and condiments began to figure interestingly. Jaggery and sugar started taking over the use of honey as a sweetener. Vedic Aryans and the residents of south India in these times ate

a wide array of meat dishes. Wild as well as domestic animals including cattle, swine, fowl, game, fishes & turtles were captured for this purpose. The ducks and the eggs of poultry do not find a place in the translations of that era.

The next phase (300 BC to 900 AD) is to be seen as a shift towards vegetarian food habits. The offering of *Ghee* while worshipping god had been a part since Vedic times and Ghee still holds a very important place in the cuisine. The animal sacrifice had also been a ritual that changed to offering grains in many parts of the country as the concept of *ahimsa* gained its place. The spread of vegetarianism in ancient India finds its roots in two main reasons – the religious practices including Jainism, Buddhism & the Vedic schools determined to be non-killing and the abundance and wide range of available vegetarian foods.

Betel Leaf Chewing: The Practice is Common & Extremely Ancient

In the medieval era, many dynasties contributed to the development of the culinary tradition of India. The food of the *Maharajas*/kings/royal feasts started establishing new trends across the country. India has also been a significant center for the spice trade, drawing traders from all over the world. Spices like black pepper, cardamom, cinnamon, and turmeric soon gained popularity as exports and entered the cuisine of multiple countries. Food habits

brought by the invasion, travel, and trade started evolving the Indian culinary tradition. To cite a few examples for the reader, Chillies were brought to the country around the 15th century, Tomatoes were introduced in the 16th century. Mughal impact on many regional cuisines in India is also an example in this regard (the modern-day north-Indian *samosa* which is filled with potatoes, finds its roots in a similar recipe filled with lamb mince of *Afghan* origin in medieval times). The food also started seeing the impact of the introduction and development of various religions such as Jainism, Buddhism, Islam, Jewish, Zoroastrianism, Christianity, Sikhism, etc. A relatively recent development in Indian culinary history is the rise of the *Dhabas* which happened right after the independence of the country.

Today, the essence of Indian cooking lies in the impeccable use of aromatic spices. The success of a chef lies in the subtle blending of a variety of spices to enhance (rather than overpower) the basic flavor of a particular dish. Gravies also play a very important role in the versatility of recipes. Indian cuisine is the resultant cuisine of many factors like seasonal availability, communities, foreign invasions, trade, religions, local tastes and preferences, and all the states of the country. Usually, the preparations of Indian cuisine do not have a standard recipe. If you taste a recipe like *Murgh Makhni* in different cities of the country, you will feel the changed taste at every new place and will find the regional preferences taking over the recipe. The custom of *Andaaz* (approximation attained with experience) plays a vital role in the Indian recipes as the spices are not measured instead are added by *Andaaz*. Indian Cuisine has a very vast and distinguishable range of regional cuisines today, which we will be focusing upon in the next coming course modules.

Check-back Questions

1. Indian cuisine is famous for its use of aromatic spices. Find and Name any five popular Indian recipes.
2. What are the eateries situated on highways of north India selling freshly-made food items called?

1.8 AYURVEDA & VEGETARIANISM

The Sanskrit term *Ayurveda* is the union of two words: *ayus* (meaning Life) and *veda* (meaning knowledge). Ayurveda can be considered a system that promotes a way of living with a sense of logic in achieving better health with justified reasons. The inception of Ayurveda is in *Atharvaveda*, and it is a system that uses integral natural principles to help maintain health in a person by keeping body, mind, and spirit in balance and equilibrium with nature. The three *doshas* or energies that need to be balanced are *vata*, *pitta,* and *kapha*. When any of these *doshas* accumulate beyond the desirable limit, the body recedes from its balance. Modern researchers interpret the *data* as the energy of movement, *pitta* as the energy of digestion and metabolism, *and kapha* as the energy of lubrication and structure. Collectively these three are called *tridoshas*.

Ayurveda employs certain approaches to restore balance so that healthy living is promoted. These approaches are:

- Diet (specific foods & eating habits depending upon the current state of *Doshas*)
- Herbal remedies (medicinal plants & preparations to support healing)
- Yoga & meditation (to promote physical and mental well-being)
- Ayurvedic Therapies (messages, detoxification like *panchakarma,* etc.)
- Lifestyle recommendation (daily routine and sleep patterns etc. to maintain health)

The founders of Ayurveda have asserted food is an essential source of nourishment, sustenance, and strengthening of health. They also stated that food can be the reason for suffering as well. Charaka Samhita mentions the conditions of the unsuitability of foods under different circumstances; for example, – cold and greasy-smooth, fatty preparations harm the body in highly humid or swampy areas, eating without appetite is harmful, etc. These **unsuitability factors** may range from seasons, utensils, habits, routine, and body of an individual to cooking & composition of food and so on; a few examples are – laxatives are harmful to the delicate digestive system, over-fried food is unhealthy, a mixture of ghee and honey may have harmful effects whereas separately each has nourishing properties, boiling milk in copper pots is not good, etc. Ayurveda teaches us to be safe from the *Apathya* (unsuitable) foods.

As far as the concept of vegetarianism is concerned, India always has been the land of non-violence, a large part of the population here has been traditionally vegetarian. The Indian culinary tradition always boasts of having a wide array of more pleasing vegetarian recipes when compared to non-vegetarian food. The non-vegetarian diet is not categorically condemned by Ayurveda, which also acknowledges that each person's dietary requirements might differ depending on their constitution (Prakriti) and any existing imbalances (Vikriti). When a non-veg. eating person is willing to become vegetarian at some stage in life, a slow transition is suggested instead of sudden withdrawal. One of the main reasons behind

Ayurveda's support of the vegetarian diet is its ability to get digested easily. 'We are what we eat' and 'the energy of the cook's mood gets transferred to food' are concepts that require much deliberation.

The concerns that drive a person to adopt vegetarianism may be listed as Ethical concerns (concerns about animal welfare), Environmental impact (vegetarian diets tend to have a lower carbon footprint), Health benefits (vegetarian diet may be associated with a reduced risk of certain diseases) and Religious or Cultural concerns, etc.

Vegetarian diets come in a variety of forms, including the **lacto-ovo vegetarian** diet which combines plant-based foods with dairy and egg products. Eggs are not allowed on the **lacto-vegetarian** diet, but dairy products are. The **ovo-vegetarian** contains eggs but does not include dairy items. **Vegans** abstain from consuming any animal products, such as meat, dairy, eggs, and occasionally even honey. They only consume meals that are derived from plants.

Vegetarianism and Ayurveda are closely related since they both place a strong emphasis on harmony, balance, and overall health. The Ayurvedic medical system views nutrition as a crucial element in preserving health and preventing disease. Ayurveda views food as a medicine that can affect the body, mind, and soul in addition to being a source of nutrients. Some of the common aspirations of Ayurveda and Vegetarianism may be sequenced as under:

- **Ahimsa (Non-violence):** a compassionate approach that includes avoiding harm to animals
- **Sattvic diet:** it is considered the most conducive to promoting clarity, harmony, and spiritual growth.

- **Digestive Health:** balanced and properly prepared food is considered to be easily digestible and supportive of good digestive health.
- **Healing Properties of Plants:** many foods are valued for their medicinal properties and ability to support the body's natural healing processes.
- A vegetarian diet can also be tailored to balance the three doshas (Vata, Pitta, and Kapha).

Check-back Questions
1. What are the three doshas mentioned by Ayurveda?
2. Mention some qualities of vegetarian foods.

1.9 LET US SUM UP

We have stressed the hygiene practices to be maintained by food handlers. The understanding of the utmost priority the food industry has to offer to personal hygiene, food hygiene, and environment hygiene is a key attribute any kitchen personnel should possess.

Appreciating the use of kitchen uniforms and taking pride in wearing them marks the beginning of an impressive career in food production operations.

Since the kitchen is a place where a worker is exposed to potential hazards and the workflow and work pressure may create situations that are prone to accidents, we must pay a great deal of attention to the safety procedures all the time.

Later, we moved on to develop an understanding of the versatile operations and aspects of food production as an industry. While learning to work in professional kitchens, a budding hospitality person should also assimilate the knowledge about the progress that the world's traditional and modern cookery has made. In continuation, Indian culinary history is also a vast and diversified field and today Indian cuisine features one of the most popular cuisines around the world. India has given Ayurveda to the world and an increasing shift towards vegetarianism is a reflection of changing and adaptive mindset of the consumers.

REVIEW QUESTIONS

MULTIPLE CHOICE QUESTIONS [MCQS]

1. Which of the following is Not a type of biological contamination:

a) Bacteria
b) Virus
c) Fungus
d) Pesticides

2. The term *Toque Blanche* means:

a) Chef's trousers
b) Shoes
c) Chef's Cap
d) Chef's coat

3. Which of the following is Not a set of factors that may cause injuries:

a) Slips, trips, and falls
b) The frequent Hand wash procedure
c) Repetitive strain injuries
d) Stress and fatigue

4. Which among the following is Not a class of traditional Western cookery:

a) Cuisine Classique
b) Nouvelle Cuisine
c) Haute Cuisine
d) Molecular Cuisine

5. The Tridoshas mentioned in Ayurveda are:

a) Kapha, Yagna and Janeu
b) Kapha, Vata and Pitta
c) Vata, Pitta and Prastar
d) Yagna, Magna and Manah

FILL IN THE BLANKS

1. The main purpose of wearing the _____ is to absorb facial perspiration.
2. The '_____' temperature range is 50 C to 630 C.
3. _____refers to conditions and practices that help to maintain health and prevent the spread of diseases.
4. Professional kitchens are_____ designed. [choose from these options – ergonomically/quickly/grammarly]
5. Ayurveda is the union of two words: _____ and _____.

TRUE OR FALSE

1. Indian cuisine is famous for its use of aromatic spices.
2. Nouvelle Cuisine succeeded the Cuisine Classique.
3. A blunt knife easily cuts the vegetables in uniform shapes.
4. Repetitive tasks performed at a fast pace may cause aches and stiffness in muscles.
5. Temperature does not play any role in the growth of bacteria.

SHORT ANSWER TYPE QUESTIONS

1. List the different parts of the Chef's attire.
2. Write a note on 'taking pride in being a chef and being a hotelier'.
3. Define Hygiene. What is the importance of Hand- wash procedure?
4. List any five types of bacteria that cause food poisoning.
5. List any five popular Indian dishes with their respective cuisines.

LONG ANSWER TYPE QUESTIONS

1. Explain the different types of contamination that may spoil food, and what are the various ways to prevent them.

2. Write an essay on safety in handling kitchen equipment, focusing on the dos and Don'ts for food handlers.
3. 'Indian food heritage is a mixture of art and science and is exceptionally vast and diverse', detail and explain this sentence.
4. Write an essay on the importance of Ayurvedic principles for healthy living.
5. How has the popularity of cookery shows changed food trends globally? Explain with examples.

ACTIVITY

1. Students are to be divided into small groups, and the groups after visiting a five-star hotel in the area; are to submit a report on 'safety procedures followed in the hotel kitchens'.
2. Students will be given a task to create a timeline about 'key changes & major developments in Indian Culinary History'.

CASE STUDY

Aniket is an enthusiastic student. He aspires to be a culinary professional. While attending the lecture on Indian Culinary History, Aniket noted down many interesting facts in his notebook while the teacher was showcasing the fascinating journey of Indian cuisine. He was spellbound by knowing that the history of Indian food is a true example of the fusion of age-old customs, cross-cultural influences, and culinary inventiveness that continues to mesmerize and inspire people all over the world. The lecture was indeed a joyride to history, and as it is always said that 'history is sociology in making'; the students in the class were able to view that sociological development through the glasses of culinary-delight. There were mentions of food customs traveling to India via invasions, travel, trade, religions, etc.

Later in the evening when Aniket was going through his day's work in the notebook, he felt quite perplexed after paying further attention to some of the mentioned points from the lecture. The dilemma and Aniket's thoughts are summarized here:

- The tomato sauce in Portuguese cuisine and makhni gravy in India are significantly different as far as their tastes and uses are concerned. The *mathania mirch* (used in laal maas from Rajasthan) was brought from Mexico, Mexican cuisine also has lamb and pepper recipes; despite the similarities of main ingredients, the resultant dishes are having distinctiveness of culinary heritage.
  While the ingredients could travel and were accepted at the new place, why not all the recipes were accepted in their original forms?
- Help in solving Aniket's dilemma by answering the following questions (also site necessary examples):
- When an ingredient or recipe travels to a new place, how do the local conditions/ people's palates influence it?
- What are the factors responsible for the development of a regional cuisine?

OPEN BOOK QUESTIONS

1. Explain the importance of each part of the Chef's Uniform.
2. Name the different bacteria that cause food poisoning, and also mention the specific conditions promoting their growth.
3. What are the general things to be kept in mind to ensure safety while working with kitchen equipment?

ANNEXURE

JOB HAZARD ANALYSIS AND RISK ASSESSMENT – KITCHENS						
Sr. No.	**Job Title**	**Sequence of events or specific job task**	**Potential hazard**	**Body parts exposed to the potential hazard**	**Level of Hazard** Critical (C) High (H) Moderate (M) Low (L)	**Risk Control Methods**
1.	CUTTING	Cutting vegetables/ meat/fish/ poultry	Fingers may get cut	Fingers	H	• Training. • Keeping knife blades sharp. • Proper storing of sharp knives after use. • Always using a cutting board.
2.	COOKING	Boiling water	Burn injury from spillage	Any body part	C	• Training • Heat resistant gloves, aprons to be provided. • Wipe up spills immediately. • Keep cold cream in first aid box and apply immediately
		Operational electric points	Electrocution	Any body part	C	• Students & staff training to check equipment before use and to report any defective plugs, discoloured sockets or damaged cable and equipment. • Plugs, sockets etc to be suitable for kitchen environment. • Access to fuse box kept clear. • Ensuring equipment is unplugged before touching the blades.

		Cooking	Dehydration from exposure to heat	All body part	H	• Providing well ventilated working area. Air conditioning wherever possible.
		Stirring	Muscular strain	Hand, wrist & shoulder.	H	• Using stirrer with long handle.
		Usage of utensils	Burn injury from hot utensils	All body parts	M	• Providing heat proof cloth when lifting hot utensils. • Providing heat resistant pan handles. • Using pot and pans of adequate size. • Keep cold cream in first aid box and apply immediately
		Standing continuously	Muscular strain	Legs, back	M	• Task rotation for repetitive work. • Taking regular rest breaks.
3.	GRINDING	Continuous Standing	Muscular fatigue	Wrist & shoulders, legs, back	M	• Task rotation for repetitive work. • Taking regular rest breaks.
		Putting pulses/ spice to grind	Caught in between	Hands, Fingers	M	• Unplugging grinder when adding or removing pulses/ spices. • Regular maintenance of the grinding machine.
		Taking out the batter from the grinder	Caught in between	Fingers	M	• Unplug grinder when removing the batter.
		Switching on and switching off the grinding machine	Electrocution	Entire body	M	• Students & staff training to check equipment before use and to report any defective plugs, discoloured sockets or damaged cable and equipment. • Plugs, sockets etc to be suitable for kitchen environment. • Access to fuse box kept clear.

4.	GRATING	Grating of coconut	Nipping of fingers while grating coconut on the grating machine	Fingers	M	• Training. • Plugging off when putting coconut in the grater. • Regular maintenance of the grater.
		Switching on and switching off of the grating machine	Electrocution	Entire body	M	• Students & staff training to check equipment before use and to report any defective plugs, discoloured sockets or damaged cable and equipment. • Plugs, sockets etc to be suitable for kitchen environment. • Access to fuse box kept clear.
		Continuous standing	Muscular fatigue	Legs, Back	L	• Task rotation for repetitive work • Taking regular rest breaks. • Changing position.
5.	USE OF OVERHEAD SALAMAND-ER	Switching on and switching off the grinding machine	Electrocution	Entire Body	M	• Students & staff training to check equipment before use and to report any defective plugs, discoloured sockets or damaged cable and equipment. • Plugs, sockets etc to be suitable for kitchen environment. • Access to fuse box kept clear.
		Operating the Salamander	Heat generated from the salamander causes constant sweating and fatigue	Entire Body	H	• Providing well ventilated and air conditioned working area. • Regular maintenance of ventilation system.

		Standing for long hours	Muscular Strain	Legs, Back	L	• Task rotation for repetitive work. • Taking regular rest breaks. • Changing position.
		Keeping in or taking out items from the Salamander	Burn injuries	Hand, Fingers	H	• Training. • Wearing Heat resistant gloves, aprons.
6.	CHAR GRILLING	Working on the charcoal grill	Burn Injuries	Upper body parts	H	• Using tongs to place and remove food.
		Exposure to continuous heat from the charcoal	Dehydration fatigue	Entire Body	H	• Providing well ventilated and air conditioned working area
		Standing for long hours	Muscular body	Legs, Back	L	• Task rotation for repetitive work. • Taking regular rest breaks. • Changing positions.
7.	FRYING	Spillage of the hot oil	Burn Injuries	Upper body part	C	• Cleaning spillage immediately.
		Exposure to continuous heat from the hot oil	Dehydration fatigue	Entire Body	C	• Providing ventilation. • Providing protective gloves, aprons and footwear.
		Standing for long hours	Muscular Strain	Legs, Back	L	• Task rotation for repetitive work • Taking regular rest breaks. • Changing positions.
8.	SLICING	Slicing cold cuts/meat	Cut injuries due to the slicing machine	Hand	C	• Training. • Students & staff to check equipment before use and to report any defective plugs, discoloured sockets or damaged cable and equipment. • Blades to be protected by interlocked guard. • Maintenance of slicer.

9.	BAKING	Placing and taking out the items from the oven	Burn injuries	Hand, Fingers	C	• Used long gauntlet gloves to protect forearms.
		Working with the bakery	Muscular Stress	Entire Body	C	• Taking breaks and task rotation. • Changing position. • Use trolleys or smaller trays.
		Standing for long hours	Muscular stress	Legs, Back	L	• Task rotation for repetitive work. • Taking regular rest breaks. • Changing positions.
		Cutting and shaping cakes and pastries	Cut injuries	Hand, fingers	L	• Training. • Using sharp cake cutters/knives.
10.	GENERAL	Lifting tubs and large utensils	Muscular strain, crush injuries	Legs, back, shoulder, feet	M	• Using trolleys. • Modifying the load by using smaller loads. • Training.
		Walking through wet floors	Slip and fall	Entire body	H	• Spills cleaned immediately. • Good lighting. • Wearing slip resistant footwear. • Providing slip resistance flooring. • Providing visible signs warning of slippery floors.
		Hand washing of Utensils (Pot Washing)	Direct contact with detergents	Hands	M	• Wearing protective gloves with rough surfaces. • Using washing brushes with long handles to clean big pots with minimal bending. • Using water sprinkler to wash huge and heavy pots to avoid holding them under the water flow.

		Handling the electric panel of dishwashing machine and burnishing machine	Electrocution	Entire body	H	• Training • Students & staff training to check equipment before use and to report any defective plugs, discoloured sockets or damaged cable and equipment. • Access to fuse box kept clear.
		Washing of utensils in the machine	Caught in between	Crush injury	H	• Unplugging dishwasher when placing and removing dishes in the machine. • Regularly checks of machinery guards before use.
		Walking through crowded cooking activities	Hit on the sharp edges burn injuries	Any body part	H	• Providing well lit areas. • Slip resistant flooring. • Wearing slip resistant footwear.

2

Chapter

ORGANIZATION STRUCTURE OF MODERN KITCHENS AND AIMS & OBJECTS OF COOKING FOOD

OVERVIEW

Why is Foundation Course in Food Production essential in the hospitality world? Becoming a chef is a career-long process. Cooking is a dynamic profession - one that provides some of the greatest challenges as well as some of the greatest rewards. Learners will be exposed to the required international standard by inculcating the required set of knowledge skills and mindset which assists them both on professional and personal front. It teaches many 'tricks of the trade' and will fuel a desire in students to take up kitchen operations as an exciting career.

Keeping in mind the growing demand for educated manpower in the culinary world, the module will focus on an introduction to culinary arts with emphasis on the basics of French Cuisine, essential commodities, culinary techniques, equipment, and processes.

Learning Objectives

Organization Structure of Modern Kitchens and Aims & Objects of Cooking Food

S.NO.	Sub Unit	Learning Topics	Key learning Objectives / At the end of the sub-unit, the learners will be able to:
1	**Classical Kitchen Brigade & Modern Staffing**	• Introduction • The Concept • The basis of kitchen organization • The Kitchen Brigade (hierarchy) • Duties and Responsibilities of Various Chefs • Coordination with other departments	1. Describe the concept of the Kitchen brigade. 2. List the basis of staffing. 3. Draw and explain the Kitchen Brigade (hierarchy) 4. List the duties and responsibilities of various chefs. 5. Explain the coordination between the kitchen and other departments of the Hotel.
2	**Professional Ethics and Etiquette in the Workplace**	• Attitude and behavior in the kitchen.	1. Explain the attitude and behavior to be displayed while working in the kitchen. 2. Narrate the importance of a positive attitude required in the workplace. 3. Recognize a full range of skills required in the workplace. 4. Recall a good understanding of the basics.

3	**Aims of cooking (Including senses through food)**	• What is Cooking? • Aims of Cooking. • Objectives of Cooking. • Sensory characteristics of food.	1. Define what is cooking. 2. List and explain the different aims of cooking. 3. List and explain different objectives of cooking. 4. Comprehend different sensory characteristics of food.
4	**Outcomes of the cooking process, Techniques used in cooking**	• Texture • Techniques used in cooking • Preparation of ingredients (Mise-en-place) • Techniques Used in Cooking and Baking	1. Recognize different textures of food. 2. Identify the different textures and explain. 3. Categorize different Mise-en-place for different preparations and planning and organizing it accordingly. 4. List different techniques involved in food preparation.
5	**Basic Principles of Safety Precautions**	• Safety • The safe workplace • Basic rules of kitchen safety	1. Elaborate on the concept of safety in the kitchen. 2. Recognize the good practices for developing a safe workplace. 3. List and explain the different basic rules of kitchen safety.
6	**Waste Segregation**	• The concept. • The Basics of Kitchen Waste Segregation and Management. • What is Waste Segregation? • Segregating Kitchen Waste. • How to Handle Kitchen Waste Segregation Efficiently? • What You Can Do as a Restaurant Owner?	1. Elaborate on the concept of waste generation in a kitchen. 2. Recognize the basics of kitchen waste segregation and management. 3. Comprehends how to handle kitchen waste efficiently and effectively. 4. Defend the waste as a restaurant operator.
2.0: ROLE OF INGREDIENTS			
1	**Fats & Oils (Shortenings)**	• Introduction to fats. • Types of Fats. • Storage of Fats • Introduction to oils. • History • Facts • Usage • The most commonly used oil • Difference between Fats and Oils. • Hydrogenation of fats • Rendering of fat	1. Describe the difference between Fats and Oils. 2. Discuss the types and storage of Fats and Oils. 3. Elaborate on the concept of Hydrogenation and the Rendering of Fats.

2	**Raising Agents**	• What is a Raising Agent? • Types of Raising Agents.	1. Define raising agents 2. Narrate the function of different types of raising agents used in food production.
3	**Flour – All-purpose, Whole wheat, Multigrain, millet, Gluten-free.**	• Wheat flour • Wheat varieties • Composition of wheat • Milling of wheat • Composition of flour • Types of flour	1. Explain what is wheat flour. 2. List the varieties of wheat 3. Draw and identify different parts of wheat grain. 4. List the different constituents of flour. 5. Discuss different types of flour.
4	**Sugar – Importance, Types, Cooking Stages**	• Introduction. • Sugar and sugar products. • The properties and cooking sugar. • Different stages of cooking sugar.	1. Describe different types of Sugar and sugar products used in food preparation. 2. Discuss various properties of cooking sugar. 3. Narrate the different stages of cooking sugar.
5	**Water –pH, Application in cooking, as a commodity**	• Introduction • Importance • What is the p H of water? • The importance of water in cooking	1. Recall the importance of water in cooking. 2. Describe the p H of water 3. Narrate the importance of water in cooking with proper examples.

1.1: CLASSICAL BRIGADE & MODERN STAFFING, DUTIES AND RESPONSIBILITIES OF VARIOUS CHEFS IN CATERING ESTABLISHMENTS.

1.1.1 Introduction

The kitchen brigade system, known as the "brigade de cuisine" was instituted by the legendary French Royal Chef Escoffier, a protégé of Marie-Antoine Carême, the father of French cooking, who became famous for modernizing and simplifying the French cuisine codified by his mentor. It is a framework for hiring and organizing restaurant kitchen staff to maximize efficiency. In the system, everyone has a specific and useful role, which helps the kitchen run like a well-oiled machine. It served to eliminate the chaos and duplication of effort that could result when workers did not have clear-cut responsibilities. Under this system, each position has a station and defined responsibilities, outlined below. In smaller operations, the classic system is generally abbreviated and responsibilities are organized to make the best use of workspace and talents. A shortage of skilled personnel has also made modifications in the brigade system necessary. The introduction of new equipment has helped to alleviate some of the problems associated with smaller kitchen staff.

1.1.2 The Concept

One of the definitions of a business organization is an arrangement of people in a job to accomplish the goals of the operation. Similarly, the organizational structure of the Kitchen staff will reflect the needs of the operation, the job functions, and the various goals. Food Production organizations vary according to the needs of the enterprise's design.

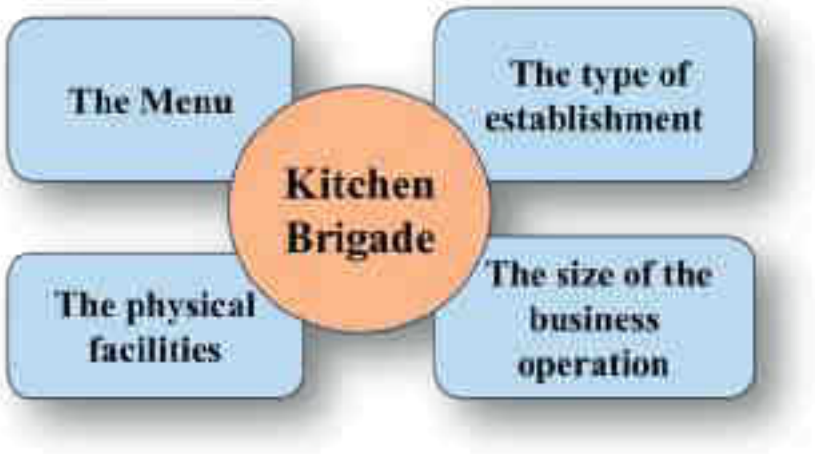
> "If you can organise your kitchen, you can organise your life." — Louis Parrish

The classical (continental) organization of a Kitchen varies widely, but commonly in such an organization a Chef de Cuisine (Exec. Chef) is in charge and a Sous Chef (under Chef) supervises the kitchen and the heads of the various departments or section (Chef de Parties). Under these Chefs are Assistant Cooks (Demi Chefs), Commis, and other workers.

Of the several categories of organization, the Kitchen is an example of a Line Organization. (A Line Organization is one in which authority and responsibility flow down from the top (Exec. Chef) through the various positions to the last position of the operation). There can be no jump of authority or responsibility. If the top man gives an order it runs down the ranks until it is delegated to the proper level. Every job even the lowest, in a line organization has a certain amount of responsibility.

Naturally, as one goes higher in the line organization the responsibility becomes greater. In a line organization, the top position holds full responsibility for everything that happens in the organization.

1.1.3 The Basis of the Kitchen Organisation



The purpose of kitchen organization is to assign or allocate tasks so they can be done efficiently and properly and so all workers know what their responsibilities are. The way a kitchen is organized depends on several factors.

1. **The menu**: The kinds of dishes to be produced determine the jobs that need to be done. The menu is, in fact, the basis of the entire operation. Because of its importance, we devote a whole chapter to a study of the menu.

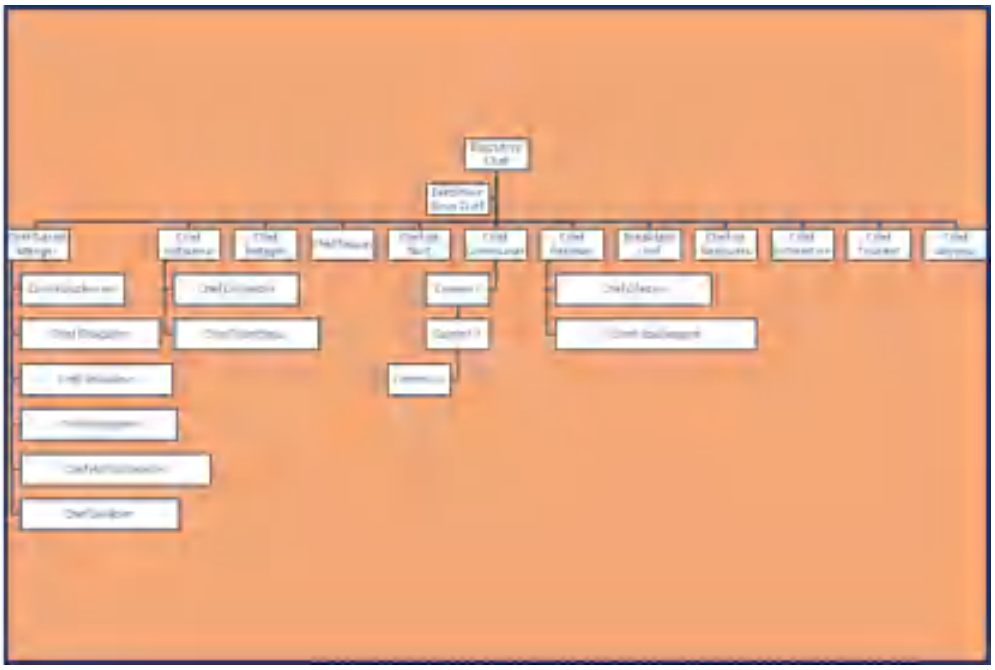
2. **The type of establishment**: The major types of food service establishments are as follows:
   - Hotels
   - Institutional kitchens
     - Schools
     - Hospitals,
     - nursing homes,
     - other health-care institutions
     - Employee lunchrooms
     - Airline catering
     - Military food service
     - Correctional institutions
   - Catering and banquet services
   - Fast-food restaurants
   - Carry-out or take-out food facilities
   - Full-service restaurants
3. **The size of the operation (the number of customers and the volume of food served).**
4. **The physical facilities, including the equipment in use.**

1.1.4 The Kitchen Brigade (hierarchy)

Like a general is the head of the army, an executive chef is the head of the kitchen in a restaurant. According to the kitchen brigade system, the chef de cuisine is second-in-command to the executive chef. However, sometimes restaurants will have either an executive chef OR a chef de cuisine, rather than both positions. Below the chef de cuisine is the sous chef de cuisine (colloquially known as the sous chef).

Stations or **Parti system**s are a signature of the brigade system. Partie is a French word meaning "part (of a whole) or section." A Partie system is one in which an operation's space equipment and jobs are divided up into sections. The Partie system for chefs evolved in the Escoffier era from an analysis of the tasks needed for production and then a grouping of those tasks to maximize production speed and efficiency. The original system lasted up to the 1930s and was designed primarily for large restaurants, especially those in major hotels providing extensive **à la carte** and **table d'hôte** menus in the classic French tradition. As the task of the professional kitchen came to involve serving more customers in more and different ways, its organization inevitably became more complex. Highly elaborate dishes required highly specialized experts rather than general chefs who must handle all types of cookery at once.

The system has several types of chefs de cuisine, also known as **line cooks**, that oversee each station in the brigade system. Their specific duties, and titles, depend on their stations. In the traditional brigade system, line cooks have junior chefs working with them. Junior chefs help execute orders at the stations to which they're assigned. So the commis chef to the poissonnier would help their boss prepare fish dishes, while the commis chef to the saucier would help make sauces. Depending on the above factors the classical kitchen brigade can be fabricated as follows:



1.1.5 Duties and Responsibilities of various chefs

Chef de cuisine (head chef): The Chef de Cuisine in the large establishment is much more a departmental manager than a working craftsman. He is selected for his organizing and executive abilities than for his culinary skill. Though he should have such skill and a large appreciation of fine cookery. His principle function is to plan, organize and supervise the work of the kitchen.

He prepares the menus for the management following the costing and catering policies laid down. He has full responsibility for staff, selection, and policy or major responsibility for staff, selection and dismissal in conjunction with the personnel department.

He will also be concerned with the planning and equipment of his kitchen. Thus the executive responsibilities for his Kitchen. Thus, the executive responsibilities of the Chef de Cuisine can be considered under the principal head.

- Food and food costs (through menu planning & ordering)
- Kitchen Staff
- Kitchen plant and equipment

Under his control, all three activities must be coordinated to produce goods efficiently and economically. His status is normally second only to the manager and he will expect complete control of his department.

In addition to the crafts skill and technical knowledge acquired as a result of an apprenticeship, technical training, and experience, the Chef's de Cuisine must additionally acquire managerial qualities and administrative knowledge, particularly regarding the organization of work, control of staff, the efficient use of machinery, costing and food control. He must be aware of modern development in manufacturing and processing food for his kitchen. Present trends indicate that the Chef must increasingly concern himself not only with cookery but with the quality of the food and the art of food presentation. In the widest sense. This calls for a degree of merchandising skill and on occasion showmanship. Hygiene is of top importance in the kitchen and there is hardly a better beginning than with the Chef's person.

A Chef de Cuisine must know French, Current affairs, commodities, and tools of his trade.

Sous Chef: Sous Chef or under-chef is the principal assistant of the Chef de Cuisine. In large establishments, the Sous Chef will have no sectional or partial responsibility but will aid the chef in his general administration and in particular in supervising the work of preparing food and overseeing its service at the (Pick up counter). Where a considerable kitchen operation is involved there may be more than one Sous Chef.

The Sous Chef acts as a Chef de Cuisine in the absence of the Chef. When the Chef de Cuisine is engaged at work within his office, i.e. occupied in Menu Planning, checking records figures, or in similar administrative routines, the Sous Chef directly supervises the practical kitchen activities.

The Sous chef directly supervises the food pick-up during meal service times and can make ad-hoc staff changes during the working day to relieve pressure.

In large establishments there can be as many as four to six Sous Chefs, particularly it is so when separate kitchens are set up for say Grill room, Restaurant, Banquet Service, specialty cuisines, etc.

Duties and responsibilities of executive Sous Chef:

- Supervises kitchen shift operations and ensures compliance with all Food & Beverage policies, standards, and procedures.
- Assists Executive Chef with all kitchen operations.
- Performs all duties of kitchen managers and associates as necessary.
- Recognizes superior quality products, presentations, and flavor.
- Maintains purchasing, receiving, and food storage standards.
- Ensures compliance with food handling and sanitation standards.
- Calculates accurate theoretical and weighted food costs.
- Estimates daily production needs every week and communicates production needs to kitchen personnel daily.
- Coordinates banquet production with Banquet Chef.
- Supports procedures for food & beverage portion and waste controls.

- Assists in maintaining associate cafeteria operation and food quality standards.
- Follows proper handling and the right temperature of all food products.
- Knows and implements Hotel Hygiene Standards.
- Helps the Executive Chef Research and test new food products in conjunction with company initiatives.
- Assists the Executive Chef with maintaining all standard recipes.
- Participates in training the Restaurant and Catering staff on menu items including ingredients, preparation methods, and unique tastes.
- Operates and maintains all department equipment and reports malfunctions.
- Assists with an effective kitchen equipment repair and maintenance program.
- Orders associate uniforms according to budget and ensures uniforms are properly inventoried and maintained.
- Purchases appropriate supplies and manage inventories according to budget.
- Reviews staffing levels to ensure that guest service, operational needs, and financial objectives are met.
- Interacts with guests/customers, community, Company representatives, vendors, and local education systems as needed.
- Trains associates in safety procedures and supervises their ability to follow loss prevention policies to prevent accidents and control costs.

Effectively investigates reports and follows up on associated accidents.

Chef de partie: The Chef de partie is a working cook in charge of a clearly defined section of activities within the kitchen. The Chef de Partie particularly of the sauce and Grade manager may have the status and duties of a Sous Chef in addition to sectional responsibilities.

All the Chef de Parties may be regarded as supervisors or foremen of their sections as well as skilled craftsmen. The full brigade has stations for every type of food preparation method needed in the kitchen.

Job Description of Demi Chef De Parti

- Cooking and presentation as per the standardized recipes
- Allocation of work
- Checking mis-en-place on quality and quantity
- Control wastage
- Maintain quality
- Innovate new dishes
- Maintain discipline and grooming of staff
- To Maintain Hygiene and sanitation
- Portion control
- Storage of food and provisions
- Raw material quality check

- Allot duties to commis
- Control over production and wastage.
- Adhering to HACCP
- Enabling and adhering to the principles and work practices detailed under the HACCP System in the department viz., Food Safety, Hygiene and Cleanliness, Health, Storage, etc as applicable to the area of your workplace.

Chef garde manger: The Chef Grade manger is incharge of the larder. The larder is not only a place where food is steamed but also a place where the raw materials of cookery are prepared and dressed.

In larger establishments larder work may be broken into sections and in one or two instances, the sub-sections may have independence of the Chef Garde manger, i.e. Boucherie might be directly controlled by the Chef De Cuisine or Sous Chef.

This is rarely true in smaller establishments, the sub-sections within the Grade manger will both indicate the wide range of this Chef de Parties duties and explain why he enjoys a status in the Kitchen brigade comparable to that of the Chef Saucier.

The Chef Grade manger is normally accommodated adjoining the main kitchen but will have its cooking facilities. According to the size of the establishment, its sub-section too will be separate to a greater or smaller extent. This also incorporates an Hors-d'oeuvre section and a salad room, sometimes a fruit room where such items as melons, grapefruit, fruit salad, etc. are prepared. There is a great deal of work organization and careful distribution of work to be carried out. Chef grade manger caters to such dishes as those commonly found on a cold table and comprises not only cold dishes and salads. Sandwiches are his responsibility except for sale of the hot or toasted sandwiches such as club sandwiches (Chef Rotisseur). Mayonnaise, vinaigrette sauce, and other dressings and sauces for cold food are made by the Chef grade manger.

Job description of chef garde manger

Picture Courtesy Google

- Performs all duties of Culinary and related kitchen area associates to train new associates and step in and assist during high-demand times.
- Supervises daily shift operations and oversees production and preparation of culinary items.
- Opens and closes kitchen shifts and ensures completion of assigned duties.
- Maintains food handling and sanitation standards.
- Works with Restaurant and Banquet departments to coordinate service and timing of events and meals.
- Assists with developing menus and promotions.
- Operates all department equipment as necessary and reports malfunctions.
- Purchases appropriate supplies and manages food and supply inventories according to budget.
- Supervises staffing levels to ensure that guest service, operational needs, and financial objectives are met.
- Understands and implements Marriott's 30 Point Safety Standards.
- Develops railroad-cleaning schedules for associates; ensures associates follow cleaning schedules and keep their work areas clean and sanitary.
- Ensures all associates have proper supplies, equipment, and uniforms.
- Communicates areas in need of attention to staff and follows up to ensure follow-through.
- Helps train associates in safety procedures and supervises their ability to execute departmental and hotel emergency procedures.
- Participates as needed in the investigation of associate accidents.
- Understands and complies with loss prevention policies and procedures.
- Performs other duties as assigned to meet business needs.

Boucherie (butcher shop): Boucherie in hotels differs in many important regards from that of retail trade. It includes the dissecting of quarters of beef and carcasses of lamb etc. It will also include the dressing of meat either for joints such as contre filet or small cuts like noisettes, cotelettes, or tournedos, etc.

Charcutier (Pork Butcher and Sausage maker): Charcutier involves Pork butcher, the preparation of Pork products and sausage, etc. He is also responsible for the rendering and clarifying of dripping. Again, the extent to which the Charcutier work is separated from the staff of the Grade Manger depends on the volume of work.

Volailleur (Poulterer): Where there is an extremely large establishment, the Poulterer who is responsible for the plucking cleaning, and dressing not only of the poultry but game birds, hares, and rabbits may be separated from the fish monger and the larder proper.

Poissoner (Fishmonger): The hotel fishmonger prepares fish not in the style of the tradesman, in retail trade for he must have the raw materials ready for the immediate attention of the appropriate Chef, either for the Chef Piossoner or in some instances for cold dishes for Chef Grade Manger. A wide range of products of sea, river, and lake will normally come to him for treatment which includes skinning, filleting, and portioning. Fish, such as eel, oysters, lobsters, and crabs will demand his attention as well as the ordinary range of river, sea, and shellfish.

Hord d'oeuvrier (Hors d' oeuvre cook): Where work justifies it, the preparation of Hors d' oeuvre of all kinds is organized separately. The dishes for this section can be great and involve the regular preparation of commodities e.g. preparation of dressings, varieties of vegetable salads (Potato, Russian), and varieties of meat and fish dishes found on the Hors d' oeuvre is often entrusted not only to a Chef Hors d'oeuvrier and assistant of Chef Grade Manger but to semi-skilled hands, often women workers trained only in assembling prepared material and in decorating dishes.

Sladier (Salad Maker): The person responsible for the preparatory work and assembling of salads usually works in the Grade manger.

Chef de nuit: Night duty cook is a chef whose main duties are to take over when the main kitchen staff leave. A separate Chef de Nuit may be retained in the Grade manger but

normally one person suffices. Night duty cook does not necessarily remain on duty throughout the night but only until such time, the late meals have ceased.

The duties of Chef de Nuit are sometimes carried out by a Sous Chef. The Sous Chef is present for the service of dinner but not lunch and is responsible for all the work when the normal brigade has gone off duty. This system is used in 75% of places where late service is given. Sous Chef must make sure that he has all the necessary facilities and that the correct mis-en-place is left by Chef de Partie before they go off duty.

Chef potager (Soup Cook): The Chef's importance within the kitchen is also supported by the fact that the repertory of soups including Consommé, Crèmes and Veloutés, Purées, Broth / Bouillon, Bisque, and many specialties and natural flavoring essences and garnish in hundreds of ways, besides all basic stocks, are prepared by him.

Chef potager can be supplied by other parties with some of the garnishes required. For example, he receives material not only from the Grade Manger but for consommé célestine, who receives pancakes from Chef Entremetier. He receives stocks from the Chef Poissoner for fish and other ordinary tools, particularly producing vegetables of a wide variety of shapes and sizes. Like all cooks, a cultivated palate is an important requirement for adjustment.

Chef saucier (Sauce Cook): He prepares all fundamental sauces i.e. Béchamel, Tomato sauce, and Velouté. He prepares all light and heavy Entrées for example vol-au-vent (light entrée). Heavy entrée (Steaks) i.e. meat, poultry, and game dishes that are not roasted or grilled.

It is difficult to differentiate between the duties of Chef Saucier and that of Chef Rotisseur. The Saucier prepares the poêlage (poeling), Stews, Braised, Boiled, and Sauted dishes which approximates a roasting process.

He is considered to be the senior Chef de Partie and normally takes over the responsibility of the Sous Chef when absent. He requires knowledge because his work covers an extensive variety of dishes and specialty sauces.

Chef communar (Staff/Cafeteria Cook): The staff cook provides the meals for the employees who use the staff room for the wage-earning staff and includes uniformed and maintenance staff, chambermaids, waiters, lower grade clerical staff, etc. Catering of this nature should be influenced by nutritional factors.

Chef entremtier (Vegetable Cook): The Entremet course is, on the modern menu, the sweet, which is the responsibility of the Chef Patissier and not the Chef Entremetier. Traditionally, an important Entremet course on the traditional menu in France was however the entremet de legumes when skillfully prepared and cooked vegetables were presented on a dish apart. An entremet was originally something sent to the table between the courses and this practice still survives in France as far as vegetables are concerned.

The Entremetier, therefore, is concerned mainly with the following things :

- All vegetable dishes
- All potato dishes other than deep fried
- All egg dishes
- All farinaceous dishes

***In some circumstances, it is not possible to employ a Chef Potager, therefore, Chef Entremetier prepares all soups.**

Chef du petit déjeuner (Breakfast cook): The cooking and service of breakfast are commonly entrusted to a specialty cook whose range is limited o the needs of breakfast. He does not rank as a full Chef de Partie but needs to be of good skill. He works alone with a Commis and partners. After the breakfast preparation, he attaches himself to the roast section. Here he prepares mis-en-place and continues cooking roasts and grill for late service lunch when the Chef de Partie and staff go off.

The mis-en-place for breakfast including the boning and slicing of bacon and preparation for the various types of fish eaten at breakfast time, was carried out in advance by a subordinate of Grade Manger and semi-skilled assistants in the patisserie. The breakfast cooks and helpers are left with the simple tasks of assembling and cooking breakfast dishes.

Toasts and beverages are the responsibility of the Still Room.

Chef rôtisseur (Roast cook): This is a very responsible section. The finest roast cooks are English as roasting has always been renowned in England as a specialization. Roasts are very popular. This party is responsible for deep–frying foods of all kinds, including fried potatoes and the Rôtisseur may have an assistant le friturier (Frying cook) for the task.

Chef Rôtisseur is responsible for savories such as Welsh Rarebit and Hot Sandwiches (Club Sandwich types). This corner is also occupied with the preparation of stock for gravies which accompany the roasts and other dishes.

Picture Courtesy Google

Foods to be roasted cover a wide range of poultry, game, and meat including the baking or pies, the joints of poultry and game to be cooked by the Rotisseur are given the basic preparatory treatment (plucking, preparation, etc.) for the oven in the larder by the butcher or poulterer. Sometimes commis from the roast corner may help the larder for clearing the trussing of poultry of dissection trimming and trying of joints of butcher's meat. The roast corner is located in the main stove section and all the necessary cooking apparatus for roasting, and deep frying for the finishing of savories under the salamander are grouped and make this section the hottest. Some dishes are identical basically, but different methods of handling are employed therefore they are sometimes done by Rotisseur and sometimes by the saucier.

- In short, the duties of a roast cook are :
- Responsible for roasting poultry and game feathered and furred.
- Responsible for all deep-fried dishes, Pommes Frites, pont- neuf, etc.
- Responsible for all deep-fried fish dishes.
- Mis-en-place e.f. if separate grilled pommes pailles mut be prepared by Rotisseur. These are used as garnish on certain grills.
- Savories e.g. Oyster rolled in bacon grilled on a skewer, Welsh rarebit.

Certain types of savories, scotch wood cock, and scrambled eggs, are prepared by the entremetier but it is completed and served at the last minute by the Rotisseur.

Trancheur (Craver): Chef Trancheur or carver may be under the control of the Rotisseur. Trancheur is killed only in carving not in cooking. He may operate only behind the scenes at the hotel service counter or may alternatively be stationed in the dining room and patrol the restaurant with a heated voiture (trolley).

Chef grillardin (Grill Cook)/ Chef savourier (Savoury Cook): The work of the grill cook is simply undertaken by a subordinate of the Chef Rotisseur.

Where a separate grillardin is set he might deal with the savories & combine the functions of grillardin with that of Savourier (Savoury Cook).

The grill cook is a semi-skilled specialty cook, his duties relative to those of other chefs are narrow but deal with grilling, using charcoal or more modern grills using electricity or gas. Experience and judgment are required for this job.

Chef Poissoner (Fish Cook): The Chef Poissonnier is responsible for the cooking, garnishing, and sauce-making for the fish courses except for deep-fried fish, the grilled fish have possibly been done by the grill cook.

Cleaning including scaling, skinning, fileting portioning, and breadcrumbing is the responsibility of the Chefs Grade Manger. The subordinate engaged in egg and crumbing is called in French the Panadier.

This chef is responsible for the cooking, garnishing, sauce making, and dishing of fish. Fish featuring freshwater fish, seawater fish, and shells like crab, crayfish, shrimps, lobster, and mussels.

Oysters are ordinarily served either direct from the fishmonger or a convenient cool place. If they are cooked, they are dished out direct from Chef Poissonier.

Methods of cooking fish include poaching, A la menuière, En poel, and elaborate dressings done by Chef Poissonnier.

Velouté de poisson is a fundamental sauce produced only by Poissonnier made froma roux and a Fond de poisson. Poissonnier is responsible for making stock and then Velouté, the fish bones are supplied by the Grade Manger.

He stores the sauces properly which are made in advance as precautions against food poisoning. The repertoire of fish dishes and their accompanying sauces requires great experience training and judgement from this Chef de Partie.

Chef de banquets (Banquet Chef): In large establishments, completely separate arrangements may be provided if not for the complete cooking of banquet and function meals at least for

their assembling and service. The Chef given responsibility for special service of the banquet may be known as Chef de Banquets.

Chef Patissier (Pastry chef): Chef Patissier has a different status but certainly not less than Chef Saucier and the Chef Garde Manger. The work of this department is normally separated from the main kitchen and is self-contained in the matter of cold stage, machinery, and equipment for making ice and with its own baking and cooking facilities.

Picture Courtesy Google

Chef Patissier is responsible for all hot and cold sweets, lunches, dinners, and functions and for pastries served at tea time or other occasions. He is also responsible for the making of pastes like short and puff pastry, frying batters, and making noodles and Italian pasta for supply to other corners of the Kitchen.

Sorbets and water ice-like items are made in the pastry section. The service of ice and these sweets which are based on ice cream are prepared and assembled in Patisserie. They include the sweet 'omelet au surprise' and 'souffle surprise', 'peach melba', 'Poire Helene', dipped fruits, etc.

The art of pastry includes work like colored sugars to make flower baskets and similar decorative centerpieces, work with fondant and icing sugar, gum pastes, the fashioning of praline into boxes, and decorative objects containing chocolates.

The work of the Patissier has always been highlighted by the beauty of the cold sweets and their accompaniments. Chef Patissier requires great skill, imagination, and experience. In big establishments, semi-skilled assistants will prepare fresh fruit salads for service not only at lunch and dinner but also at breakfast. The Chef Patissier is therefore like the Grade Manger, something like a Chef de Cuisine of a specialty kitchen, and in addition to his skills must coordinate and organize the work of several subordinates.

- **Boulangers (Baker)**:- He is a baker working under Chef Pattisier. He is responsible for all baked items bread rolls, bread, and breakfast rolls like croissants, brioches etc.
- **Glacier:** (He would be responsible for making various kinds of ice creams such as Bombes, Biscuits, Glaces, and many varieties of ice cream. He is one of the assistants of Chef Patissier.

(Junior Chef): Dependent on the Parties concerned the sectional Chef will be assisted by one or more trained cooks who have not yet reached full chef status. These assistants or commis should have completed their apprenticeship or training but will still be getting experience before taking full Parties responsibility. The first commis as the senior of the assistants is called, should be capable of taking charge when the Chef de Parties is off, and as second in command takes a considerable responsibility under his chef.

1.1.6. Coordination with other departments

The primary function of the food and beverage department is to provide food and drink to a hotel's guests. In earlier times, when an inn had a single dining room that could hold a limited number of guests, this was a fairly simple task. Today, however, providing food and drink is much more complicated. A large hotel might well have a coffee shop, a gourmet restaurant, a poolside snack bar, room service, two banquet halls, and ten function rooms where food and beverages are served. It might also have a lounge, a nightclub, and a lobby bar. On a busy day (or night), it's quite likely that functions will be booked in many outlets at the same time. In addition, some outlets may have multiple events scheduled for a single day. As you can see, there is great diversity in the types of activities performed by a food and beverage department, requiring a significant variety of skills on the part of its workers.

Because of the diversity of services provided, the food and beverage department is typically split into subunits/subdivisions. The executive chef, a person of considerable importance and authority in any full-service hotel, runs the food production, or kitchen, department. A variety of culinary specialists who are responsible for different aspects of food preparation report to the executive chef.

The actual serving of food in a large hotel's restaurants is usually the responsibility of a separate department, headed by the assistant food and beverage director. The food service department is composed of individual restaurant and outlet managers, maître d'hôtel (the head waiter of a restaurant), waiters, and waitresses.

Because of their special duties and concerns, many large hotels have a separate subunit that is responsible only for room service. Because of the high value and profit margins associated with the sale of alcoholic beverages, some hotels have a separate department that assumes responsibility for all outlets where alcoholic beverages are sold. The person responsible for this department is the beverage manager.

Most full-service hotels also do a considerable convention and catering business. The typical convention uses small function rooms for meetings and larger rooms for general sessions, trade shows, exhibits, and banquets. As a hotel or lodging business increases the use of its facilities for conventions and meetings, it may form a separate convention services department. The convention services department and its personnel are introduced to the client, a meeting planner, or an association executive by the marketing and sales department. The convention services department then handles all of the client's meeting and catering requirements. Individually catered events include parties, wedding receptions, business meetings, and other functions held by groups. To provide for the unique needs of these types of customers, hotels often organize separate catering and convention departments.

Depending on the size of the hotel, the job of cleaning the food and beverage outlets themselves as well as washing pots and pans, dishes, glasses, and utensils is often delegated to a subunit known as the stewarding department.

It is only through continuous cooperation and coordination that a hotel's food service function can be carried out effectively. A guest who is dining in a hotel restaurant requires the joint efforts of the kitchen, food service, beverage, and stewarding departments. A convention banquet cannot be held without the efforts of the convention and catering department along with the food production, beverage, and stewarding departments. The sequence of events and cooperation required among the food and beverage staff is even more important than in the rooms department, thus increasing the importance of communication between managers and employees alike. Another challenge faced by management is the diversity of the employees in the food and beverage department; the dishwasher in the stewarding department is at a dramatically different level than the sous chef in the kitchen.

Coordination is not as important an issue in the marketing and sales department, which is generally much smaller than the food and beverage department. The primary responsibility of the sales managers who make up the marketing and sales department is sales or the selling of the hotel facilities and services to individuals and groups. Sales managers sell rooms, food, and beverages to potential clients through advertising, attendance at association and conference meetings, and direct contacts.

In many hotels, the accounting department combines staff functions and line functions, or those functions directly responsible for servicing guests. Another dimension of the accounting department's responsibilities deals with various aspects of hotel operations, cost accounting, and cost control throughout the hotel. The two areas of central concern to the accounting department are rooms and food and beverage. The accounting department's front office cashier is responsible for tracking all charges to guest accounts.

The food and beverage department may be responsible for food preparation and service, but the accounting department is responsible for collecting revenues. The food and beverage controller and the food and beverage cashiers keep track of both the revenues and expenses of the food and beverage department. The food and beverage controller's job is to verify the accuracy and reasonableness of all food and beverage revenues.

Check Back Questions

1. **Is the classical system of organization developed by Escoffier the best one for all types of kitchens? Why so?**
2. **Explain the Parti System.**
3. **List the duties and responsibilities of the Sous Chef.**
4. **List the job description of Chef Garde Manger.**

1.2.1 Attitude and behavior in the kitchen

What does it take to be a good food service worker? The emphasis of food service education is on learning a set of skills. But in many ways, attitudes are more important than skills because a good attitude will help you not only learn skills but also persevere and overcome the many difficulties you will face. The successful food service worker follows an unwritten code of behavior and a set of attitudes we call professionalism. Let's look at some of the qualities a professional must have.

- **Positive attitude toward the job:** To be a good professional worker in the kitchen, you have to like cooking and want to do it well. Being serious about your work doesn't mean you can't enjoy it. But the enjoyment comes from the satisfaction of doing your job well and making everything run smoothly. Every experienced chef knows the stimulation of the rush. When it's the busiest time of the evening, the orders are coming in so fast you can hardly keep track of them, and every split-second counts—then, when everyone digs in and works together and everything clicks, there's real excitement in the air. But this excitement comes only when you work for it. A cook with a positive attitude works quickly, efficiently, neatly, and safely. Professionals have pride in their work and want to make sure it is something to be proud of. Pride in your work and your profession is important, but humility is important too, especially when you are starting. Sometimes new culinary school graduates arrive on the job thinking they know everything. Remember that learning to cook and learning to manage a kitchen is a lifelong process and that you are not yet qualified to be an executive chef. The importance of a professional attitude begins even before you start your first job. The standard advice for a successful job interview applies to cooks as well as to office professionals: Dress and behave not for the group you belong to but for the group you want to join. Arrive neat, clean, appropriately dressed, and on time. Get noticed for the right reasons. Carry this attitude through every day on the job.
- **Staying power:** Food service requires physical and mental stamina, good health, and a willingness to work hard. It is hard work. The pressure can be intense and the hours long and grueling. You may be working evenings and weekends when everyone else is playing. And the work can be monotonous. You might think it's drudgery to hand-shape two or three dozen dinner rolls for your baking class, but wait until you get that great job in the big hotel and are told to make 3,000 canapés for a party. Overcoming these difficulties requires a sense of responsibility and dedication to your profession, to your coworkers, and to your customers or clients. Dedication also means staying with a job and not hopping from kitchen to kitchen every few months. Sticking with a job for at least

a year or two shows prospective employers you are serious about your work and can be relied on.

Picture Courtesy Google

- **Ability to work with people:** Few of you will work in an establishment so small that you are the only person on the staff. Food service work is teamwork, and it's essential to be able to work well on a team and to cooperate with your fellow workers. You can't afford to let ego problems, petty jealousy, departmental rivalries, or feelings about other people get in the way of doing the job well. In the old days, many chefs were famous for their temper tantrums. Fortunately, self-control is more valued today.
- **Eagerness to learn:** There is more to learn about cooking than you will learn in a lifetime. The greatest chefs in the world are the first to admit they have more to learn, and they keep working, experimenting, and studying. The food service industry is changing so rapidly that it is vital to be open to new ideas. No matter how good your techniques are, you might learn an even better way. Continue to study and read. Seek extra work that allows you to learn from people with more experience. For example, if you are working on the hotline in a restaurant, ask the pastry chef if you could come in early, on your own time, to help out and, in the process, gain new knowledge and experience.
- **A full range of skills:** Most people who become professional cooks do so because they like to cook. This is an important motivation, but it is also important to develop and maintain other skills that are necessary for the profession. To be successful, a cook must understand and manage food costs and other financial matters, manage and maintain proper inventories, deal with purveyors, and understand personnel management.
- **Experience:** One of our most respected chefs said, "You don't know how to cook a dish until you have done it a thousand times." There is no substitute for years of experience. Studying cooking principles in books and schools can get your career off to a running start. You may learn more about basic cooking theories from your chef instructors than you could in several years of working your way up from washing vegetables. But if you want to become an accomplished Chef, you need practice, practice, and more practice. A Degree/ diploma does not make you a chef.

- **Dedication to quality:** Many people think only a special category of food can be called gourmet food. It's hard to say exactly what that is. The only thing so-called gourmet foods have in common is high prices. The only distinction worth making is between well-prepared food and poorly prepared food. There is good roast duckling à l'orange and there is bad roast duckling à l'orange. There are good Murg Makhni and Tandoori Murg, and there are bad Murg Makhni and Tandoori Murg. Whether you work in a top restaurant, a fast-food restaurant, a college cafeteria, or a catering house, you can do your job well, or not. The choice is yours. High quality doesn't necessarily mean a high price. It costs no more to cook green beans properly than to overcook them. But to produce high-quality food, you must want to. It is not enough to simply know-how.

Good understanding of the basics: Experimentation and innovation in cooking are the order of the day. Brilliant chefs are breaking old boundaries and inventing dishes that would have been unthinkable years ago. There seems to be no limit to what can be tried. However, the chefs who seem to be most revolutionary are the first to insist on the importance of solid grounding in basic techniques and the classic methods practiced since Escoffier's day. To innovate, you have to know where to begin. For the beginner, knowing the basics will help you take better advantage of your experience. When you watch a practiced cook at work, you will understand better what you are seeing and will know what questions to ask.

Check Back Questions

1. **Explain the need for a positive attitude toward the job.**
2. **In the kitchen physical and mental stamina and good health is a very important requirements. Justify.**
3. **Explain the effectiveness of the ability to work with people affects performance.**
4. **According to you, knowing the basics is important or not. Justify**

1.3: AIMS OF COOKING (INCLUDING SENSES THROUGH FOOD)

1.3.1. What is Cooking?

Picture Courtesy Google

Cooking is a chemical process where raw materials are exposed to heat or withdrawal of heat to get a finished product of a certain desired quality with a change in the physical state also.

1.3.2. Aims of cooking

- **Improves the taste and food quality:** Cooking improves the natural flavor and texture of food. For example, roasting groundnuts, frying onions and papads, cooking rice, and roasting coffee seeds improve the flavor. Cooking meat with spices, rice with spices in making pulao, frying cashew nuts in ghee, and the addition of turmeric, and curry leaves, blend flavor during cooking. Too much cooking lowers the flavor as flavoring compounds are volatile. Over-cooked pulao does not taste as good as well-cooked pulao.
- **Destruction of microorganisms:** Microorganisms are present everywhere and some are useful in making curd, cheese, and bread. Some are harmful and cause infections or produce toxins, e.g. clostridium botulism and salmonella. Some moulds produce toxins. Aspergillus flavus produces aflatoxin in groundnuts, cereals, and spices. This aflatoxin is a health hazard. One of the most important methods of protecting food against harmful microorganisms is the application of heat. Cooking food to the required temperature for a required length of time can destroy all harmful microorganisms in food e.g. pasteurized milk. Tapeworms or its larvae that infest pork can be killed by proper application of heat. By cooking, food is made safe for consumption.
- **Improves digestibility:** Cooking softens the connective tissue of the meat and the coarse fibers of cereals, pulses, and vegetables so that the digestive period is shortened and the gastrointestinal tract is less subjected to irritation. Cooking improves the texture hence it becomes more chewable. Cooking also bursts the starch granules of pulses and cereals so that starch digestion is easier, more rapid, and complete. When dry heat is applied to starches they are converted to easily digestible dextrins. Cooking increases access to enzymes and improves digestibility.

- **Increases variety:** By cooking, the same food can be made into different dishes. For example, rice can be made into plain, pulao, lemon rice, biriyani, or a combination with pulses into idli. Wheat can be made into chapatis, puri, paratha, or halwa.
- **Increases consumption of food:** Cooking improves the texture and makes the food chewable. Improvement in texture and flavor by cooking increases the consumption of food to meet our nutritional requirements.
- **Increases availability of food:** Raw egg contains avid which binds biotin making biotin unavailable to the body. By cooking, avid in gets denatured and biotin is available to the body. Trypsin inhibitors present in soybean and duck egg get denatured on cooking and the availability of protein is improved. Toxic substances from Kesari dhal (like toor dal) can also be removed by boiling it and throwing away the water.

1.3.3. Objective of cooking

- Retaining the nutritive value of the food.
- Retaining the original color of the food.
- Prevent the clash of colors.
- Avoid undercooking
- Avoid overcooking

1.3.4. Sensory characteristics of food

- **Flavor:** Millions of flavor sensations are experienced in a lifetime. The flavor is an important attribute of a food. It involves the complex integration of sensations from the olfactory center in the nasal cavity, the taste buds on the tongue, tactile receptors in the mouth, and the perception of pungency, heat, cooling, and so on when a portion of food is placed in the mouth. However, much of what we call flavor is a blending of taste and aroma. Other sensory factors may also affect our total experience with food, including its visual appearance and even the sounds of crunching crisp foods such as raw carrots and celery and the sizzle of fajitas when they are brought to the table.

Picture Courtesy Google

- **Taste and Aroma:** Sometimes the words flavor and taste are used synonymously. In a strict sense, however, the taste is only one part of the flavor. Taste involves the sensations produced through the stimulation of the taste buds on the tongue. It is generally accepted that there are only five primary taste sensations: sweet, sour, bitter and salty, and umami. But the perceived flavor of food involves, to a considerable extent, the sense of smell along with the taste sensations. It is influenced by other senses as well.

Taste buds are found in small elevations, called papillae, on the surface of the tongue. The actual taste sensations are produced when bitter, salty, sweet, or acid substances in a solution contact with taste receptors in the taste pore leading to the taste bud. A message is sent to the brain from the taste cells by way of nerve fibers with endings in the taste cells. The brain interprets and identifies the specific taste.

The olfactory center is found at the top of the nasal cavity. To stimulate the olfactory center, substances must be in gaseous form. The gaseous molecules enter the nose as food is placed in the mouth and are drawn toward the olfactory center where they stimulate nerve endings.

The flavor is a blend of taste, smell, and general touch sensations evoked by the presence of a substance in the mouth.

1. **Olfactory:** Having to do with the sense of smell
2. **Tactile:** Having to do with the sense of touch
3. **Pungency:** A sharp, biting quality
4. **Taste:** Sensations perceived through stimulation of taste buds on the tongue; primary tastes are sweet, salty, sour, and bitter.
5. **Aroma:** An odor detected by the olfactory sense
6. **Papillae:** Small, nipple-like projections of various shapes on the surface of the tongue
7. **Taste receptor:** Tiny ends of the taste cells that come in contact with the substance being tasted.
8. **Taste pore:** A tiny opening from the surface of the tongue into the taste bud
9. **Taste bud:** A group of cells including taste cells, supporting cells, and nerve fibers
10. **Umami:** Umami was first identified by Oriental Cooks 1200 years ago, it wasn't until the turn of this century that scientists isolated glutamate and other substance which convey this distinctive flavor.

Glutamate is an amino acid that is found throughout the human body. Its also naturally present in protein-rich foods such as cheese, meat, fish, and human milk. When present in its free form in foods - not bound together with other amino acids in protein - glutamate exerts its umami flavor effect.

MSG added to foods provides a similar flavoring function to the "free" glutamate that occurs naturally in foods. It is often used to flavor meats, poultry, seafood, soups, stews, sauces, and gravies.

Check Back Questions

1. **Define and explain the aims of cooking with examples.**
2. **List and explain the different sensory characteristics of food.**

1.4: OUTCOMES OF THE COOKING PROCESS, TECHNIQUES USED IN COOKING

1.4.1 Texture

Picture Courtesy Google

Texture is the term used to describe the characteristics of a finished food product. The order in which the ingredients are added, the way of mixing and the method of cooking affect the resulting product.

The physical properties of foods, including texture, consistency, and shape, involve the sense of touch or feeling, also called the tactile sense. When food is contacted, pressure and movement receptors on the skin and muscles of the mouth and tongue are stimulated. Sensations of smoothness, stickiness, graininess, brittleness, fibrous qualities, or lumpy characteristics may be detected.

A good cook should not only be able to distinguish between one texture and another but also be able to produce what he or she wants. Only by observation, experience, and perseverance will a person be able to know what the correct texture of a particular product should be. A brief description of some commonly found textures and their correct occurrence is given below, but it must also be borne in mind that the difference between one texture and another is very fine.

- **Firm and close**: The air bubbles made by the raising agents are many but small, and the

mixture is not in the least spongy. The fat included prevents the mixture from being too hard, e.g., in biscuits or plain short pastry.

- **Short and crumbly**: This is similar to firm and close, but more fat is added. Eg.in shortbread or Nankhatais.
- **Spongy:** A soft and elastic texture showing the inclusion of air, e.g.Swiss rolls, sponge cakes, and idlis.
- **Light and even**: Holes are plentiful and of a fair size. The food is firm but not tough. It is neither as short as pastry nor as spongy as sponge cakes, eg. Madeira cake, and Queen cake.
- **Flaky:** This is caused by the method of adding fat. Thin crisp layers are formed, separated by air pockets. The flakes themselves should not be tough, eg. .flaky and puff pastry, chiroti, etc.
- **Coarse:** Holes are large and uneven, and the food is sunken in the center. This is brought about by the addition of too much raising agent or too little liquid.
- **Tough:** Coarse mixtures are also tough. Toughness is caused by too much liquid or through incorrect mixing. This will also result if too little fat is added.
- **Hard:** A bad fault brought about by the addition of too much liquid or too much pressure while mixing. Hard mixing. Hard mixtures are usually heavy since the air enclosed in driven off.

1.4.2. Techniques used in cooking

- **Mise en place: "Everything ready":** Even on the simplest level, preparation is necessary. If you prepare only one short recipe, you must first
  - Assemble your tools.
  - Assemble your ingredients.
  - Wash, trim, cut, prepare, and measure your raw materials.
  - Prepare your equipment (preheat the oven, line baking sheets, etc.)
  - Only then you can begin the actual preparation.

  When many items are to be prepared in a commercial kitchen, the situation is much more complex. Dealing with this complexity is the basis of kitchen organization.
- **Planning and organizing for preparation.**

  The Problem: Every food service operation faces a basic conflict between two unavoidable facts ;
  - There is far too much work to do in a kitchen to leave until the last minute, so some work must be done ahead.
  - Most foods are at their best quality immediately after preparation, and they deteriorate as they held.

  The Solution: To solve this problem, the chef must plan the pre-preparation carefully. Planning generally follows these steps;
  - Break each menu item down into its stages of production. Note that the procedures are divided into a sequence of steps, which must be done in a certain order to make

a finished product.

- Determine which stages may be done in advance.
  a. The first step of any recipe, whether written or not, is always part of preparation; assembling and preparing the ingredients. This includes cleaning and cutting produce. Cutting and trimming meats, and preparing breading and batters for frying.
  b. Succeeding steps of a recipe may be done in advance if they can then be held without loss of quality.
  c. Final cooking should be done as close as possible to service, for maximum freshness. Frequently separate parts of a recipe, such as a sauce or a stuffing, are prepared in advance, and the dish is assembled at the last minute.In general, items cooked by dry-heat methods, such as broiled steaks, sautéed fish, and fresh fried potatoes, do not hold well. Large roasts are an important exception to this rule. Items cooked by moist heat, such as braised beef, soups, and stews, are usually better suited to reheating or holding on a steam table. Very delicate items should always be freshly cooked.
- Determine the best way to hold the item at its final stage of preparation.
  a. Sauces and soups are frequently kept hot, above 140 OF (60 OC), for service in steam tables or other holding equipment. Many foods such as vegetables, however, are kept hot for only short periods, because they quickly become overcooked.
  b. Refrigerator temperatures, below 104OF (40 OC), are best for preserving the quality of most foods, especially perishable meats, fish, and vegetables, before final cooking or reheating.
- Determine how long it takes to prepare each stage of each recipe. Plan a production schedule beginning with the preparations that take the longest. Many operations can be carried on at once because they don't all require your complete attention the full time. It may take 6 to 8 hours to make a stock, but you don't have to stand and watch it all that time.
- Examine recipes to see if they might be revised for better efficiency and quality as served. E.g.
  a. Instead of preparing a full batch of green peas and holding them for service on the steam table, you might blanch and chill them and then heat portions to order in the sauté pan, steamer, or microwave oven.
  b. Instead of holding a large batch of veal scaloppine, in mushroom sauce on the steam table, you might prepare and hold the sauce, sauté the veal to order, combine with a portion of the sauce, and serve fresh from the pan.

The Goal: The goal of preparation is to do as much work in advance as possible without loss of quality. At service time, all energy can then be used for finishing each item immediately before serving with the utmost attention to quality and freshness. Many preparation techniques in common use are designed for the convenience of the cooks at the expense of quality. Remember that quality should always take the highest priority.

1.4.3. Preparation of ingredients (Mise-en-place) & Techniques used in Cooking and Baking

- **Sub – Division**

Washing: This is necessary to remove superficial dirt. Meat, fish vegetable, and fruits are washed in cold water before any preparation, if peeling or cutting. If cut and soaked for a long period or washed after cutting, there is a great loss of water-soluble vitamins and minerals. The more cut surface exposed, the more nutrition is lost.

Peeling: Spoilt, soiled, and inedible portions are removed. The skin of vegetables or fruits is either peeled or scraped.

Paring: Paring is removing the surface layer in a circular motion by the pressure of a knife edge all around the object.

Cutting: Reducing to small pieces with a knife. When a similar result is obtained with a chopping knife, or with a mechanical food chopped the process is called chopping (small pieces). Dicing – cutting in cubes is known as dicing, as in dicing potatoes, carrots, etc.

Mirepoix: Coarsely cut root vegetables.

Mincing: Cutting into very fine pieces. Eg. Mutton, Onions, etc.

Grating: Reducing small particles by rubbing on a rough surface, as in grating lemon peels, cheese, etc.

Grinding: Reducing to small fragments by crushing, as in grinding spices, of coffee in a mill or on a grinding stone.

Mashing: This is a method of breaking up soft foods with pressure, with a potato masher or with a fork.

Pureeing: To press food through a food mill or fine strainer to make it smooth, and semi-liquid.

Pressing: Separating liquid portions from solids by weights or mechanical pressure, as in making cider from apples, paneer, etc.

Steeping: Extracting coloring flavoring by allowing ingredients to stand in water to a temperature just below boiling point

- **Fractionalization**

Milling: This is used for cereals to remove husk etc.

Sieving: Passing through a fine wire mesh to remove impurities. It also helps in enclosing air and mixing ingredients evenly, like sieving flour for cakes.

Refining: Freeing any material from impurities, as in refining cane sugar/oil.

Skimming: Removing a floating layer by passing a utensil under it (ladle) as in skimming cream from milk.

Rendering: Separating fat from connective tissues by heat as in rendering lard (dripping).

Filtration: Separating solids from liquids, through fine-meshed materials, as in filtering fruit juices for jelly through a cloth bag, or fine wire mesh strainer.

Flavoring: A bundle of herbs and vegetables to impart flavor to stocks and sauces in Bouquet Garni.

Homogenization: Subdividing large drops into smaller ones by forcing them through a small aperture under great pressure as in homogenizing the fat in cream.

Emulsification: Even dispersal of one liquid throughout another immiscible liquid.

Evaporation or Reduction: Removal of water, commonly accelerated by heating without a lid.

- **Combining and Mixing in the Preparation of Foods**

Food preparation often involves the combining and mixing of different foods or food materials. Important effects of the methods of combining foods or ingredients are those related to palatability. Texture and flavor are often controlled to an important degree by the skill and method employed in combining component materials.

Beating: Mixing materials briskly, lifting and dropping them with an appropriate tool. Sometimes used synonymously with whipping as defined below. This is done to thin a mixture of liquids. The aim is to mix well and incorporate air.

Blending: Mixing two or more ingredients thoroughly, e.g., blending milk into a white roux for Béchamel sauce.

Cutting in: Usually the incorporation of fat in flour and other sifted dry ingredients with a knife, a method which produces a relatively coarse division of the fat and does not result in blending as in cutting the fat into a pastry mixture.

Creaming: Softening fat by friction with a spoon usually followed by gradual incorporation of sugar as in cake making.

Folding: Mixing materials with a palate knife or wooden spoon, by a careful lifting and dropping motion as in folding whipped egg whites into a cake mixture. The palate knife is to lift.

Kneading: To work the dough by pressing and folding it until it becomes smooth and elastic.

Marinating: Coating the surface of food materials, a marinade, which is usually a mixture of oil and acid marinating the components of a vegetable salad with French dressing.

Sealing: Sautéing or pre-cooking roast, to develop color and flavor

Stirring: Mixing materials with an appropriate tool, such as a spoon by a circular motion, as in stirring white sauce, while cooking.

Whipping: Rapid beating with a wire eggbeater or mechanical beater usually incorporates air, as in whipping egg white

Whisking: Whisking is done when a mixture needs a lot of air, items need to be mixed so that they do not separate.

Blind baking: To cook an empty pastry shell before filling it with a liquid (or) creamy mixture, which would otherwise soak the bottom or with delicate fruit that does not need to be cooked.

Docking: Small holes are made in the Pastry**.** The aim is to allow steam to escape during baking to avoid distorting the pastry.

Rubbing in: Fat and flour are rubbed together. Fat is reduced to bread-crumb-sized particles. Fat particles melt during baking, giving off steam which makes the pastry expand and rise.

Check Back Questions

1. **Define Texture. List and explain the different textures with suitable examples.**
2. **List and explain different techniques involved in the basic cooking process.**

1.5: BASIC PRINCIPLES OF SAFETY PRECAUTIONS

1.5.1. Safety

Kitchen work is usually a relatively safe occupation, at least in comparison with many other industrial jobs. However, the kitchen has many hazards. Kitchen Safety is making sure that

you are taking the proper precautions to keep the kitchen safe. Keeping the kitchen safe involves practices such as using the correct cookware for the job, keeping your work area clean, and being aware of potential hazards like sharp knives, hot cooking burners, and slippery floors if not kept dry and free of trip hazards. Minor injuries from cuts and burns are common, and more serious injuries are all too possible. The quantity of hot equipment and powerful machinery, combined with the busy, sometimes frantic pace, make it important for everyone to work carefully and with constant attention to the rules of safety.

This is especially important in busy restaurants, where there is a higher risk of accidents because of how busy kitchen operations can become back of the house. By following proper kitchen safety procedures, you can help to prevent injuries and accidents in the workplace.

The two very important aspects of running a successful kitchen are Sanitation and safety However, they are not the same thing. Kitchen sanitation refers to the cleanliness of the kitchen and the food that is prepared there. Kitchen safety, on the other hand, refers to the procedures and policies in place to prevent accidents and injuries.

1.5.2. The safe workplace

The kitchen personnel can prevent certain kinds of accidents, such as cuts, burns, and falls. However, it is much easier to develop and practice habits that prevent accidents if safety is built into the workplace.

- The authorities of food production and service operation must see to it that the structure and equipment have the necessary safety features.
- Know where fire extinguishers are located and how to use them.
- The structure, equipment, and electric wiring are in good repair with adequate lighting on work surfaces and in corridors with proper ventilation for good air quality that helps remove any airborne particles and allows fresh air to circulate.
- The floors must be nonslip and marked exits. Equipment should be supplied with necessary safety devices.
- Proper arrangements for heat-activated fire extinguishers over cooking equipment, especially deep fryers, and emergency equipment, such as fire extinguishers, fire blankets, and first-aid kits must be conveniently located
- Posted emergency procedures, for victims of choking. employees should have received formal training in this procedure. In addition, it is a good idea to train one or more employees in cardiopulmonary resuscitation (CPR).
- Smooth traffic patterns to avoid collisions between workers.

1.5.3. Basic rules of kitchen safety

- **Wear proper kitchen attire:** When you're in the food production area, you must wear proper kitchen attire for safety, wearing proper kitchen attire will prevent the person from getting hurt such as acquiring burns, cuts, and other injuries.
- **Keep the kitchen clean**: Science says that a clean kitchen is a safe kitchen. An uncleaned and untidy kitchen is a breeding ground for accidents as well as bacteria that can be harmful to our health. Always keep the counters clear of clutter, the floors clean and dry, the appliances wiped down, and the kitchen utensils sanitized.
- **Follow food safety guidelines:** Ensure that all the food safety guidelines are observed while handling various equipment and preparing food. That includes washing hands often, keeping raw meat separate from other foods, and cooking food to the proper temperature. The kitchen should have an effective food safety management system implemented. This will surely provide a safer work environment not only for the staff but also for the customers.
- **Use kitchen appliances safely:** Understand the manuals for your kitchen appliances and use them according to the instructions. Be attentive when using knives, blenders, and other sharp objects or devices with moving parts to ensure hand safety and overall safety. Do not engage yourself with any unfamiliar kitchen equipment. Always ask for help or assistance if needed.
- **Be aware of potential hazards:** Always remain aware of the potential hazards in the kitchen which include things like open flames, hot surfaces, sharp objects, slippery floors, toxic chemicals, etc.

- **Store food properly:** Always store food properly to prevent contamination and spoilage. Follow the expiration dates of food items and keep them stored in airtight containers. Regularly refer and check inventory to prevent any spoilage.
- **Know first aid:** Accidents may happen at any time in the workplace. That is why it is essential to know first aid to provide immediate response and care when an injury or accident occurs in the kitchen. It is also important to have a first aid kit handy in your kitchen, in case of emergencies.
- **Take some breaks:** Working in the kitchen is exhausting especially when you stand around for the rest of the shift. It can take a toll on the body which may lead to accidents and injuries. This is why it is essential to take some breaks when you can. Proper rest will help your mind and body to regain their energy to allow you to focus and be alert when you are fulfilling your duties in the kitchen.
- **Learn and implement best practices:** Safety in the workplace is effective when you learn and implement best practices daily. Not only will it help you to pass essential safety certifications but also promote a safe environment for the team and your customers inside your establishment.

Check Back Questions

1. **Why safety is so important in kitchen?**
2. **How do you ensure that your workplace(kitchen) is safe to work.**

1.6: WASTE SEGREGATION

1.6.1. The Concept

Growing volumes of solid waste cause major public health and environmental issues. Kitchen waste (KW) like leftover organic matter from kitchens, restaurants, etc., and food waste (FW), also termed as plate waste, is food that has been served but has not been eaten completely, stale food, etc is a constant threat. Throwing waste in the dustbin is a good habit. However, what will happen to the garbage that is thrown every day? It needs an effective waste management system to be implemented to combat such serious health issues. The most pertinent question is how it will be treated. Or where it will be dumped? Therefore, there is an urgent need for kitchen waste management.

1.6.2. The Basics of Kitchen Waste Segregation and Management

Picture Courtesy Google

- In the food service business, waste segregation and how to manage it are key elements in day-to-day operations. Those in the food business should take extra care to ensure that their establishments are always up to the highest level of operation in dealing with waste disposal in their kitchens.
- In any scenario, proper waste segregation is an essential aspect of daily life. It is imperative in our homes, and that importance only escalates if it is a part of your business. Proper segregation and management of waste, in the food service business, can make or break its existence. Thus, those in the food industry must take extra care to ensure that their establishments understand the importance of waste segregation.

1.6.3. What is Waste Segregation?

It is the process of separating or sorting out waste into different categories. Segregating our trash is something we are taught in school and if you run a food business, the methodology is no different. So to get the most efficient results, the management of waste should be done at its source. Thus, it pays to have readily available waste segregation bins where the kitchen staff can chuck garbage immediately. The typical setup involves a wet bin and another for dry items. Some businesses will have a separate container for difficult to dispose of items such as oil. Others create a container for composting food waste - more on this later. Contrary to belief, having a proper waste disposal system in place is not an expensive endeavor. It only takes time and effort to produce the best results.

In any restaurant business one individual should be made to learn its importance because:

- A kitchen with proper waste segregation and waste management does not attract diseases and pests.

- The waste segregation system should have a separate place for wet waste which should be well-ventilated and away from household pests. This will lead to a much cleaner place.
- Segregation leads to a collection process that is more convenient and efficient for collecting companies.
- Proper segregation is required for the functioning of waste incineration.

1.6.4. Segregating Kitchen Waste

Wastes can be divided into categories:

1. **Biodegradable waste** includes organic waste, e.g. kitchen waste, vegetables, fruits, flowers, and garden.
2. **Non- biodegradable waste** includes recyclable waste- plastics, paper, glass, metal, etc
3. **Toxic waste:** Old medicines, paints, chemicals, bulbs, spray cans, fertilizer, pesticide containers, batteries, and shoe polish.
4. **Soiled:** Hospital waste such as cloth soiled with blood and other body fluids.
5. **E-waste:** Floppy disks, batteries, CDs, etc.

1.6.5. How to Handle Kitchen Waste Segregation Efficiently?

How does one manage their kitchen waste then which is of utmost importance? A restaurant's kitchen, especially a busy one, generally produces a lot of food waste. So how does one effectively start a waste segregation system? Some important points should be kept in mind.

- Don't shop in bulk.
- Manage your inventory.
- Donate leftover food to charity.
- Design a custom menu.
- Compost your food waste.
- Track product expiration dates.

1.6.6. What You Can Do as a Restaurant Owner?

- Create a dedicated team for waste management.
- Educate your staff.
- Invest in good quality equipment.
- It's Never Too Late to Start

Check Back Questions

1. **Elaborate briefly on the concept of waste in the Kitchen.**
2. **Explain the basics of segregation of kitchen waste and management in brief.**
3. **How kitchen waste is segregated effectively?**

2.1 FATS & OILS (SHORTENINGS)

2.1.1. Introduction to Fat

Fats are important for our health. They add taste and texture to our foods, help our bodies absorb fat-soluble vitamins such as A, D, E, and K, and, provide extra energy.

Fats can be defined as a soft greasy substance found in organic tissue. Fats and oils are triglycerides with varying degrees of **saturated** and **monounsaturated or polyunsaturated and Trans** fatty acids. These terms reflect chemical differences in the composition of fats. Cooks do not need to know the chemical structure of fats, but they should understand their nutritional characteristics.

Fats – generally solid at room temperature and high in saturated fatty acids. Oils –generally liquid at room temperature and low in saturated fatty acids.

Fatty acids consist primarily of long chains of carbon atoms to which hydrogen atoms are attached. If a fatty acid chain contains as many hydrogen atoms as it can hold, it is called saturated.

If the chain has empty spaces that could hold more hydrogen, it is called unsaturated.

The function of fat is to protect the vital organs of the body, to provide heat and energy and certain fats provide vitamins. Fats can be divided into solid fats and oils.

- Fats are a cooking medium.
- Fats were traditionally of animal origin.
- The quality of solidifying naturally distinguishes saturated fats and unsaturated fats like vegetable oils.
- They are the chief source of energy.

The major functions of fats in baked items are:

- To add moistness and richness.
- To increase keeping quality.

- To add flavor
- To assist in leavening when used as a creaming agent, or to give flakiness to puff pastry, pie dough, and similar products.

2.1.2. Types of fats

- Margarine
- Butter
- Suet
- Lard
- Back fat
- Dripping and goose fat
- Shortening
- Ghee

Margarine:

- Made from vegetable oils.
- Contain milk or animal fats or fish oils, plus emulsifiers and coloring agents.
- Oils are hydrogenated to form solids.
- Its characteristics are similar to butter.
- It is not suitable for frying.
- Too soft to be rubbed into the flour.
- It contains 80 to 85% fat, 10 to 15% moisture, and about 5% salt, milk solids, and other components.
- The two major categories: **Cake and Baker's Margarines, Pastry Margarines**
- **Butter:**
- Butter is made by beating cream, the thickest, fattiest part of milk.
- Fresh butter consists of about 80% fat, about 15% water, and about 5% milk solids.
- Butter is available **salted** and **unsalted.** Unsalted butter is more perishable, but it has a fresher, sweeter taste and is thus preferred in baking.
- Butter has a highly desirable flavor.

Suet:

- The hard white fat on the kidneys and loins of cattle, sheep, and other animals.
- Comes from the Latin word tallow.
- Was used instead of wax for making candles.
- It is stiff and melts slowly.
- Used for sweet puddings such as Christmas pudding, and jam-roly poly.
- Used in savory ones like steak and kidney and steaks and mushrooms.

Lard:

- It is the pork fat
- Light and clean tasting
- Mainly used for frying
- Also used in bakery because of its creaming properties.
- The best lards are the ones rendered from belly fat or the bacon big.
- And from directly under the skin of the back.
- To overcome the porky taste add drops of rosemary.
- Used throughout South America and the US.

Back fat:

- This is the fat that runs along the back of the pig over the loin.
- Used primarily for larding dry meats such as veal and game birds.
- Cut into strips called **lardons**, fat can be inserted into the flesh using a needle to keep it soft while cooking.

Dripping and goose fat:

- Acquired from straining and reserving the fat that has dripped off a roasting joint or bird.
- Drippings from different kinds of meat should not be mixed.
- Beef drippings can be used to fry the beef stews.
- Drippings from goose or duck are used for bean dished, roast vegetables, fried potatoes
- Lamb drippings smell unpleasant

Shortening:

- All hard fats are shortenings. Any fat acts as a shortening in baking because it shortens gluten strands and tenderizes the product.
- Shortenings generally consist of nearly 100% fat.
- They are capable of producing a crumbly shortcrust.
- The white cooking fats may be made of blended vegetable oils or a mixture of vegetable and animal fats or fish oils.
- They are bland light in texture and fluffy.
- The texture of white cooking fat makes creaming and rubbing easier
- There are three main types: regular or all-purpose (AP) shortenings, high-ratio plastic shortenings, and high-ratio liquid shortenings.
- It is flavorless.

Ghee: A type of clarified butter made by heating ordinary butter to get rid of impurities. Very commonly used in Indian cuisine.

2.1.3. Storage of Fats

The points to be remembered:

- All fats become rancid when exposed to the air for too long.
- Also, they tend to absorb odors and flavors from other foods.
- Highly perishable fats, such as butter, should be stored, well-wrapped, in the refrigerator.
- Other fats and oils should be kept in tightly closed containers in a cool, dry, dark place.
- Avoid exposure to heat, light, and oxygen.
- Rotate the stock of fats and oils.
- Buy fats and oils in smaller containers.

2.1.4. Introduction of oil

Oil is a fatty substance that is liquid at normal or room temperature. There are various kinds of oils like mineral oil, animal oil, vegetable oils, etc., The oils used in cooking are vegetable oils, which are extracted from seeds, nuts, fruits, or roots.

2.1.5. History

The Egyptians did the oldest use of oil and they used the sesame oil. In Greece, the olive tree was a sacred tree and a symbol of the city of Athens. Oil was not only for food but also used as a fuel to provide light and heat for many centuries.

2.1.6. Facts

Pure oils are taken from a single vegetable species. Whereas the term vegetable oil indicates that they are a blend of two or more vegetable oils.

Most oils sold today are refined oils, which means that during processing, their original taste and flavor have been removed. However, there are still a few oils, which are processed by cold pressing and are termed as virgin or natural oils as they still retain the taste of their vegetable origins. e .g. Olive oil

2.1.7 Usage

- Used in marinades for vegetables, meats, seafood, kebabs, etc.,
- Preservatives: Used in preserving Indian pickles, and also to preserve goats' cheese, meats, fish, and herbs.
- Used to make sauce: Mayonnaise, Aioli, Pesto, etc.,
- Used as an ingredient in cold dressings: Vinaigrette.
- Used directly in most of the basic principles of cookery like deep frying, shallow frying, sautéing, braising, searing, etc.,

2.1.8. The most commonly used oils

- Groundnut oil, coconut oil, Mustard oil, Soya-bean oil, Sunflower oil, Olive oil, Corn oil, Walnut oil, etc.,

- Oil varieties are available in different grades and qualities. For example, olive oil which is rich and easy to digest is sold under various grades such as:
  - **Virgin olive oil:** Mixed with other oils and from the second or third press.
  - **Pure:** Mixed virgin and refined oils.
  - **Extra virgin:** The purest oil obtained only from the first pressing.

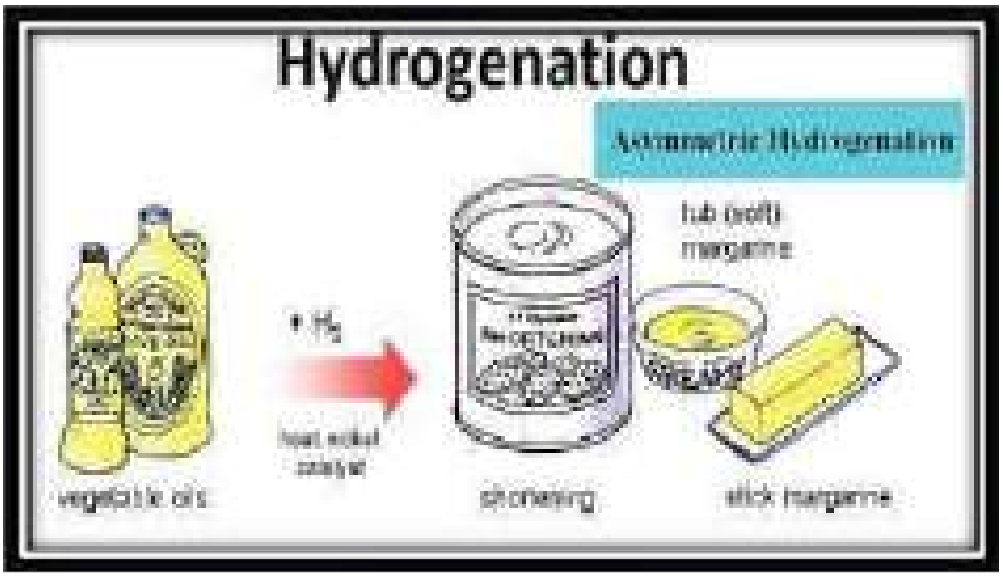
2.1.9. Difference between Fats and Oils

To make you understand how Oils and fats are different from each other, here are some major differences between oils and fats are mentioned below:

- **Fats**
  1. Solid at room temperature.
  2. Saturated and trans are its types.
  3. Mostly derived from animals.
  4. Increases cholesterol levels.
  5. Mainly comes from animal food but also through vegetable oil by a process called hydrogenation.
  6. Example: Butter, beef fat, etc.
  7. Contains 9 cal/gm.
- **Oils**
  1. Liquid at room temperature.
  2. Unsaturated fats like monounsaturated and polyunsaturated are its types.
  3. Mostly derived from plants.
  4. Improves cholesterol levels.
  5. Mainly comes from plants or fish.
  6. Examples: Vegetable oil, fish oil, etc.
  7. Contains 9 cal/gm.

2.1.10. Hydrogenation of fats

It is a chemical process that turns unsaturated fatty acids into saturated ones, in the presence of a catalyst such as nickel, palladium, or platinum. Unsaturated fatty acids may be converted to saturated fatty acids by a relatively simple hydrogenation reaction. Vegetable oils are commonly referred to as "polyunsaturated". This simply means that there are several double bonds present. Vegetable oils may be converted from liquids to solids by the hydrogenation reaction. Margarine and shortenings are "hardened" in this way to make them solid or semi-solids. Vegetable oils which have been partially hydrogenated, are now partially saturated so the melting point increases to the point where a solid is present at room temperature. The degree of hydrogenation of unsaturated oils controls the final consistency of the product.



Picture Courtesy Google

2.1.11. Rendering of fat

This means rendering the whole fatty tissue from animals and turning it into fats that are purified, like lard and tallow. The method of rendering can be done in two ways: Dry heat or wet heat method (which includes the presence of water). The fat is slowly melted and then strained. The pure fat obtained through this method can be stored in the refrigerator for 6 to 8 weeks and if frozen, it can be stored for almost a year.

Check Back Questions

1. **Describe the concept of Fats and Oils and how it is different from each other.**
2. **List the different types of fats and oils used in the kitchen.**
3. **Explain the concept of Hydrogenation and rendering of Fats.**

2.2: RAISING AGENTS

1.2.1. What is a Raising Agent?

The word Leavening or raising means to increase the surface area of any dough or batter by creating gas bubbles inside the dough or batter as it causes the foaming action thus lightening and softening the ultimate finished product. The expansion of gas bubbles during baking increases the volume of the product and gives a desirable porous structure due to the formation of carbon dioxide induced by chemical agents reacting with moisture, heat, acidity, or other triggers.

1.2.2. Types of Raising Agents

Depending upon the origin and the process, raising agents that are used in the kitchen can be classified into the following categories:

- **Biological (Yeast).**
- **Chemical (Baking powder, baking soda, baking ammonia).**
- **Mechanical (Beating, whisking, creaming, sieving).**
- **Lamination.**
- **Natural Leavening Agents.**

Biological Raising Agents:

a) Yeast: Yeast is a tiny living microscopic fungus consisting of single oval cells that reproduce by budding, and are capable of converting sugar into alcohol and carbon dioxide. The structure of yeast consists of a) Cell wall b) Protoplasm and c) Vacoale. It can be of two types

1) **Fresh or compressed Yeast and**

2) **Dry Yeast**

It thrives on sweetness, warmth, and moisture. As the yeast eats, it excretes carbon dioxide and generates alcohol. It is this gas which causes a rise in the baked product. The Alcohol evaporates during the baking process, yet helps in the development of flavor in the bread. And because yeast is a living organism the baker's main goal is to control the point of death of the yeast. The scientific name of yeast is **Saccharomyces Cerevisiae**.

Picture Courtesy Google

Yeast, irrespective of compressed or dry is usually stirred into a small amount of warm liquid and allowed to stand for at least five minutes to dissolve.

b) **Food:** Simple sugar like dextrose or fructose.

c) **Suitable climate:** 80 to 85 0 F, at least 70% humidity can give the best result.

d) **Fermentation activity:** The protoplasm of yeast contains the following enzymes:

- **Invertase**: It converts cane sugar or sucrose into a simpler form of sugar which is known as invert sugar, which is a combination of dextrose and fructose.
- **Maltase:** It converts maltose sugar into dextrose which can be directly fermented by yeast.
- **Zymase:** this is the most important fermenting agent which breaks inverted sugar and dextrose to carbon dioxide, some amount of pure alcohol, and a very small amount of glycerine, acetic acid, and some amount of lactic acid. It also produces a flavourful aroma which gives a pleasant fermentation flavor.
- **Protease:** It softens down the flour protein, thus giving a better stretchability for the bread (to be specific on gluten) so that it can get a good volume and structure.

e) **Storage of yeast:** Stored at 45 0F. Yeast is killed by heat in a range of 1270 to 140 0F.

f) **The symptom of damaged or rotten yeast**: Buttery consistency, Brownish in color, Crumbly in texture, Very obnoxious smell. If the baker has any doubt about the freshness of the yeast then it should be proofed.

Method of proofing yeast: Dissolve yeast in 1/4 cup of warm water with one teaspoon of sugar and two tablespoons of flour. If the yeast is active it will be spurred on by the sugar and fed by the flour. Within ten minutes the yeast should begin to expand and foam. The proofing of yeast before adding it to other ingredients will save time and expense.

Chemical Raising Agents:

A chemical raising agent is brought about by the production of carbon dioxide in a solution of acid and alkali, in the presence of heat. The following are the examples:

- **Baking Powder**: It is a leavening agent made up of a blend of an acid reacting salt with bicarbonate of soda in the presence of some starch to the mixture to keep it in a dried condition and also to act as a separator between sodium bicarbonate and acid reacting salt until used. There are three types of baking powder.
  - **Double action** - Baking powder releases 1/3 of its carbon dioxide at room temperature and the rest during baking.
  - **Tartrate -** Baking powder reacts quicker, as soon as the liquid is added to it.
  - **Phosphate -** Baking powder is slower and only heat releases its gases.

  In the presence of both heat and moisture, the acid-reacting salt reacts with sodium bicarbonate and releases carbon dioxide. A part of the gas is entrapped into the gluten structure or small air cells of a batter which already has developed because of the creaming action of fat, these structures now expand with the production of the gas and during baking also and the small part of the gas is absorbed by the media itself. Cream of tartar is a form of refined tartar which is a by-product or precipitation from the grape wine manufacturing process.

  Baking powder can also be made by mixing 1/2 teaspoon of cream of tart with 1/4 teaspoon of baking soda, and 1/4 teaspoon of cornflour, (This last element acts to round the recipe up to 1 teaspoon. and aids in anti-clogging) to get a 1 teaspoon.

- **Baking Soda:** Baking soda which is chemically known as **Sodium bicarbonate** acts also acts as a leavening agent when mixed with an acid such as sour cream, sour milk, buttermilk molasses, or citrus juice. The chemical reaction of the leavening agent and acid produces gases that make the mixture rise. As it is much stronger than baking powder. The general rule is to use 1 to 1-1/4 teaspoons of baking powder per 100g of flour. Baking soda should be added at 1/4 teaspoon per 100g of flour.
- **Ammonium Carbonate**: Known as **Baker's ammonia** or **Salt of Hartshorn**, which is in white crystalline salt. Since it readily degrades to gaseous ammonia and carbon dioxide upon heating, it is used as a leavening agent and also as a smelling salt. As it also produces carbon dioxide in the presence of heat but because of the strong offensive flavor, it is always to be used with very strong flavouring agents.

Mechanical Raising Agents:

It is the process of incorporation of air by beating, creaming, whisking, and sieving. Whisking of egg and sugar, creaming of fat and sugar, and sieving of flour are examples of mechanical raising. All these actions involve physical movement hence known as mechanical raising or leavening. The following are good examples of mechanical processes:

Creaming method: Fat and sugar are creamed together until the sugar crystals melt and achieve the consistency of whipped cream. Small crystal size castor sugar, will combine with the fat far easier than granulated sugar which has a larger crystal. This is not necessary though, as long as you cream the mixture properly, granulated sugar works just as well. This creaming process will incorporate air into the mixture which is held in place by the semi-solid fat. The bubbles expand during baking allowing the batter to rise. Care must be taken once flour is added. This should be folded in carefully to avoid the development of the gluten lattice structure. If the cake mixture is over mix after adding the flour, once baked a very firm crumb and a prominent point in the center of the cake will be visible. The cake will still be edible, though dense!

To get a cake with a better texture and more rise by using cake flour to bake with as it is lower in lattice-forming gluten. If cake flour is not available, substitute 20% corn starch (cornflour) for 20% of the flour called for in the recipe. Sieve the two together well. You will have reduced the gluten content of ordinary plain flour.

- **Kneading method:** This technique is very much adopted in bread making. Yeast liquid is dispersed into high-gluten flour to make a dough. The mechanical action of kneading the dough, either by hand or machine, develops the gluten strands which form a lattice structure. Due to gentle warmth being applied, carbon dioxide is released by the yeast and is trapped in the developed lattice pockets. The yeast continues to work and give off carbon dioxide, which pushes up the lattice structure until heat is applied during baking. This heat kills the yeast and fixes the gluten's lattice structure in place resulting in a well-risen loaf, light in texture with a lovely crunchy outer.
- **Beating:** In some baking processes, the use of a 'beating' method is required – generally where heat is involved. While making hot water crust pastry you would bring water and butter to the simmer stage in a pan. Flour is added and the mixture is beaten until combined. Use as the pastry for 'Raised' Pies. This pastry has a much stronger structure allowing pies to be cooked without a tin. The same principle is also adopted while making choux pastry. Flour is added to a hot water/butter mixture. Raw egg is then beaten in. The egg gives rise to this pastry.

- **Whisking:** When volume is the main outcome of the product then the whisking method is used. Meringues are made by whisking egg whites with sugar until the volume is six to eight times more than you began with. Gentle heat applied over several hours in an oven dries out the meringue and leaves a crisp, sweet confection. Fatless sponge cakes require whole eggs and sugar to be whisked together to achieve a high volume. Cake flour is gently folded in. Air incorporated into the eggs and sugar gives volume and lightness to the cake.

Lamination:

This is another concept of raising procedure where the fat and dough are folded and rolled. The moisture incorporated in the fat and in the dough also will vaporize during baking and gives the desired rise to the end product.

Through this process, the purpose is to create alternating layers of dough and "roll-in-fat" (butter, hard fats, margarine, shortening) to create light, tender, and flaky pastries. There is usually a 30-min rest period between folds. Refrigeration of dough between folds, or maintaining a bakery room temperature of 60°F (15°C), is usually the rule to prevent fat from melting.

In Danish pastry, fat is placed between two or three layers of fermented sweet dough and by repeated layering and folding methods, the fat layers are reduced to thin films separating dough layers. In these products, there are two principal leavening systems taking place, one from yeast and the other from the expansion of the moisture and air entrapment in layers of dough and roll-in fat.

Check Back Questions

1. **Explain the concept of raising agents used in the kitchen.**
2. **List the different types of raising agents used in the kitchen based on their origin and process of use.**

Natural Leavening Agents:

- **Steam:** Steam can be used as a leavening agent for cooking that is done at very high temperatures. The batter must be capable of holding in the steam until it is set. Steam gives the effect of leavening as it expands upon heating. This way of cooking is generally applied in popovers and Yorkshire puddings.
- **Air:** Air is another leavening agent that can be incorporated by beating the batter thoroughly with Mechanical leavening agents. The trapped air expands upon heating.

2.3: FLOUR – ALL PURPOSE, WHOLE WHEAT, MULTIGRAIN, MILLET, GLUTEN-FREE.

1.3.1. Wheat flour

One of the most essential ingredients in the bakeshop is flour. Most of the baker's products, including bread, cakes, cookies, and pastries get their desired structure from flour. In general,

for home cooking we depend almost entirely on a product called **all-purpose flour**, however, the professional baker needs to know the wide variety of flours with different qualities and characteristics. It is very important to understand the characteristics of each type of flour and how it is milled. Depending on this select the proper flour for each product, and handle each of them correctly.

The most important ingredient which gives the body and structure to the bread. The contents of flour affect the final product to such an extent that it becomes vital to understand the various components and their properties.

The most commonly used grain in flour manufacture is the Wheat grain or the Triticum group. Though there are thousands of varieties of wheat however there are three main groups under which wheat can be classified. These are;

1. **Triticum vulgare**
2. **Triticum durum** (high sugar, starch susceptible to diastase)
3. **Triticum compactum**(too soft for breadmaking)

2.3.2. Wheat varieties

The wheat from which it is milled, the location where it is grown, and its growing conditions reflect the characteristics of flour. Some wheats are **hard** and some are **soft**. **Hard wheat** contains greater quantities of proteins called **glutenin** and **gliadin (80% of the protein)**, which together form gluten when the flour is moistened and mixed. These two proteins, when combined with water and mixed in a dough, form an elastic substance called gluten. Without gluten, it is impossible to make yeast-raised breads, because it provides their structure. Gluten proteins can absorb about two times their weight in water.

Gluten development is a major concern when mixing doughs and batters.

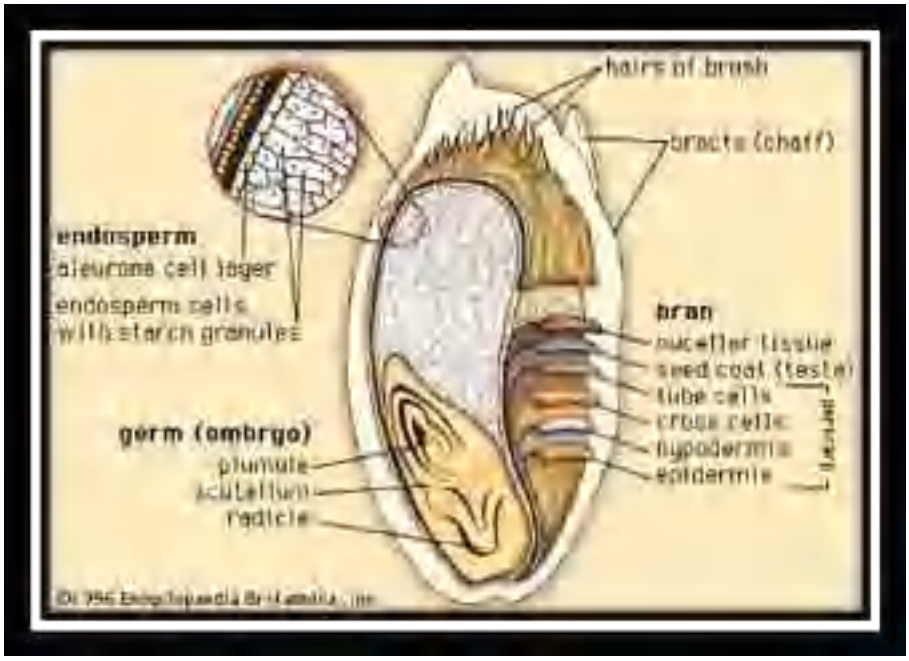
- **Strong flours**: that is, flours from hard wheat with high protein content—are used primarily to make bread and other yeast products.
- **Weak flours**—that is, flours from soft wheat with low protein content—are important in the production of cakes, cookies, and pastries.

1.3.2. Composition of wheat

The wheat kernel consists of three main parts:

1. **The bran** is the hard outer covering of the kernel, the protective covering of the grain. It has five layers which are **Epidermis, Epicarp, Endocarp, Episperm or Testa, and Aleurone** cells or cerealin. Darker in color than the interior of the grain, bran is present in whole wheat flour as tiny brown flakes, but is removed in the milling of white flour. (In the case of whole wheat flour made from white wheat, the bran flakes are a much lighter, creamy white color.). It is high in dietary fiber and contains B vitamins, fat, protein, and minerals.
2. **The germ** is the part of the kernel that becomes the new wheat plant if the kernel is sprouted. It has a high-fat content that can quickly become rancid. Therefore, whole wheat flour containing the germ has poor keeping qualities. It also contains cellulose and other valuable components which are removed during the milling of refined flour. Wheat germ is high in nutrients, containing protein, vitamins, and minerals, as well as fat.

3. **The endosperm** is the white, starchy part of the kernel that remains when the bran and germ are removed. The endosperm is the portion from where refined flour is milled. It consists of 85% of the grain and is made up of a no of small compartments of cellulose. Depending on its source, the wheat endosperm contains about 68 to 76% starch and 6 to 18% protein. The endosperm also contains small amounts of moisture, fat, sugar, minerals, and other components.



1.3.3. Milling of wheat

The purpose of milling wheat has two stages:

1. to separate the endosperm from the bran and germ;
2. to grind the endosperm to a fine powder.

Picture Courtesy Google

The wheat grain has to be milled to extract all the components of the grain and to make it ready for the bread-making process. There are 2 main methods employed to do this job, which are;

1. Stone Milling.
2. Roller milling.

1.3.4. Composition of flour

(approx. values will vary from grain to grain and flour)

Starch	70%
Water	13%
Gluten(insoluble protein)	11%
Soluble protein	2%
Fat	1%
Sugar	2.5%
Mineral matter/ Ash content	0.5%

Note: Orange-yellow pigments called carotenoids are present in flour in tiny amounts. Because of these pigments, unbleached flour is creamy in color rather than pure white. As flour ages after it is milled, oxygen in the air bleaches some of these pigments, turning the flour somewhat whiter in color.

1.3.5. Types of flour

There are different types of flours are available in the kitchen. Each type of flour has its texture, taste, nutrient profile, and varied uses. They are discussed as follows:

- **All-purpose flour(AP):** Commonly found in local markets, although it is often the most basic type of flour and used as a general-purpose flour in restaurants, where it is purchased under the name restaurant and hotel flour. Prepared from processed wheat and involves milling of both soft and hard wheatThis flour is formulated to be slightly weaker than bread flour so it can be used for pastries as well. All-purpose flour has a protein content of about 10 to 11.5% and produces less gluten.

- **Durum flour:** It is made from durum wheat, a high-gluten wheat of a different species than those used for most flour and primarily used to make spaghetti and other dried pasta. It is occasionally used in specialty products, such as Italian semolina bread (semolina is another name for durum flour or durum meal). Durum flour has a protein content of 12 to 16%.

- **Self- rising Flour:** Essentially, self-rising flour is all-purpose flour with added baking powder and sometimes salt has been added. If you wish to make self-rising flour at home, then add baking powder to your AP flour accordingly in the proportion of 1 ½ teaspoons of baking powder, 1 cup of all-purpose flour, and ¼ teaspoon of salt. The self-rising flour is usually 9%. Note that self-rising flour is best when used within six months of purchase. If used longer than that, the added baking powder loses its power.
- **Whole wheat flour**: Made by grinding the entire wheat kernel, including the bran and germ. The germ is high in fat, which can become rancid, so whole wheat flour does not keep as well as white flour.Because it is made from wheat, whole wheat flour contains gluten-forming proteins, so it can be used alone in bread making. The protein content is typically 12 to 13%. However, bread made with 100% whole wheat flour is heavier than white bread because the gluten strands are cut by the sharp edges of the bran flakes. Also, the fat from the wheat germ may contribute to the shortening action. This is one reason why most whole wheat breads are strengthened with white flour. Another reason is that the flavor of 100% whole wheat is stronger than many people care for, and the lighter flavor imparted by a blend of flours is often preferred by customers
- **Multigrain flour:** This type of flour contains multiple grains, typically four or more. The grains can be whole or milled, and the flour can be either bleached or unbleached. Multigrain flour can be used in a variety of recipes, including breads, pancakes, and cookies. It can be either whole grain or refined. Most multigrain flour is not gluten-free because it contains wheat, rye, or barley.
- **Cake flour:** Cake flour is made from weak excellently milled white flour or low-gluten flour made from soft wheat. It has a soft, smooth textur
- e and a pure white color. Cake flour is used for cakes and other delicate baked goods that require low gluten content. The protein content of cake flour is approximately 5% to 8%, and the ash content is approximately 0.3%. Cake flour cake be made at home by adding two tablespoons of cornstarch to all-purpose flour.
- **Gluten-free flour:** It is a type of flour made without gluten that is meant to replace all-purpose flour. All-purpose flour is made from wheat—and wheat contains gluten. So, Gluten-free flour is made with ingredients other than wheat, such as different types of grains, nuts, and seeds. They differ from one another in terms of nutritional value, taste, and texture. For this reason, the best gluten-free flour is different based on what you're using it for and personal preference. However, gluten-free flour is often not an exact 1:1 replacement but Gluten-free flours are often blends of flours, starches, and sometimes gums that are mixed in specific ratios to replace wheat flour.
- **Millet flour:** It is made from ground millet, a grain coming from a grass family and widely grown in different parts of the world. It resembles wheat in both appearance and texture but is gluten-free. This flour is appreciated because of its light texture, sweet and nutty flavor. Many recipes cannot be made with this flour but it is often used in combination with other flours. It is a very good source of many vitamins and minerals.

Check Back Question

1. **Explain wheat flour and with the help of a neat diagram of the wheat kernel, explain different parts of it.**
2. **How flour is constituted?**
3. **List and discuss different types of flour.**

2.4: SUGAR – IMPORTANCE, TYPES, COOKING STAGES

1.4.1. Introduction

"Sugar" is defined as sweet–tasting carbohydrates, formed naturally in the leaves of numerous plants, but concentrated mainly in the roots, stems, or fruits. Sugar can be extracted from the Maple tree, the Toddy, Palmyra, Coconut, and Date Palms; and from Sorghum and Grapes among others. However, the two main commercial sources of sugar are sugar cane, a giant Bamboo grass, in tropical regions, and Sugar Beet, a root vegetable in temperate regions.

The term Sugar, in the singular, denotes cane sugar or beet sugar, the scientific name for which is SUCROSE or SACCHAROSE. In the plural "Sugars" denotes the class of soluble simple carbohydrates to which Sucrose belongs. Other simple sugars include Glucose or Dextrose, which occurs naturally in fruit and vegetables; Glucose Syrup, which is partially hydrolyzed starch; Fructose or Levulose, which is the sugar of fruit and honey; and Galactose, found in dairy products.

The different sugars vary in sweetness or sweetening powder. Fructose is sweeter than Sucrose and its sweetening power in culinary use is greater. Glucose is not as sweet as Sucrose. Honey is a mixture of Glucose and Fructose and therefore sweeter than pure Sucrose.

1.4.2. Sugar and sugar products

White sugar is refined beet or cane sugar containing 99.9% sucrose and less than 0.06% moisture, having been oven dried at 105 C. It has the highest purity and may be sold as a granulated, caster, or in any other form.

Brown sugar is unrefined, or raw, cane sugar (no brown sugar is made from beet because of the inedible molasses), containing 85 – 98 % sucrose and certain impurities, which account for the varying shades of brown. Natural brown sugar possesses a distinctive flavor. Some essential minerals and vitamins may be present, but probably in insufficient quantities. Some commercial brown sugars are refined sugars with caramel or molasses added to color and flavor them.

1. **Castor (superfine) sugar:** Comprising fine small grained crystals. Caster sugar dissolves faster than grain sugar and is particularly used in baking, for making meringues, and for sweetening fruits and ices. There are three grades available: Fine, Medium, and Coarse although the latter is almost indistinguishable from the fine granulated. Golden caster sugar again derived from unrefined cane sugar, is also available.

Picture Curtesy Google

2. **Granulated or regular sugar:** Produced directly from the crystallization of the syrup, it forms fairly coarse crystals. It is the most common all-purpose sugar – for use on the table and in cooking. Golden granulated sugar, a free-flowing brown sugar derived from cane sugar molasses, is very pale brown and has the very same general use.
3. **Icing (confectioners) sugar or powdered sugar:** Granulated sugar is milled into a very fine powder, and mixed with starch, calcium phosphate, or cornflour (cornstarch) to prevent it caking. The fastest dissolving sugar, it is used for dusting, decorating, and icing (frosting) cakes. Golden icing sugar, very pale brown, is derived from unrefined cane sugar.
4. **Lump (loaf) sugar:** Obtained from molding moistened granulated sugar while hot, then drying it to fuse the crystals (agglomerated sugar). Lump sugar takes the form of cubes, tablets, or irregular chunks.
5. **Preserving sugar:** Large sugar crystals are designed for jam-making because they dissolve quickly without forming too much scum. Some jam sugars (gelling sugars) consist of caster or granulated sugar with added natural pectin and citric and/or tartaric acid, which helps produce a good quality set in jams and jellies, particularly for fruit low in pectin. This sugar is used for reducing boiling time, thereby giving a better color and retaining the aromatic flavor of the fruit.
6. **Sugarloaf:** Mainly used in Arab countries, this is sugar molded into cone shapes, with its base wrapped in blue paper.
7. **Sugar nibs (crystal sugar):** Rounded grains, obtained by crushing pieces or blocks of white sugar, sorted for size in a sieve. Its main use is in the decoration and dressing of certain baked goods, like Bath Buns.

8. **Demerara sugar:** Raw or partially refined cane sugar with relatively hard, large, golden-colored sugar crystals. Is often used as a decorating and dressing medium for fermented goods, biscuits, etc. It is rarely used as an ingredient because of the difficulty in getting it to dissolve.
9. **Jaggery:** Moist, dark brown, coarse unrefined sugar, extracted by the traditional methods from the sap of palm trees. It tastes strongly of molasses and is used in India and South East Asia.
10. **Muscovado sugar:** Another raw cane sugar. Dark Muscovado, called Barbados Sugar is similarly good for baking rich cakes, while light Muscovado sugar goes well in cooking with Banana, Toffee, and Butterscotch flavors.
11. **Soft molasses sugar or black Barbados sugar:** Soft, fine, moist, raw cane sugary dark in color, it has a high molasses content and a strong flavor. It is often used to make Ginger Bread, Rich dark fruit cakes, Christmas cakes, Christmas puddings, and chutneys and pickles.
12. **Candy sugar:** Very large crystals of white or brown sugar, are obtained using slow crystallization on wire mesh frames. This is often served with coffee.
13. **Invert sugar:** A sugar obtained by the action of acid and an enzyme on the source, which comprises a mixture of Glucose and Fructose with a little noninverted Sucrose. It is used mainly by professional pastry cooks and industries. It is a thin, clear, and transparent solution.

Picture Courtesy Google

14. **Confectioner's glucose:** Confectioners glucose must not be confused with pure dextrose which has this name. It is a product manufactured from starch consisting of a complicated mixture of different sugars and gum dextrin in the form of a thick, viscous, clear, transparent syrup. The main use of confectioners' glucose is in sugar boiling. There are several grades available according to their Dextrose Equivalent (DE). The types having low DE value have a lower sugar content with a corresponding high percentage of Dextrin gum and are the types that should be used for sugar boiling. Dried glucose

(Maltose) is now available for use in baked goods and is likely to supersede the viscous types. Confectioners' glucose has an indefinite life, although the viscous types may become cloudy on prolonged storage.

15. **Honey:** Obtained either as a clear, golden-colored, thin syrup or as an opaque crystalline mass. For use in the flour confectionery, the thin clear syrup is preferred since it readily mixes in with the other materials. The thick honey is the crystallized variety and is more suited as a preserve. Whilst honey will keep indefinitely, the thin variety will gradually crystallize on prolonged storage.
16. **Pulverized sugar:** This is a really poor variety of Icing sugar having a coarse, gritty texture and grey color. It is useful in short bread and biscuits where it can be more readily dissolved in a small amount of liquid available.
17. **Commercial syrups:** These are syrups like Molasses, Maple Syrup, Golden Syrup, and others. All are popular as toppings for dishes such as pancakes or porridge, except molasses, which is too strong and bitter. Syrups are also popular in icings and desserts.
    - Molasses is the syrup left after the sugar has been crystallized from cane sap. "First" or light molasses is the sweetest and most refined, and "Second" molasses is less so. "Final" or "Blackstrap" molasses (in Britain, Black Treacle) is very heavy and dark, with a harsh flavor. "Premium" table molasses is made by blending cane syrup with "First" molasses. Molasses lends a strong characteristic taste to food and is used most typically in biscuits, gingerbread, etc. It also features barbecue sauces and Boston baked beans and some Asian savory preparations.
    - Cane syrup tastes like molasses and is made commercially by simmering sugar cane juice until thick and golden brown. Pale yellow golden syrup, also made from sugar cane sap, is milder, with a thick Honey-like consistency. Glucose or honey are the closest substitutes.
    - Corn syrups are sweet, thick liquids derived from corn kernels, used in baking, desserts, sweets, and snack foods. Light corn syrup tastes like liquid sugar but dark corn syrup is mixed with molasses for added color and flavor. American pancake syrup is corn syrup mixed with a little maple syrup.
    - Maple syrup, made from the sap of the sugar maple tree, is the most highly prized of all syrups. It has a very sweet, distinctive flavor and auburn color. Maple sugar, crystallized from the sap, is available granulated or in sweets.
    - Sorghum or molasses syrup is extracted from the stalks of the sorghum plant. Barley malt syrup (barley malt or malt extract) has a delicate flavor and is high in vitamins and iron.

1.4.3. The properties and cooking of sugar

- White, shining, odorless, and with a particularly sweet flavor, granulated sugar in its pure stage is in a rhomboidal prism.
- Its true density is 1.6 by volume but its practical density is about 1.2 by volume. Its degree of solubility in water depends upon the temperature: 1 Lt water can dissolve 2 Kg of sugars at 19 0C and nearly 5 Kg at 100 0C.
- It is not easily dissolved in Alcohol.

- Heated when dry, it begins to dissolve at about 16 0C
- The sugar caramelizes above 17 0C and burns at about 19 0C
- Beaten with egg yolks, it produces creamy foam used in numerous recipes for desserts; when added to stiffly beaten egg whites it provides the basis for Meringues.

1.4.3. Different stages of cooking sugar

Definitions of stages and temperatures vary slightly. The following are typical stages and temperatures:

Picture Courtesy Google

- **Coated 100 0c**: Translucent syrup is about to come to a boil. When a skimmer is dipped into it and withdrawn immediately, the syrup coats its surface. It is used for fruits in syrup.
- **Small thread or small gloss (103-105 0c)**: The consistency of this sugar is tested by plunging the fingers first in cold water, then quickly in the sugar syrup, which has become thicker; on parting the fingers slowly, short threads will form, which will break easily. It is used for almond paste.
- **Large thread or large gloss (106-110 0c)**: The thread formed in between the fingers is now stronger and about 5mm wide. This syrup is used in recipes requiring 'sugar syrups' for buttercreams and icings (frostings).
- **Small pearl** (110-1120 **c**): A few minutes after the large thread stage, round bubbles form on the surface of the syrup, when a little is cooled on a spoon and taken between the fingers, it forms a wide solid thread. It is used in jams and torrone (a type of nougat).
- **Large pearl or souffle (113-115 0c)**: The thread of sugar in between the fingers may reach the width of 2cm, if it drops back, forming a twisted thread it is described as 'in a pigtail'; when one blows on the skimmer on plunging it into the syrup, bubbles are formed on the other side. It is used in jams, sugar-coated fruits, maroon glaces, and icings.
- **Small or softball (116-118 0c)**: When a little syrup is removed with a spoon and plunged into a bowl of cold water, it will roll into a softball; if one blows on the skimmer dipped into the syrup, bubbles break loose and blow away. It is used in jams and jellies, soft caramels, nougats, and Italian Meringues.

- **Large or hard ball (121-124 0c):** After several boiling of the soft ball stage this hard ball stage sets in and can be tested similarly to the soft ball where a hard ball is obtained. If one blows through the skimmer, snowy flakes are formed. It is used in jams, sugar decorations, Italian meringue, fondant, and caramels.
- **Light, small or soft crack (129-135 0c):** A drop of the syrup in cold water hardens immediately and will crack and stick to the teeth when chewed. It is used mainly for toffee.
- **Hard crack (149-150 0c**): The drops of syrup in cold water becomes hard and brittle, but not sticky. The sugar acquires a pale yellow color at the edges of the saucepan. It is used for boiled sweets and candies, spun sugar decorations, icings, sugar flowers, and candyfloss.
- **Light caramel (152-160 0c)**: The syrup which now contains hardly any water, begins to change into barley sugar, then into caramel; yellow at first, it becomes golden and then brown. It is used in the caramelization of Crème Caramel, sweets, nougatine, puddings, cakes, biscuits, and icings.
- **Brown or dark caramel (166-175)c)**: When it has turned brown sugar has lost its sweetening powers. As the last stage of cooked sugar before Carbonization (sugar burns and smokes at about 190C), brown caramel is used mainly for the coloring of sauces, cakes, and stocks.

Check Back Question

1. **What is the scientific name of sugar and its different source.**
2. **Name at leat 5 sugar products.**
3. **Explain different stages of cooking sugar.**

2.5: WATER –PH, APPLICATION IN COOKING, AS A COMMODITY

2.5.1 Introduction

Water, the essential material for life is the only substance on the Earth that occurs in all three physical states e.g.

- Solid/ice,
- Liquid/water
- Gas/water vapor

Living systems contain water around 70–80% and it helps in the possesses of many chemical and physical properties that make it useful to cells and organisms.

2.5.2 Importance

Water is an important nutrient in food groups like grains, meats, dairy products, fruits, and vegetables and major nutrients such as carbohydrates, proteins, water-soluble vitamins, and minerals are hydrophilic. Most carbohydrates and proteins in foods are plasticized by water. Water interacts with other food components using polar, hydrogen-bonding, and hydrophobic interactions. These interactions change the properties of water.

Water also plays various critical roles within the field of agriculture, food, and feed science, technology, and engineering. In our life, water is the main component of drinking water, beverages, and most foodstuffs. The water content of fresh fruits, vegetables, meats, and sea foods exceeds 50%. Water is used as a good medium to cook food. water is not just a medium for reactions, but is also an active ingredient used to control reactions, food texture, and physical and biological behavior. Food may pick up moisture from the environment or lose moisture to the environment during storage. The percentage of loss of fresh foods can be significantly reduced by controlling their water activity during storage. These changes may influence the texture and organoleptic properties of foodstuffs. Many operations in food processing (concentration, drying, dehydration, thawing, salting, and freezing) use the physicochemical properties

2.5.3 What is the p H of water?

The amount of hydrogen ion present in a water-based solution is called p H. What is p H? p H means the **potential of hydrogen**, and measures the acidity or alkalinity of water-soluble compounds. The pH scale ranges from 0 to 14, with 7 being the neutral point. As the number falls below seven, acidity levels below seven rise, with 0 being the most acidic.

- A pH of less than 7 implies more hydrogen ions in the water, making it acidic.
- A pH greater than 7 implies that the liquid has fewer hydrogen ions, making it basic.

2.5.4 The importance of water in cooking

- **Water can help to tenderize the meat:** Beyond boiling and steaming, making stews and soups in the kitchen, one of the most important applications of water in the kitchen is tenderizing and softening the meat. As meat cooks, the heat applied causes the protein in the meat to tighten and squeeze the moisture.
- **Cooking food in water adds moisture:** When dry food like rice and pulses are submerged in water for a specific time, it becomes soft and cooking time reduces. When food is exposed to boiling water during cooking, the water helps to trap the steam and condensation around the food and resulting in food becoming soft and juicy.
- **Water is used in sous-vide cooking**: In some high-end restaurants, this popular method is in existence. In this method, the food item is sealed in an air-tight plastic bag and cooked under a water bath at a very controlled temperature. The heat is transferred very slowly and gently and helps to food to retain the moister and remain juicy.

- **Water is used to rinse and refresh the food**: Water helps in removing the surface dirt or other unwanted materials especially from vegetables by putting it under cool running water. To prevent overcooking of vegetables also, its refreshed with ice-cold water.
- **Blanching vegetables in water also helps with flavor and natural color.**
- **Water is also used for pickling and brining.**

Check Back Question

1. **Why p H of water is very important in cooking?**
2. **List some function of water to facilitate cooking.**

SUMMARY

Cooking is a highly diverse subject, but what makes it unique is that it connects people from all over the world, regardless of their race, religion, or ethnicity. The vast variety of cuisines represents people and their cultures ever so beautifully.

The growth of the food service industry creates a demand for thousands of skilled professionals every year. Many people are attracted to this career that is challenging and exciting and, above all, provides the chance to find real satisfaction in doing a job well

"Cooking is an art, but all art requires knowing something about the techniques and materials." – Nathan Myhrvold. To honor the statement, in this gastronomic world, all service personnel in the food service industry must be conversant with techniques, processes, and methods. It is also imperative to understand the role of all the ingredients used in the kitchen with the science and art involved in it. In this particular unit, an effort has been given to explore the organizational structure of modern kitchens and the duties and responsibilities of various Chefs working in different catering establishments. It is also mandatory to understand what are professional ethics and etiquettes while grooming themselves as a professional. The science behind why we cook, and the aims and objectives of cooking are also discussed in this unit to sustain interest. Attention to the basics has always been the hallmark of this unit. The fundamental of cooking techniques, the role of ingredients, and the outcome of the product are also explained in this unit.

This unit is designed to be readable and useful. The format emphasizes and highlights key points in bold type and numbered sequences, so basic information can be located and reviewed at a glance.

REVIEW QUESTIONS

MULTIPLE CHOICE QUESTIONS (MCQ)

1. Who is the chef responsible for preparing sautéed shrimp with garlic and butter sauce?

I. Potager
II. Legumier
III. Saucier
IV. Poissonier

1. Baking powder produces which gas?

I. Carbon monoxide
II. Carbon dioxide
III. Oxygen
IV. Cooking gas

2. The melting point of fat is _____ and the melting point of oil is _____.

I. Higher, Higher
II. Lower, Higher
III. Higher, Lower
IV. Lower, Lower

3. What is the purpose of kneading dough?

I. To add flavor
II. To create a chemical reaction.
III. To make the dough smoother
IV. To cook the dough faster.

4. The skin of vegetables or fruits is called.

I. Mincing
II. Slicing
III. Paring
IV. Slicing

FILL IN THE BLANKS QUESTIONS

1. _____ and table _____ in the classic French tradition of the menu.
2. The person responsible for the preparatory work and assembling of salads is known as _____.
3. To be a good professional worker in the kitchen, one should have _____ towards the job.
4. kitchen waste, vegetables, fruits, and flowers are coming under _____ waste.
5. Very large crystals of white or brown sugar are called _____.

TRUE AND FALSE QUESTIONS

1. A pH of less than 7 implies more hydrogen ions in the water, making it acidic.
3. Cooking sugar to Hard crack, the temperature should be 120-125 oc.

4. Granulated sugar is milled into a very fine powder, and mixed with starch is called Invert sugar.
5. The germ is the hard outer covering of the wheat kernel.
6. Ammonium Carbonate is also known as Baker's ammonia

SHORT ANSWER TYPE QUESTIONS

1. Write a note on the Attitude, attributes, and etiquette of the kitchen staff.
2. Explain the factors involved in the Hierarchy of the Kitchen Department.
3. Discuss five types of sugar syrups used in food production.
4. Describe the difference between Fats and Oils.
5. Mention any two types of Raising agents and comprehend.

LONG ANSWER TYPE QUESTIONS

1. With the help of a neat diagram, explain the classical kitchen Brigade.
2. Define cooking. Explain different characteristics of sensory organs concerning food.
3. What is the safety of a workplace(kitchen)? List and explain the basic rules of kitchen safety.
4. What is raising agents? Explain any two kinds of raising agents in brief.
5. What is wheat flour? Draw a neat diagram of a wheat kernel and identify different parts of it and explain.

OPEN BOOK QUESTIONS

1. How job description of all the chefs helps in the efficient and effective outcome of the kitchen operation?

2. **"It's necessary to understand the Art and Science of cooking for the best result."**: Justify your answer with necessary examples.

ACTIVITY

1. Students will be divided into small groups and visit different star-grade hotels and observe how the kitchen brigade is working and submit a report on that based on their job responsibilities.
2. Students will visit the hotels in small groups and collect the name/ sample (at least 10) of different categories of ingredients used and submit a report on the function of those in the kitchen.

3

Chapter

BASIC COOKING PRINCIPLES

Learning Objectives

S.NO.	Sub Unit	Learning Topics	Key learning Objectives / At the end of the sub-unit, the learners will be able to:
1	Heat Transfer and Cooking Methods	• Methods of Heat Transfer- Conduction, Convection, and Radiation • Cooking Methods • Dry Heat cooking methods (With fat & without or little fat) • Moist Heat cooking methods • Combination cooking methods • Special cooking methods	1. Describe the concept of Heat transfer 2. Narrate the concept of various cooking methods 3. List the different dry heat cooking methods 4. List the different moist heat cooking methods 5. Describe the fundamentals of combination and special cooking methods
2	Stocks	• Definitions • Types of Stocks • Components of Stocks • Principles of Stock-making • Methods of Stock-making • Storage and Usage	1. Define the term stock 2. Recognize the various types of stocks 3. Narrate the various components and ingredients of stocks 4. Recall the principles and methods involved in stock-making. 5. Describe the proper storage and usage of stocks.
3	Thickening Agents and Sauces	• Definition of Thickening Agents • Types of Thickening Agents • Sauces • Classification of Sauces • Basic Sauces and their Derivatives • Proprietary Sauces • Contemporary Sauces • Miscellaneous Sauces • Dessert Sauces	1. Define the thickening agents 2. Recognize the various types of stocks 3. Define the sauces and along with list the various types of sauces 4. Identify the basic sauces and their derivatives 5. Explain the concept of proprietary, contemporary and other sauces

3.0: BASIC COOKING PRINCIPLES

Unit Overview and Description

Overview: After reading this unit, the learners will be equipped with the fundamentals of heat transfer and various cooking methods. They would be aware of different cooking techniques. This unit will also make them understand the basic principles behind the stocks, their uses, and the concept behind the thickening agents. It will also inform them about various sauces, their derivatives, and their uses and application in day-to-day cooking.

3.1 INTRODUCTION

Cooking is a process in which raw food is transformed into something edible so that it is easier to consume and digest; using heat transfer. When the heat is applied, it results in a few desirable modifications like changes in molecular structure, flavor, aroma, texture, and appearance of food. These changes taking place in raw food due to the application of heat (either by gas flames or electric element) makes it tastier and more digestible.

Cooking is the art, science, and discipline of preparing and presenting food.

3.2 HEAT TRANSFER & COOKING METHODS:

The heat can be transferred in three ways, i.e. conduction, convection, and radiation.

3.2.1 Methods of Heat Transfer- Conduction, Convection and Radiation

Conduction Cooking

Conduction: In this, the heat is transferred using direct contact. It happens in two ways. In one way the heat moves directly from one item to another touching it. For example: from the top of the range to the soup pot placed on top of it, from the pot to the broth inside, and

from the broth to the solid food items in it. Whereas, in the second way, the heat moves from one part of something to an adjacent part of the same item. For example, the heat travels from the exterior of solid particles to the interior of it, or from the sauté pan to its handle.

Metals are good conductors of heat. Gases are poor conductors of heat. Water is a good conductor of heat as compared to air.

Convection: In this, the heat is transferred through the medium of movement of a fluid (liquid or gas). It takes place in two ways: Natural Convection and Mechanical Convection.

Natural Convection: It happens as warm liquids and gases have a feature to rise whereas colder ones incline to fall. Due to this tendency, the natural circulation of heat takes place. For example, when a pot of water or liquid is heated, the molecules at the bottom get warm and rise to the top whereas the cold and heavier molecules at the top sink and fall. After a while, the colder molecules get heated and it rises. This movement of the cycle in water leads to the circulation of heat throughout. This is a kind of natural convection.

Mechanical Convection: It happens as the circulation of heat using fans used in an oven or steamer. This proves transfers the heat more rapidly to the food. This is a kind of mechanical convection.

Radiation: In this, the heat is transferred using waves of heat. In this, no physical contact takes place between the heat source and the food being cooked, as it does in conduction and convection. There are two types of radiation: infrared cooking and microwave cooking.

Microwave Radiation Cooking

Infrared: It is based on infrared radiation emitted from the electric elements or ceramic elements heated to a high temperature. The heat waves emitted are absorbed by food resulting in heat transfer.

Microwave: In microwave cooking, the radiation (electromagnetic waves) generated by the oven penetrates partway into the food. It here agitates the water molecules of the food. The friction caused by this agitation creates heat and which ultimately results in cooking of the food.

It is effective only in food having water molecules and hence a completely waterless material will not get heated in the oven. Plates/containers become hot only when heat is conducted to them by the hot food. Because most microwaves penetrate no more than 5 cm (2 inches) into foods, heat is transferred to the center of larger pieces of food by conduction and not by radiation.

3.2.2 Cooking Methods

Primarily, foods can be cooked in the presence of a cooking medium like air, water, fat, and steam. Following are the common cooking methods: Moist heat method, dry heat method (with fat and without fat), combination cooking methods, and special cooking methods.

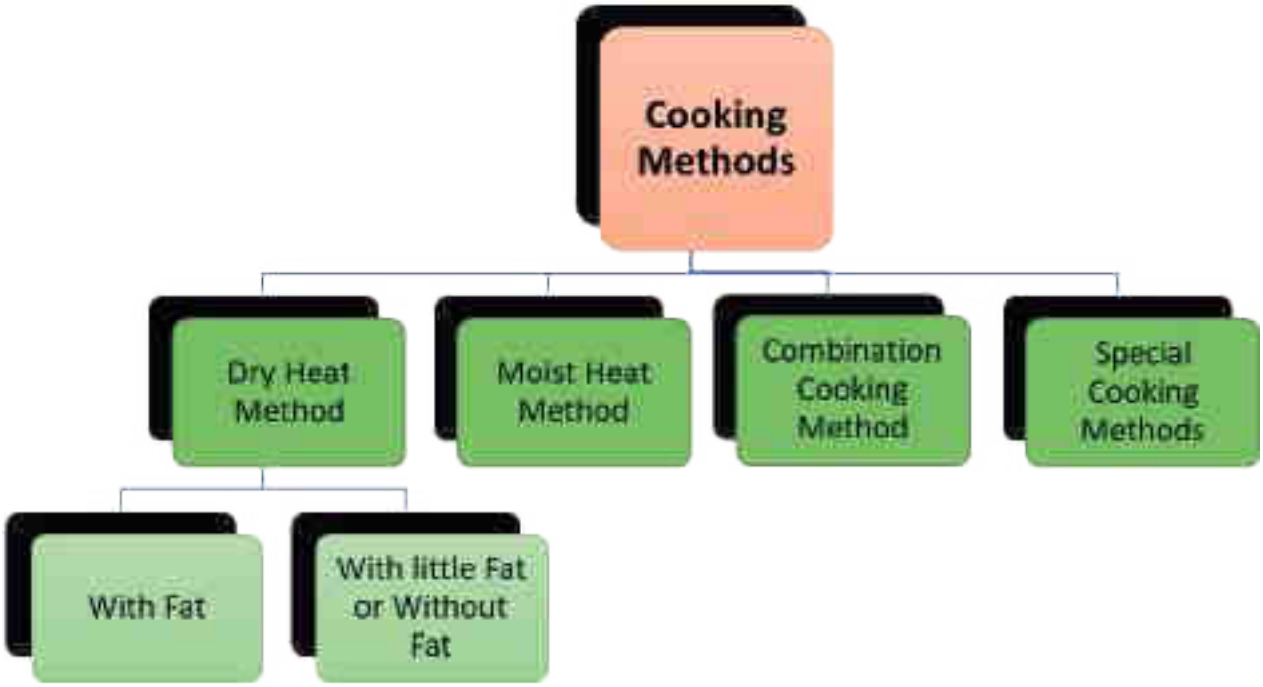


Chart - Cooking Methods

3.2.3 Dry Heat cooking methods (With fat and without or little fat)

This method of cooking implies applying heat directly to the food, by bringing it in direct contact with flame, or indirectly, by surrounding the food with heated air or heated fat.

DRY HEAT COOKING METHODS - WITH FAT

Frying: It is the cooking method in which the food is fried by placing it in oil or entirely immersing it in oil at appropriate temperatures. It is of five types: Deep frying, shallow frying, pan frying, and sautéing (stir-frying).

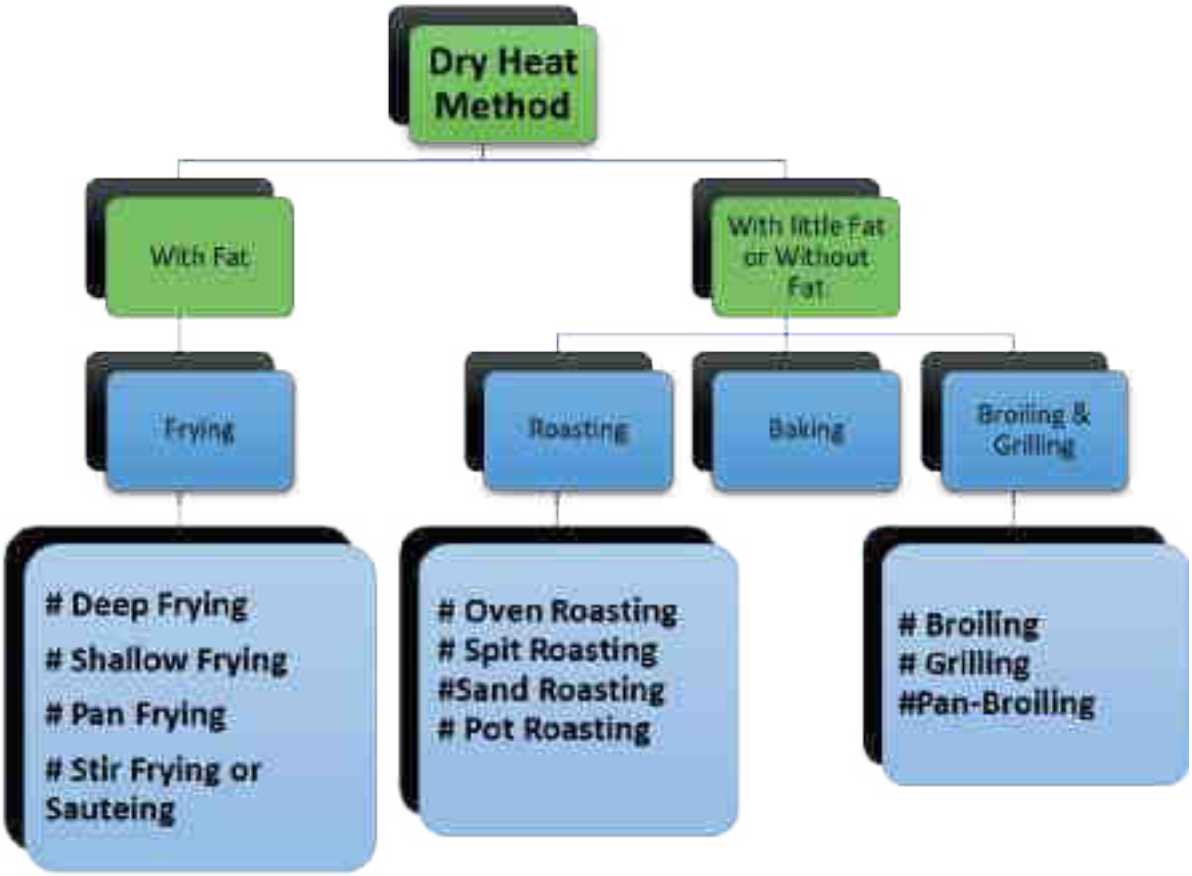


Chart – Dry Heat Cooking Method

FRYING

- **Deep frying:** It simply means to cook food submerged in hot fat or oil.

  The food to be deep fried is completely immersed in fat and therefore large amount of fat is required. Care should be taken not to heat the fat to a very high temperature otherwise it will get decompose and the fat will get spoilt. The fat should also not be very cold as the food will absorb unnecessary fat. A large number of items are capable of being cooked by deep frying that it has become one of the most frequently used methods of cookery. The process is subject to strict rules and regulation, which it is wiser not to infringe because of the danger of accidents.

Deep Frying

The utensils which are used during frying should be made of strong metals such as copper, stainless steel, etc. They can be oval or round and must be of a size sufficiently large and deep that when only half full of fat there is still sufficient room in it for cooking. Frying utensils with straight sides are better than those with sloping sides.

- **Deep Frying**
- **Shallow Frying**
- **Pan Frying**
- **Stir Frying/Sauteing**

Note:

The quality of deep-fried products can be measured by the following.

- Minimum fat absorption
- Minimum moisture loss. (Not overcooked)
- Attractive golden appearance.
- Crisp surface or coating.
- No off-flavors imparted by the frying fat.
- Conventional deep-fried foods, except potatoes, are coated with milk and flour, egg and crumbs, batter, or pastry, to:
  - Protect the surface of the food from the intense heat.
  - Prevent the escape of moisture and nutrients.
  - Reduces the absorption of fat.
  - Modify the rapid penetration of the intense heat.
  - To give crispness, color, and flavor.
  - Protects the fat against the moisture and salt in foods, which speeds up the deterioration of frying fat.

GENERAL RULES FOR DEEP FRYING

- Preparation and cooking should be done systematically.
- Fry at the proper temperature i.e. 175° C – 190° C. Excessive greasiness is caused by frying anything at a very low temperature.
- Never overfill a fryer with fat/oil. Half full is the safest level.
- Never overload the baskets, as doing so will greatly reduce the temperature of the fat/oil.
- Allow the temperature to recover between batches.
- Avoid frying strong and mild-flavored foods with the same fat, if possible, just to reduce contamination of flavors.
- Wear your sleeves rolled down to avoid burns from possible splattering of hot fat/oil.
- Ensure foods such as potatoes are dry and free of moisture before adding to hot fat to avoid splatter.
- Always place food carefully into the fry away from you to avoid splashes of hot fat.
- Turn off or lower the heat of fryers between uses. (95° C – 120° C)
- Always cover fryers when not in use to prevent oxidation.
- Skim and strain fat regularly.
- Allow fat/oil to cool before straining.

Shallow Frying

- **Shallow Frying:** When a small amount or less amount of fat is used for frying the process is known as shallow frying.

Here, the food item is not fully immersed in fat; but partially immersed or it just has a surface contact with the oil. The food item is turned on both sides to give even coloring. Generally, this method is applied to pre-cooked food and to those which require very little time to cook.

Shallow frying is the quick cooking of food in a small quantity of preheated fat or oil in a shallow pan or on a flat surface (griddle plate).

Note: The food is cooked in a small amount of fat or oil in a frying pan or sauté pan.

- Butter can be used in shallow frying, unlike deep frying.
- This method is used for the cooking of good quality and tender small cuts of meat, poultry, and fish. Small whole fish up to 400 grams can also be cooked this way.
- The presentation side is always cooked first, as this side will have a better appearance because the fat/oil is clean, the item is then turned so both that both sides are cooked and colored evenly.
- Eggs, pancakes, and certain vegetables are also cooked by this method.
- Fish cooked this way is referred to by the term *Meunier*. The fish fillet is first passed through seasoned flour, shallow fried, and finished with lemon juice, nut-brown butter, and chopped parsley.
- Tongs should be used in this style of cooking.
- The oil should be preheated and should not be much of quantity as only 2/3rd of the item is to be dipped in it.

Pan Frying

- **Pan-frying:** Pan frying is a method very much similar to shallow frying. This technique uses less oil than deep frying but a little more oil than shallow frying. The item to be pan-fried needs to be properly breaded or crumbed as breading/crumbing doesn't allow too much oil to be absorbed.

Note:

- Pan-frying is similar to sautéing except that more fat/oil is generally used and the cooking time is longer. This method is used for larger pieces of food, such as chops and chicken pieces (bone-in). The items are not tossed as in sautéing.

- Pan-frying is usually done over a lower heat than shallow frying or sautéing because of the larger pieces being cooked.
- The amount of fat/oil used depends on the food being cooked. Only a small amount is used for eggs, for example, while as much as 2,5 cm (1 inch) or more may be used to pan-fry chicken pieces.
- Most foods must be turned at least once for even cooking. Some larger foods may be removed from the pan and finished in the oven to prevent access to browning.
- The same general rules for shallow frying apply to pan-frying.
- **Sautéing/Stir-frying:** It is a dry-heat method of cooking coined from the French word *sauter* which means to jump or to bounce, referring to the action of the cut small pieces of food when tossed in less quantity of oil in a sauté pan.

Note:

- It is effective with high temperatures and small pieces of food items to be cooked.
- It needs less quantity of oil.
- The food to be fried should not be overcrowded in a sauté pan, as it will make tossing difficult.
- During this process, the pan should be in proper contact with heat just to prevent it from getting cool.

DRY HEAT COOKING METHODS – (WITHOUT OR LITTLE FAT)

Baking: It is the process of cooking food in an oven, where dry heat and steam are used to bake the food. In this, the heat energy is transferred by convection to the food's surface, and then the heat penetrates the food using conduction.

Baking

Baking is the term for cooking in a closed oven and it describes the cooking of flour and liquid mixes such as dough, paste, and batters. The hot air that surrounds the food during this procedure dries up the food's surface and gives it a lovely brown color. Heat is emitted from the oven's bottom and walls. When the same procedure is applied to meats, it is referred to as roasting.

METHOD

There are three methods employed when baking. Dry Baking, Baking with increased humidity, and Baking with heat modification.

1. Dry baking

This technique of baking creates steam from the meal's water content, which mixes with the oven's dry heat to cook the food. Cakes, pastries, and baked potatoes are a few examples.

2. Increasing the humidity while baking

The oven's humidity can be raised by adding a bowl of water or, more frequently today with contemporary ovens, by injecting steam. This enhances the quality of the cooked meal by increasing its moisture content. Examples: Baking of bread and bread rolls.

3. Baking with heat modification

To achieve this, put the container containing the meal into a second container that has water in it up to halfway. This prevents the food from scorching and modulates the heat so that the food cooks more slowly (Bain-Marie). Example: Crème caramels and baked egg custard.

Note:

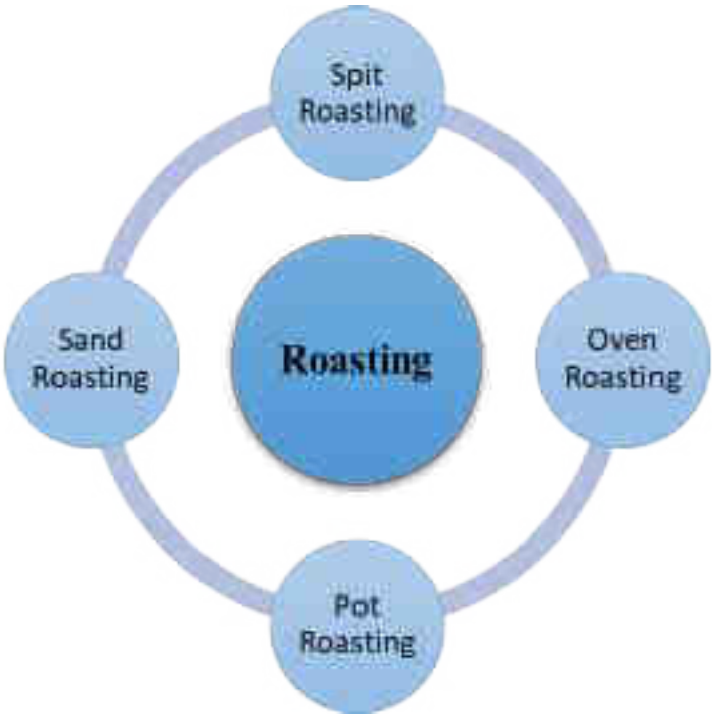
- In order to prevent food from deteriorating, always preheat ovens so that the necessary temperature is provided to the product right away.
- Because baking requires precise temperature and timing, make sure the oven has time to achieve the desired temperature before adding more batches. This is referred to as recovery time.
- Weighing, measuring, and temperature management all require accuracy in the process of baking.

Roasting was the first known form of cooking in the Paleolithic period.

Roasting: It is defined as the dry-cooking process in which the foods are exposed to direct heat from a flame or are subjected to radiant heat from any other sources. It is generally done for food items like meats, poultry, and vegetables. The items to be roasted should be moistened with fat or butter and along with turned occasionally for even cooking.

Roasting

ROASTING AND ITS TYPES



- **Spit roasting:** It is the oldest cooking technique. In this, the meat pieces to be roasted are skewered which is placed on a spit containing live charcoal emitting fierce heat. Exposing the joints directly to the dry heat or flame does spit roasting. The joints are basted at regular intervals so that they do not become dry. Bar-be-que and Tandoor cooking are good examples of spit roasting.
- **Oven roasting:** It is used for larger joints and tender vegetables. The oven is the equipment used in this cooking process. It is ensured that the oven is preheated properly and the joints to be roasted must also be larded. The heat of the oven can be reduced to penetrate the meat and then it can be increased to give colour.

- Minimize the opening of oven doors as draughts will reduce the oven temperature and affect the quality of the product being produced.
- **Pot roasting:** In this, the roasting is done in a pot containing enough amount of fat to cover the base of the pot and then the small joints of meat are browned in the hot fat turning it occasionally to let it cook evenly. The lid is closed and the pan is put on a slow fire. It is advisable to baste the meat from time to time.
- **Sand roasting:** One of the very popular techniques of roasting and is used for roasting popcorn, peanuts, Bengal gram and other grains. A kadhai is filled with sand and is heated from the bottom. The food items to be roasted are put in sand and are continuously stirred and once the roasting is done, the grains are taken out, sieved, and then separated from the sand.

Note:

- Small pieces of meat are roasted by spit roasting whereas large joints are roasted in oven roasting.
- Roasting should only be done with delicate quality meat, fowl, and game.
- Always start in a hot oven to allow for the sealing of the meat's surface and aid in the preservation of fluids.
- Lower the temperature as per the requirement of the size of the object being roasted.
- Make sure the tray is appropriate to the size of the item being roasted.
- All products must be seasoned before roasting. If the tray is too large or too tiny, the fat will burn and ruin the flavor of the gravy and make basting difficult.
- Don't cover the meats during roasting.
- When possible, keep basting the meats often while cooking.
- Use juices from the roasting process to produce accompanying gravy.
- If possible, always use the temperature probe to determine the correct cooking temperature is achieved.

Broiling: It is a cooking technique where Cooking food is done by direct heat on a griddle or pan and food is kept uncovered. In this, the heat source from above broils the food, and heat from below marks the broiled food with a hot grate multiple crossing lines mark.

Note:

A salamander is an equipment which is a low-intensity broiler used for broiling food.


Grilling

Grilling: In this cooking technique, the heat source is beneath the cooking surface. It may be electricity or gas-operated or live charcoal or wood below the food. The major goal of the culinary preparation described by this name, known as concentrated cooking, is to preserve the meat's internal fluids throughout the cooking process. The finest meats are prepared using this approach since it is the quickest. Greasing the metal grate with care is a good idea.

Charcoal Grilling

The ideal fuel for grilling is charcoal, however, electrical grills can also be used. Under a grill, how the fuel is laid out is very important. It ought to be controlled according to the kind and size of the meat. The metal grill itself has to be very hot to prevent food from sticking to the bar and ruining the meat.

In this form of cooking, the food item may be prepared in the following ways:

- Between the heat (electrically heated grill bars or grooved plates)
- Under the heat (gas or electric salamanders)
- Over the heat (charcoal, barbecues, gas, or electrically heated grills)

Note:

- The grilled foods are usually marked with multiple crossing lines/marks.
- The fat rendered during grilling drips into the fire flame below and flares up the fire thereby burning the food. This burning of food lends a smoky flavor to the delicacies.
- Grilled food must be basted with butter or any other sauce to avoid moisture loss to the food.
- Specific woods like pine, hardwood, etc. are used to lend a unique flavor to the grilled food.

3.2.4 Moist Heat cooking methods

This method of cooking implies applying heat directly to the food, either by submerging food directly into the liquid or by subjecting it to steam. The temperature in this may vary from 70°C to 100°C.

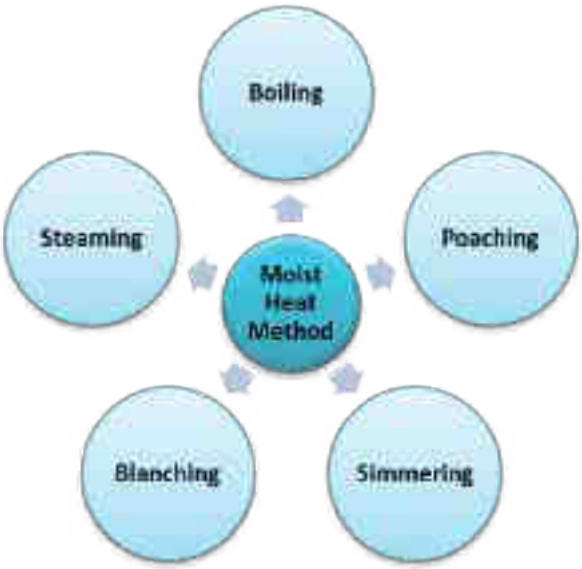


Chart – Moist Heat Method

Boiling: When cooking is done at the boiling point (100°C) of a liquid, it is referred to as boiling.

The most popular cooking technique involves immersing the food product in a liquid that is boiling and allowing it to begin to bubble. The liquid's body is violent, and its surface is rolling. Convection heat current is utilized to cook the food via the liquid that covers the food product. This liquid may be water, milk, stock, or chicken bouillon.

Boiling of Eggs

It can be done in any two ways:

1. The water or liquid is allowed to first boil and then the food is put in it directly and then allowing the food to boil properly in bubbled water.
2. The food and water are placed simultaneously in a pot and then both are heated to reach the boiling temperature of water or liquid. It is taken care that the temperature is maintained till the food is properly cooked.

Notes:

- Vegetables that are cultivated above ground are begun with cold water, while those that are planted below ground are cooked in salted water.
- Fish is simmered until fully cooked in water that has reached just below the boiling point.
- Cold water is used to cook the meat.
- Cold water is used to begin cooking dry veggies, and salt is added after they are soft.
- Par-boiling is the term for unfinished or just partially cooked food that is prepared by boiling.
- Boiling requires a temperature of 100 deg. C.
- It is preferably done for cooking certain vegetables, pasta, eggs, pulses, starches, etc.
- Boiling makes the older and tougher meats edible and digestible.
- It leads to the loss of water-soluble vitamins like Vitamin B and Vitamin C.
- One advantage of boiling is that it instantly kills all the microbes present on food surfaces.

Poaching

Poaching: Poaching is the process of cooking food in the necessary amount of liquid at a temperature i.e. just below boiling (70°–85°C). Poaching is a straightforward cooking technique that involves boiling food in a tiny amount of liquid that barely covers it. In this style of cooking, the liquid is not stirred and boils without boiling. Poaching bubbles up from the pan's bottom. This is the reason why the term "slow cooking" is frequently used to describe this method.

Notes:

- Commonly poached items are eggs, fish, fruits, and chicken.
- The poached foods are bland in taste and it is without any fat content.
- The tools like a spider, perforated spoon, or fish slice should be used to remove the poached food from the poaching liquid.
- Poached foods are more digestible as compared to other cooked foods.
- It is better to have a little amount of vinegar and salt added to the poaching liquid, while poaching eggs, as it helps faster coagulation and along with prevents tissue disintegration.
- 'Oil poaching' is also an alternative method of low-heat water poaching. Here, the oil used is below the boiling point of water and hence it doesn't brown the food.

Simmering: Simmering is a moist-cooking method where food is cooked in a liquid (just below the boiling temperature i.e. from 85°C to 95°C) and at times bubbling.

Note:

- It is preferable to simmer the fewer tender cuts of meat which require a slow, long, and moist cooking method for tenderizing.
- This method prevents food from toughening and/or breaking up food particles.
- As compared to boiling, simmering is preferred over boiling as simmering is not harmful to most food items.

Blanching

Blanching: It is a cooking process where certain foods are been partially cooked for a very short duration of time, usually in water. This is done by just dipping the food in boiling liquid for about 10 seconds to 2 minutes. The duration of dipping depends on the hard texture of the food. This process is done to facilitate the peeling of foods such as fruits, vegetables, nuts, etc.

Steaming: It is the cooking of prepared foods by steam under varying degrees of pressure.

Steaming is usually preferred in the cooking of vegetables as these can be cooked quickly with minimal loss of color and nutritional value. It is interesting to know that steaming potatoes will cook them quicker than baking or boiling. Food products like fish also cook well by this process. Certain dessert items such as puddings and sponges are lighter in texture if steamed rather than baked.

Steaming

The most interesting aspect is that none of the nourishment is lost in this type of cooking. This is a slow method of cooking and one that can only easily cook food items should be cooked by this method. Steaming requires maximum temperature.

Examples of steamed foods are Idli, rice, fish, etc.

3.2.5 Combination cooking methods

As the name suggests, the combination cooking method is a cooking method in which more than one cooking is applied to cook the food. Braising is one such combination cooking method.

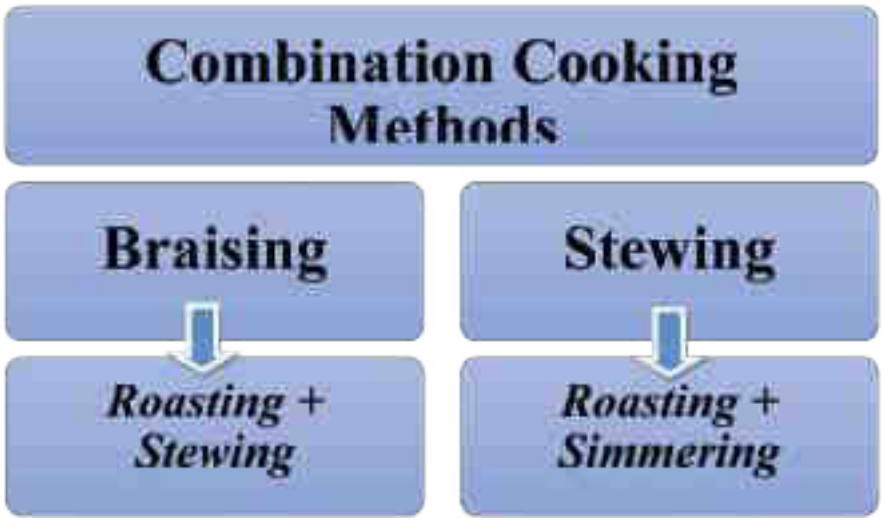


Chart – Combination Cooking Methods

Braising:

Roasting and stewing are the two cooking methods that are both utilized in the unusual cooking technique known as braising. The meal is prepared in a closed container at a low temperature with a minimal amount of liquid. To seal the edges of the meats and preserve the liquids, pot roasting is typically done during braising in the presence of some fat (roasting). The meats won't be cooked this time around; instead, the stewing principle will be used. During the cooking phase, the food item is either basted or rotated and is covered with liquid by 2/3rd (stewing).

Braising

When it comes to stewing, harder meat and poultry pieces and joints as well as some vegetables can be prepared this way. Braised foods don't have enough liquid to completely cover them, so the steam trapped beneath the lid cooks the product's top.

The art of preparing, cooking, and presenting food is called Culinary Arts

Braising is of two types:

- **Brown Braising:**

Meat joints, such as those made of venison or beef, are marinated, larded, and then sealed (browned) on both sides in a hot oven or a pan on the stove. The joints are then laid into a bed of root vegetables in a braising pan; sealing will assist to keep their fluids and taste, nutritional content, and offers a good color to the completed meal.

As with a stew, liquid (stock) and other flavoring ingredients are added, covered with a lid, and cooked gently in the oven.

Portioned pieces of meat are cooked the same way, including steaks, chops, and liver.

- **White Braising:**

Vegetables like celery, fennel, lettuce, and cabbage as well as more delicate white meats like veal and sweetbreads are typically braised in white sauce.

The item to be braised is blanched, rehydrated, laid out on a bed of root vegetables and flavorings, and then the white stock is added and cooked for a brown braise.

Some vegetables, like celery and fennel, can be briefly sautéed before braising to improve the taste.

Stewing: It is a cooking technique that is also a combination of two methods i.e. roasting and simmering. In this, the meat pieces are browned in fat (roasting) and then it is added to the cooking liquid. Meat pieces are submerged in it and then heat is reduced and food is allowed to simmer for a long (simmering).

Note:

- It is done for smaller pieces of meat.
- As compared to the braising method, cooking time here is less.
- Here, the food to be cooked is submerged completely in the cooking liquid.
- Temperature is low and is cooked by covering the pot with a lid.
- Cheaper cuts of meat are used in this style of cooking.
- Stew boiled is stew spoilt.

3.2.6 Special cooking methods

Apart from regular cooking methods of cooking, there are a few cooking techniques like microwave cooking, induction cooking and solar cooking, and so on. They are referred to as special cooking technique.

Chart – Special Cooking Methods

Microwave cooking: It is referred to as cooking in the microwave. It is a quick and contemporary alternative technique of cooking.

Microwaving is the healthiest form of Cooking Vegetables

It involves creating microwaves to stir up the water molecules in meals. The meal is heated during the agitation process, which cooks the meal. Although this method of cooking is highly condensed, it leads to increased fluid loss and does not allow for the browning of meats. Convection heat and grilling capabilities are now available with microwave equipment, which has made it easier to bake and brown food items evenly.

Induction cooking: One of the latest styles of cooking and heat transfer, induction cooking is gaining popularity all over. It is faster and more energy efficient as compared to gas cooking and electric cooking. It is done on a special ceramic surface under which a coil is fitted capable of generating magnetic fields. The generated magnetic field compels the molecules to flip violently in the pan, thereby generating frictional heat within the pan. Pan gets heated thereby heating food using conduction. This is the principle behind induction cooking.


Solar Cooker


Induction Cooking

Solar cooking: Here, natural sunlight or solar energy is used to cook the food. The solar cooker is the equipment used for this style of cooking. It is very cost-efficient but a slow process indeed.

Check-Back Questions

1. **What are the three methods of Heat transfer used in cooking and which one is most commonly used?**
2. **List the various moist heat cooking methods.**
3. **What do you understand by the term 'braising' and 'stewing'?**
4. **Mention the difference between poaching and simmering.**

3.3. STOCKS

3.3.1 Definition:

It is a base liquid with a high nutritional value. By gently cooking vegetables and bones in water for a long time, it releases their nutrients in cooking liquid and this liquid is referred to as stock.

Stock (or les fonds) is the main foundation preparation. The liquid in which meat, bones, fish, and vegetables have simmered is called the stock. During the cooking process, the flavorings and soluble nutrients are dissolved into the water.

The word "fond" comes from the word "foundation". Just as a foundation is the base for a house, fond is the base for much of cooking. Almost every culinary preparation requires a fond. For all practical purposes, "stock" and "fond" have the same meaning.

3.3.2 Types of Stocks

White stock (Fond Blanc), brown stock (Fond Brun), vegetarian or neutral stock (Fond Maigre), and fish stock (Fume de Poisson) are the four fundamental types of stock/fond. The categories do not always correspond to color but rather to the stock's composition and preparation technique.

White stock: It is prepared from white meat or beef, veal bones, chicken carcasses, and flavourful vegetables. Once the liquid is cold, the bones or flesh are added and slowly heated to a boil. Before the liquid takes on any color, the mirepoix (a seasoning foundation of chopped vegetables sweated in sufficient fat) is added. To complete cooking, the mixture is brought to a simmer. White sauce, blanquettes, fricassee, and poached foods all use this stock.

Brown Stock

Brown stock: It is produced from the flesh and bones of beef, veal, and chicken. The bones are roasted, but not burned until they are golden in color. The flavor and appearance of the stock will be harmed by burned bones and mirepoix. When the bones are three-quarters roasted, the mirepoix is added; tomato products may also be used. A cold liquid is added

once the bones and mirepoix have become golden, and the combination is gradually brought to a boil before being simmered to complete the cooking process. Brown sauces, gravies, braised foods, and meat glazes can all be made using this stock.


Vegetable Stock

Vegetable stock: This neutral stock is made up of vegetables and flavorful herbs that have been softly sautéed in butter and then boiled in liquid. This kind of stock, which is still very new, is becoming more popular.

Fish Stock: Fish stock (Fume de Poisson) is classed separately from the other basic stocks, due to its restricted use. The fumet or fond is the foundation of fish preparation. All fish are thought to emit the same type of fumet. Some fish generate stock of higher grades than others. Some fish produce stocks that are too gelatinous and flavourful of fish. Fish that are oily yield stocks with a bitter flavor or milky consistency.

Few traditional preparation demands for specific fish's bones. Fish like Dover sole, turbot, brill, and whiting are suggested for their remarkable flavor. The fish's freshness and the color of its flesh also play an important role in the preparation of fish stock.

Below is a list of some rules:

1. Avoid using trimmings from fatty fish, such as bluefish, mackerel, or salmon.
2. For sole fumet, flounder or lemon sole are the best.
3. You want the freshest local whitefish, regardless of its label.
4. Fish fumet may occasionally be enhanced by the complimentary juices of oyster, mussel, or clam. Reducing this beverage is not advised. It is exclusively utilized as an additive.
5. This liquid should not be reduced. It is used as an additive only.

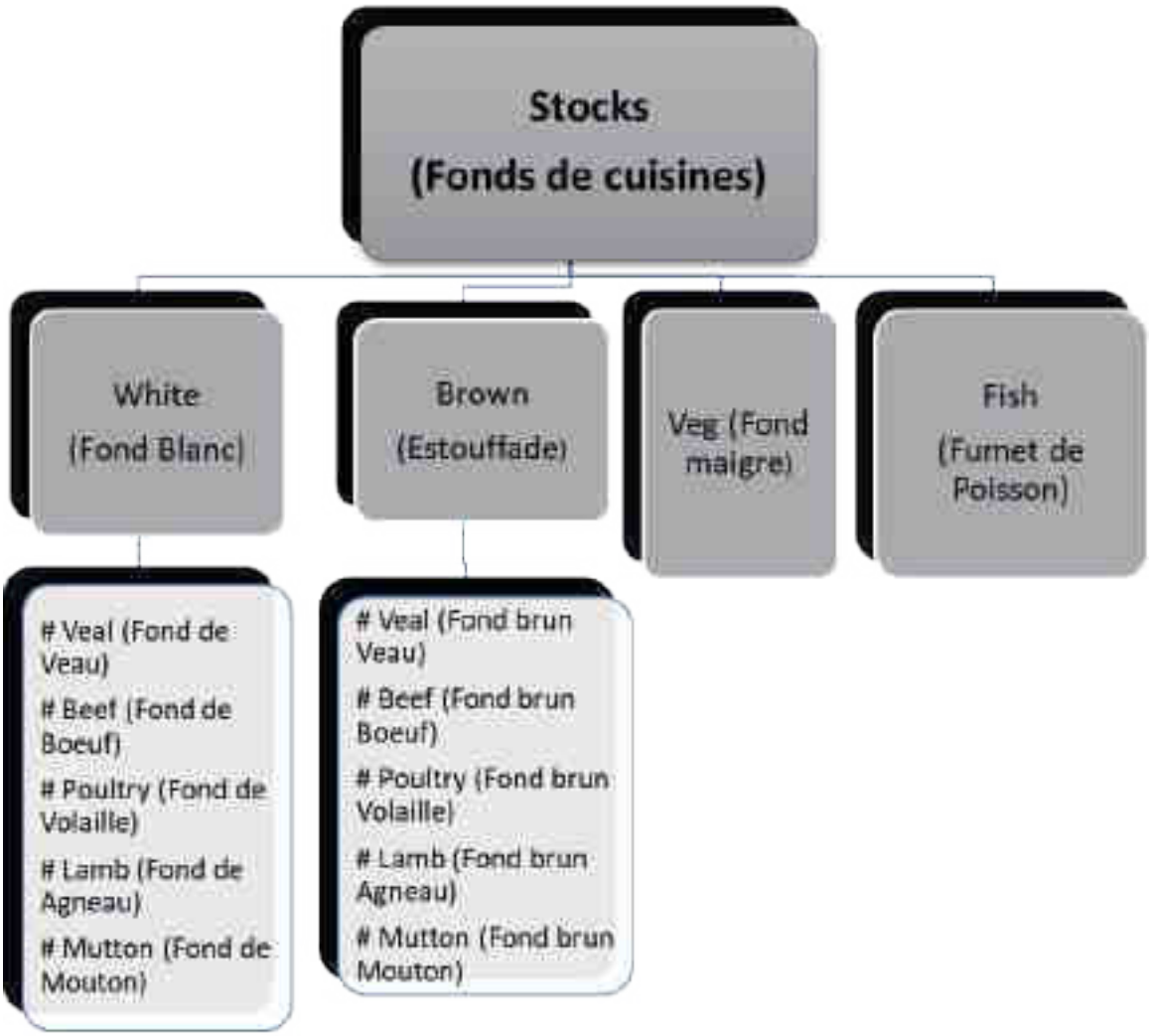
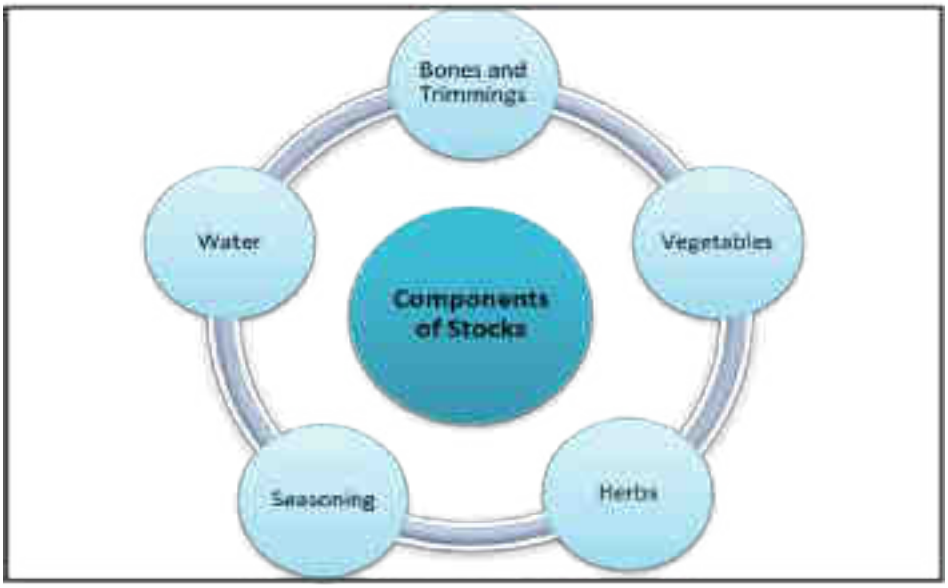


Chart- Stock Classification

3.3.3 Components of Stocks

The main ingredients of stocks are:

1. Bones and trimmings
2. Vegetables
3. Herbs (Bouquet Garni)
4. Seasoning
5. Moisture / Water



Components of Stock

Bones and trimmings: Bones are the principal ingredients used in stock preparation. Generally, the bones of beef, lamb, veal, chicken, fish, and pork are used which provides flavor, richness, and color to the various stocks. The cooking period of stock depends on the types of bones used vela bones take around 6-8 hours of cooking whereas chicken needs just 5-6 hours of cooking.

Vegetables: Only those vegetables are preferred in stock making that do not overpower the flavor and taste of stock with their character. Carrots, cauliflower, and leeks are used in stock making whereas spinach, broccoli, and asparagus are not used in making stock. Starchy vegetables are also avoided in stock preparation.

Herbs (Bouquet Garni): It comprises parsley, thyme, celery, chives, bay leaf, and leeks; all tied in a bundle with a string to prevent them from dispersing in the liquid. The bundle is discarded before serving. It can also be enclosed in a muslin bag.

Seasoning: The chief seasoning ingredients used in this are peppercorns, cloves, parsley, thyme, etc. Salt is never used in stock making.

Water: It is the main component forming the body of the stock. In the start the water must always be cold as hot water might melt the fat present in bones, turning stock in to murky and less appealing. Cold water ensures that the fat comes to the top and hence it can be easily trimmed.

White Stock and Brown Stock

- White stocks are simply made by simmering ingredients in a liquid, most commonly water.
- Brown stocks are prepared by first browning bones and vegetables, in an oven or stove, and then simmering it in water

3.3.4 Principles of Stock-making

1. **Clean, cold water:** Pour some water over the components. By getting started in this way, the blood and proteins can disintegrate. The proteins coagulate (solidify) as the temperature rises and float to the top of the liquid, where they may be skimmed off. The proteins would congeal, adhere to the bones, and spread into the stock if they were begun in hot water, leaving the stock cloudy and "muddy tasting."
2. **Simmer, never boil:** Bring a stock to a boil, then immediately decrease the heat so it simmers, never boil. The ingredients reveal their full taste at a simmer without disintegrating into particles. Even a few minutes of boiling stock will cause the fat to emulsify into it, making the stock murky and giving it a "muddy taste" and "greasy" finish. Soups and sauces will get spoiled by this texture.
3. **Skim frequently:** During the cooking process, skimming the coagulated masses off the stock's surface reduces the risk of the stock becoming "cloudy."
4. **Carefully strain:** This calls for the placement of a china cap inside of a chinois. You must remove the solids from the liquid before using the stock. It is crucial to avoid disturbing the solids at the bottom of the pot when doing this.

   Use the subsequent process:

   - Remove the surface-level fat
   - Turn off the heat and delicately pour the stock from the saucepan without disturbing it.
   - Transfer the stock to a cleaned metal container using a china cap fitted inside of a chinois.
5. **Cool quickly:** It is of the utmost importance that stocks are cooled quickly and with a minimum amount of agitation.
6. **Store properly:**

1. Store in a food safe container and label the container properly.
2. Store in the container in the refrigerator. (As the stock chills the remaining fat will rise and solidify, forming the fat cap. The fat cap provides an extra barrier against contamination and aerobic bacterial growth).
7. **Degrease:** Before using the stock, carefully lift the fat cap off of the surface of the stock, scraping off all the small bits of fat. It is always easier to degrease your stock when it is chilled. All preparations depend on the use of fat-free stocks.

The fear of Cooking is called "Mageirocophobia".

3.3.5 Method of Stock-making

Preparation of White Stocks

A good white stock has a rich, full flavor, good body, clarity, and little or no color. Chicken stocks may have a light yellow color.

1. Cut the bones into 3 to 4-inch (8-10 cm) pieces
2. Rinse the bones in cold water, (if desired, chicken, veal, or beef bones may be blanched)
3. Place bones in a stock pot and cold water to cover
4. Bring water to a boil, then reduce to a simmer, skim the scum that comes to the surface
5. Add the chopped mirepoix and the herbs and spices
6. Do not let the stock boil. Keep it at a low simmer
7. Skim the surface as often as necessary during cooking
8. Keep the water level above the bones; add more water if the stock reduces below this level.
9. Simmer for the recommended length of time:

Beef and veal bones	6 to 8 hours
Chicken bones	3-4 hours
Fish bones	20 minutes

Most modern chefs do not simmer stocks as long as earlier generations of chefs did. Longer cooking will indeed extract more gelatin, but gelatin isn't the only factor in good stock. Flavors begin to break down or degenerate after some time. The above times are felt to be the best for full flavor, while still getting a good portion of gelatin into the stock as well.

10. Skim the surface and strain off the stock through a strainer
11. Cool the stock as quickly as possible, as follows

Preparation of Brown Stock

Roasting Bones

1. **Browning Bones and Mirepoix:** Brown stocks are made by first browning bones and mirepoix and, if required by recipe, tomato paste or puree. This step starts the process of developing the stock's flavor. Allow sufficient time for ingredients to roast properly for the best end product.
2. **Rinse the bones if necessary and dry them well to remove any excess moisture.**

   Taking the time to do this will shorten the time required to properly brown the bones. If bones go into the oven when they are wet or still frozen, they will steam before the browning process begins. No one can say for sure that there is a distinct and measurable loss of flavor, but certainly, it will increase the time the bones need to spend in the oven, as well as increase the amount of energy required to cook them.
3. **Roast the bones until they are a rich brown color.**

   The amount of time required will vary, depending on whether or not the bones had time to defrost and dry, how many bones are packed into the pan, and the heat of the oven.

   For small quantities, it may be a good idea to heat some oil in a large rondeau over direct heat, and the bones and cook them on the top of the range. This is not recommended for large quantities, but it is a good way to quickly prepare smaller amounts.
4. **Add the mirepoix and tomato product to the pan.**

   Although some chefs feel that the best-quality stocks are achieved by first removing the bones and beginning the stock-making process, then browning the vegetables later on in the same roasting pan, others consider the time-saving technique of adding the mirepoix and tomato directly to the bones as they roast to be a fair trade-off.
5. **Simmer the stock long enough to fully develop flavor, body, clarity, color, and aroma.**
6. **Brown stock normally requires 6 to 8 hours of simmering time.**

3.3.6 Storage and Usage

Storage of Stock:

- When cooked; stocks must be strained and cooled within 90 minutes to minimize exposure in the danger zone and stored in a refrigerator below 5°C or can be frozen.
- The shelf life of stock is not more than 2 days if kept properly in the refrigerator and it increases to 3 months if frozen.
- All stocks must be re-boiled after storage before being used.

Reduction: Process in which the stock is reduced and concentrated by simmering it for a longer duration to let the excess water evaporate. This reduced content has more gelatin content and is used to make various sauces and other preparations.

Tips on stocks

- Never season a stock.
- Never boil a stock.
- Never add potatoes, sweet potato, squash, turnip, etc.
- Always re-boil stocks.

Usage of Stock: Stock is a very versatile liquid that is used in the preparation of various soups, sauces, stews, rice, curries, braised dishes, etc. The word stock translates to *fond* in French which means 'foundation' or 'base', as it is the basis of many preparations.

- It is used as a base for varied sauces and soups.
- It is used as a base for stews and braises.
- It is also used as a cooking medium for preparing various vegetable preparation.
- It is also used as a glaze (stock cooked and reduced till it coats the back of the spoon).

Check-Back Questions

1. **What do you understand by the term 'Stock'? List the various types of stocks prepared in the kitchen.**
2. **List down the various components of Stock.**
3. **What are the points to be kept in mind while preparing the stock?**
4. **Mention the various uses of stocks in the food production department.**

3.4 THICKENINGS AND SAUCES

3.4.1 Definition of Thickening Agents

Thickening agents give body, consistency, and palatability when used. They also improve the nutritive value of the sauce. Flavored liquids are thickened and converted into soups, sauces, gravies, curries, etc. In other words, binding agents are used to transform the stocks into sauces.

3.4.2 Types of Thickening Agents

There are various types of thickening agents, which are used in modern-day cookery. They are as follows:

- Starches
- Flour
- Roux
- Beurre Manie
- Fruit and Vegetable Puree
- Egg yolk
- Cream
- Butter
- Blood

Starches: Starches derived from roots and vegetables are among the oldest and the most versatile thickener for sauces. They are efficient and inexpensive and they can be used without imparting flavour of their own.

Starches should be combined with liquid and heated to an almost boiling temperature to be effective. Some starches are purer than others. Cornstarch, arrowroot starch, and potato starch are almost pure starches and produce shiny sauces, whereas flour contains protein, which gives a mat appearance to the sauces. Examples of Starches are cornstarch, arrowroot, potato starch, and so on.

Flour: In Western cooking, flour has long been the most popular thickener for sauces. It can be used in several ways. Although, flour has largely been replaced in recent years by other thickeners. It is still the appropriate choice for many country-style and regional dishes. The liquid to which flour is to be added must be degreased before the flour is incorporated. Flour binds with lamb and holds it in suspension throughout the liquid, making it difficult to skim. The result is a greasy, indigestible sauce with a muddy texture and flavor.

Roux: The most common method of thickening liquids with flour is to prepare a roux, by cooking the flour with an equal weight of butter. This enhances the flavor of the flour and eliminates the lumps. Because flour contains proteins and other compounds that impart flavor, sauces thickened with roux are usually skimmed for thirty minutes once they have been brought to a simmer to eliminate the impurities. Although the stock is skimmed before the roux is added, further the sauce is skimmed to eliminate the butter, and impurities in the flour.

Roux: Pronounced as 'roo' is the cooked mixture of an equal weight of flour and fat to form the paste.

There are three types of roux:

White roux: It is prepared by cooking flour and clarified butter for approx. 5 minutes over low heat and stirring constantly with a wooden spoon. It is used for Béchamel sauce and thick soups.

Blond roux: It is made from fresh butter and flour. The preparation of butter and flour is the same as for white roux. It is made more rapidly and should be made at last before use. Its color should be pale gold. It is used for volute sauce and some soups.

Brown roux: In this, the flour is cooked in bouillon fat in the oven, gently and for a long time, removing from time to time to stir, makes it. This roux should be light brown. It is used for brown sauce and Demiglace.

A thickening agent or thickener is a substance that can increase the viscosity of a liquid without substantially changing its other properties.

Beurre Manie: Like roux, beurre manie contains equal part by weight of butter and flour. It differs from roux because it is not cooked and is usually added at the end of the sauce's cooking rather than at the beginning. It is most often used to thicken stews at the end of the cooking when the braising liquid is too thin.

The beurre manie should be added little by little in boiling stock whisking continuously so that lumps do not form. Unlike roux the beurre manie should not be cooked once the sauce is thickened otherwise the sauce will have a floury taste. One of the peculiarities of flour is that develops a strong floury taste after two minutes of cooking that begins to disappear as the cooking progresses.

Fruit And Vegetable Puree: Sometimes fruit and vegetable puree are used in thickening sauces and soups. Puree soups are the best example of the same.

Egg Yolk: Because they thicken sauces in several ways, egg yolks are versatile liaisons. They provide the base for emulsified sauces, such as mayonnaise and hollandaise, and are used in conjunction with cream to finish the cooking liquid of poached meats and fish. Not only form an emulsion of fat and liquid but also combines with air so that they be used for sabayon sauce. Sauces containing should not be boiled unless they contain flour, which stabilizes them. When combining egg yolk with liquids, be sure to combine some of the liquid separately before returning the mixture to the saucepan. If the egg yolks are added directly into the hot liquid then they are liable to coagulate as soon as they get in contact with the heat.

Cream: In recent years thickened cream has replaced roux as the thickener, becoming the base for white sauces.

Precaution should be taken in reducing cream. A quick whisk should be given to the cream otherwise they become granular and may break. Always use a large saucepan, three times the volume of the cream otherwise flames from the sides can discolor the cream.

Whenever cream is used, as a thickener in a wine-based sauce, are sure to reduce the wine otherwise they give an unpleasant flavor. Cream used in conjunction with egg yolk, butter, and flour gives a better result.

Butter: When butter is whisked into a hot liquid, it forms an emulsion, similar to the action of egg yolk. The milk solids and proteins contained in the butter act as an emulsifier and give butter sauce its sheen and consistency. Because the milk solids in the butter are what maintain the emulsion, sauces and cooking liquids cannot be thickened with clarified butter. Cold butter is proffered to hot butter in the thickening of the sauces.

Blood: Blood has long been used in cooking to finish sauces for braised or roasted game, poultry, or rabbit. Blood not only deepens the flavor of the sauce but also acts as a thickener. The blood must be mixed with a little amount of vinegar to avoid coagulation.

A Chef who specializes in making sauces is called a Saucier

3.4.3 Sauces:

Sauces are liquid or semi-liquid mixtures that are added to meat, poultry, fish, vegetables, and desserts to give moisture or richness, to garnish or to otherwise enhance the appearance and in some cases, the nutritional value, but more importantly to better the flavor. The principal purpose of a sauce then is to add or enhance the flavor of food.

The word "sauce" is a French word taken from the Latin salsa, meaning salted.

The functions of the Sauce:

- Sometimes sauces are used to add a **contrast in taste** to another food. Apple sauce with fresh roast pork serves the same purpose. Broadly speaking any condiment or mixture of food, which serves to contrast with or complement another food, can be termed a

sauce. In this broad sense, a peanut butter and jelly mixture would be a sauce to a piece of bread if they were served together.

- Some sauces are used to add **sharpness** or **tanginess** to bland food. A remoulade sauce served with shrimp is an example of a piquant sauce.
- Sauces may add to the **appearance** of food, sometimes as a coating that is poured or brushed over the food to give a pleasing appearance to an otherwise uninteresting item. the *chaud-froid sauce* made with cream or mayonnaise and gelatin is used to coat various food items.
- Sauces such as *barbeque sauce* are used to **modify the original flavor** of food, blending the sauce flavor with the flavor of the food.
- Some sauces are used to **disguise or mask** the original flavor of the food. As the French use the word **`mask'** regarding sauces, masking a food with a jelly or sauce is to completely cover it physically hiding its appearance. Masking does not change the true flavor of the food.

Sauce as salad dressings

- Sauces should never be used to change the flavor of a food material, only to **enhance or compliment the flavor** of the food.
- **Salad dressings** such as *French dressing* and *mayonnaise* could also in this sense considered sauces. However, sauces are usually considered those mixtures served with meats, entrees, desserts, and other major foods as a compliment or contrast to their flavor.

3.4.4 Classification of Sauces

Sauces are very varied in nature and the family of sauce is also very vast. Based on their method of preparation, ingredients used and the purpose they serve; they have been classified as below:

- Leading Sauces or mother sauces or basic sauces
- Proprietary Sauces
- Contemporary Sauces
- Miscellaneous Sauces
- Dessert Sauces

Classification of Sauces

Basic Sauces	Proprietary Sauces	Contemporary Sauces	Miscellaneous Sauces	Dessert Sauces
• Bechamel Sauce • Espagnole Sauce • Veloute Sauce • Tomato Sauce • Mayonnaise Sauce • Hollandaise Sauce	• Tabasco Sauce • HP Sauce • Ketchup • Soy Sauce • And so on...	• Compound Butter Sauce • Hot Butter Sauce • Pesto Sauce • And so on...	• Mint Sauce • Apple Sauce • And so on...	• Creme Anglaise • Chocolate Sauce • And so on...

3.4.5 Basic Sauces and their Derivatives

Basic Sauces or leading sauces are basically the base of sauces or are the entire assemblage of classical hot sauces used all across the globe.

They are as such:

- Bechamel Sauce
- Espagnole Sauce
- Velouté Sauce
- Tomato Sauce
- Mayonnaise Sauce
- Hollandaise Sauce

Sauce Bechamel, milk-based sauce, thickened with a white roux

Sauce Velouté, white stock-based sauce, thickened with a roux or a liaison

Sauce Tomate, tomato-based sauce, thickened with a roux

Sauce Espagnole, roasted vela stock-based sauce, thickened with a brown roux.

Sauce Mayonnaise, a cold emulsion of egg yolk, butter and vinegar, and mustard paste

Sauce Hollandaise, a hot emulsion of egg yolk, butter, and lemon juice or vinegar


White Sauce

Béchamel Sauce (White Sauce): White sauce or Bechamel sauce is more versatile for its neutral base. It is used to bind soufflés, croquettes, soups, egg dishes, and gratins and to coat many foods. The texture should be smooth and rich and the consistency of double cream. The taste should be milky but with no hint of raw flavor.

A plain Bechamel Sauce is made with flour, butter and milk in ratio of 1:1:10. It is flavoured with a clove studded onion (cloute /pique) which is infused in milk before making the sauce. Sometimes a amount of finely chopped onion, which is sweated in butter added to milk before adding the roux.

For thickening soup or sauce use only 15 grams of butter, and 15 grams of flour with 225 ml of milk and for a very thick Bechamel sauce, use only 25 grams of butter, and 25 grams of flour with 225 ml of milk.

Thickening milk with a white roux and simmering it with aromatics makes this white sauce. It should be creamy, smooth, and lustrous.

Composition (Béchamel Sauce – Yield 10 portions)

Butter	100 g
Flour	100 g
Milk	1 liter
Pique/cloute	1 no (onion studded with cloves and bay leaf)
Nutmeg	Pinch
Salt, pepper	To taste

Derivatives of Bechamel sauce

1.	Cream	bechamel + cream
2.	Mornay	bechamel + grated parmesan + gruyere cheese
3.	Scotch-egg	bechamel + sieved boiled yolk + chopped boiled egg white
4.	Ecossaise	bechamel + braised brunoise of vegetables
5.	Anchovy	bechamel + anchovy butter
6.	Lobster	bechamel + lobster butter + dices of butter

7.	Onion	bechamel + onion cooked in milk and strained
8.	Soubise	bechamel + cooked onion puree + cream
9.	Cardinal	bechamel + cream + lobster dices + brandy
10.	Parsley	bechamel + cream + butter + parsley
11.	Mustard	bechamel + cream + butter + mustard

Brown Sauce

Espagnole Sauce (Brown Sauce): It is also called a brown sauce. This famous brown sauce is made with a rich brown stock and a gently cooked brown roux. Although the rich sauce is robust, yet fine and well-flavored. It is time-consuming and requires skills. A brown roux is tricky to make without scorching or separating. The sauce is intensified by adding fine original Spanish ham and tomato puree, which add to the glossy brown color. Although it can be served by itself as its own. It is also the base of many rich, dark French French sauce as 'Demi glaze', Sauce Robert, and Sauce Madira.

Nowadays many chefs use a last-moment thickener like arrowroot or potato starch, which produces a lighter sauce.

Composition (Espagnole Sauce – Yield 10 portions)

Butter	100 g
Flour	100 g
Brown stock	1 litre
Sachet D'epices	1 no. (¼ tsp thyme, 1 bay leaf, 3 parsley stems, 1 garlic clove,1 tsp pepper corn)
Red wine	50 ml
Mirepoix	150 g (onion 50%, carrot 25%, celery 25%)
Salt, pepper	To taste
Tomato paste	50 g
Oil	20 ml

Derivatives of Espagnole sauce

1.	Demi-glaze	50% brown sauce + 50% brown stock reduced to half
2.	Bercy	Demi-glaze + chopped shallots + white wine
3.	Madeira	Demi-glaze + Madeira wine
4.	Bordelaise	Demi-glaze + chopped shallots + red wine + sliced bone marrow
5.	Chasseur	Demiglaze + chopped shallots + white wine + mushroom + parsley + tomato Concassse
6.	Diable (devilled)	Demi-glaze + chopped shallots reduced in white wine + pepper
7.	Robert	Demi-glaze + chopped onion + white wine + vinegar + mustard
8.	Charcuterie	Demiglaze + chopped shallots + white wine + vinegar + mustard + gherkins
9.	Bourgignone	Demi-glaze + red wine
10.	Choudfroid	Demiglaze + truffle essence + Madeira wine

Veloute Sauce

Veloute Sauce: Veloute sauce is often made from the liquid used in cooking the main ingredient, such as that used in poaching fish and chicken or for veal, as in a Blanquette. The additional liquid is added to the blond roux at the beginning to make a very thin sauce. Simmering for 15 minutes to 1 hour thickens the sauce and intensifies the flavour. The long slow process of cooking gives it a velvety texture and consistency -- hence the name Veloute or Velvety. Stir the sauce frequently to prevent scorching and skimming from time to time.

Composition (Veloute Sauce – Yield 10 portions)

Butter	100 g
Flour	100 g
White stock	1 liter
Sachet D'epices	1 no. (¼ tsp thyme, 1 bay leaf, 3 parsley stems, 1 garlic clove, 1 tsp peppercorn)
Salt, and pepper	To taste

Derivatives of Veloute sauce:

➢ Chicken veloute

1.	Supreme	chicken veloute + cream
2.	Ivory	supreme + meat glaze
3.	Hongroise	chicken veloute + paprika powder
4.	Curry	chicken veloute + curry powder
5.	Allemande	chicken veloute + egg yolk + mushroom + cream + lemon
6.	Mushroom	supreme + mushroom
7.	Aurore	chicken veloute + tomato sauce + butter
8.	White chaudfroid	chicken veloute + chicken glaze + cream
9.	Chivalry	chicken veloute + tarragon + parsley + chives + butter
10.	Poulette	allemande s + mushroom essence + lemon + chopped parsley

➢ Veal veloute

1.	Allemande	Veal veloute + egg yolk + mushroom + cream + lemon
2.	Ravigote	Veal veloute + chopped shallots reduced in white wine
3.	Verjuice	Veal veloute + juice of unripened grapes
4.	Port wine	Veal veloute + chopped shallots + port wine

➢ Fish veloute

1.	Normande	fish veloute + cream + mushroom fumet
2.	Joinville	normande + shrimp butter + truffles
3.	Shrimp	normande + shrimp butter + chopped shrimps
4.	Aurore	fish veloute + tomato sauce + butter
5.	Nantua	fish veloute + crayfish butter + brandy + cream
6.	Vin blanc	thin fish veloute + egg yolk + butter
7.	Diplomate	normande + lobster butter + dices of lobster + truffles
8.	Caper	fish veloute + capers


Tomato Sauce

Tomato Sauce: It is also the foundation of numerous small sauces. It is prepared by using tomato paste and roux, but nowadays roux is rarely used in its preparation. The paste or puree of tomato is capable of giving a sauce-like texture even without the roux. Tomato is properly cooked, and it gradually thickens transforming it into tomato sauce.

Tomato sauce is also referred to as *coulis* (French term), which means a puree of vegetables or fruits used as a sauce in contemporary kitchens.

Composition (Tomato Sauce – Yield 10 portions)

Olive oil	70 ml
Onions (chopped)	100 g
Celery (chopped)	30 g
Garlic chopped)	20 g
Tomatoes concasse	1 kg (De skinned, deseeded, and chopped)
Tomato paste	80 g
White wine	50 ml
Basil	10 g
Salt, and pepper	To taste

Derivatives of Tomato sauce:

1.	Bretonne	tomato sauce + sauteed chopped onion + white wine + parsley butter
2.	Tomato aspic	tomato sauce + aspic jelly
3.	Provencale	tomato sauce + saute sliced mushroom + garlic tomato concasee + sugar + chopped parsley
4.	Italien	tomato sauce + demi glaze + shallots + mushroom + herbs
5.	Portuguese	tomato sauce + tomato concasse + garlic + white wine
6.	Barbeque	tomato sauce + tomato ketchup + vinegar + garlic + honey
7.	Victoria	tomato sauce + white wine + chopped shallots + tarragon + butter + lemon
8.	Just Paris	victoria + cream + red cayenne pepper

Mayonnaise Sauce: It is one of the most used and consumed mother sauces. It is a cold emulsified egg-thickened sauce made by whisking egg yolk mixed with seasoned vinegar (it includes vinegar, salt, pepper and mustard powder) or lemon juice and then added with salad oil, little at a time. In this, it is an emulsion of oil and vinegar where egg yolk and mustard powder acts an emulsifying agent.

Mayonnaise Sauce

This delicious sauce is used in salads, sandwiches, and unlike other sauces. It can be varied by using different oils, herbs, and other flavorings. Mayonnaise can also be made in a blender, food processor, or with an electric mixer. Make sauce ensuring that all the ingredients are at room temperature. If making by hand, set the bowl on a towel to stop it sliding around.

This is a cold, emulsified sauce, used extensively in the Garde Manger (Larder Section).

Composition (Mayonnaise Sauce – Yield 10 portions)

Egg yolks	4 no.
Salad oil	800 ml
Dijon mustard	10 g
White wine vinegar	30 ml
Salt, and pepper	To taste

Derivatives of Mayonnaise sauce

1.	Chantilly	Mayonnaise + whipped cream
2.	Andlouse	Mayonnaise + tomato puree + pimentos
3.	Tartare	Mayonnaise + chopped boiled egg + caper + gherkin + parsley
4.	Verte	Mayonnaise + pureed spinach + herbs
5.	Vincent	Tartare + verte sauce
6.	Cocktail	Mayonnaise + tomato ketchup + tabascoo + worcestershire sauce
7.	Thousand Island	Mayonnaise + tomato puree + pimentos + chopped boiled egg white + sieved boiled yolk + paprika
8.	Remoulade	Mayonnaise + gherkins + parsley + chervil + capers + tarragon + chives
9.	Cambridge	Mayonnaise + anchovies + caper + sieved yolk + chopped egg white
10.	Aillade	Mayonnaise + crushed garlic + walnuts
11.	Aioli	Mayonnaise + crushed garlic


Hollandaise Sauce

Hollandaise Sauce: It is hot emulsified egg-thickened sauce, and is made by slowly whisking clarified butter into warm egg yolk. In it, melted butter and water (including lemon juice or vinegar) are the two liquids emulsified and egg yolk acts as an emulsifier.

Hollandaise and its variations are opaque, but the sauce should have a luster and not appear oily. They should have a smooth texture. A grainy texture indicates overcooking of the egg yolks. It should have light consistency and at times almost appears frothy.

Composition (Hollandaise Sauce – Yield 10 portions)

Egg yolks	2 no. Oil (Olive oil, vegetable oil
Or half of each)	360 ml
Salt and Pepper	To taste
Mustard (Dijon)	a dash
Sugar	5 gms
White vinegar /Lemon juice	15 ml

Derivatives of Hollandaise sauce

1.	Mousseline	Hollandaise + whipped cream
2.	Maltaise	Hollandaise + zest and juices of oranges
3.	Noisette	Hollandaise + brown butter
4.	Mustard	Hollandaise + mustard
5.	Caper	Hollandaise + chopped caper
6.	Paloise	Hollandaise + mint reduced in vinegar + freshly chopped mint
7.	Bearnaise	Hollandaise + chervil + tarragon (reduced in vinegar) + chervil + white wine + lemon juice
8.	Choron	bearnaise + tomato puree
9.	Fayot	bearnaise + meat glaze
10.	Mustard	Hollandaise + mustard
11.	Figaro	Hollandaise + tomato puree + celery

3.4.6 Proprietary Sauces:

Apart from basic mother sauces, there are a few sauces that are prepared industrially and then they are used in kitchens, for ages. Such sauces are referred to as Proprietary Sauces. The recipes are kept secret with the brands of the industry and the quality is maintained to the highest standards possible. A few examples of proprietary sauces are as such: Soy sauce, Worcestershire sauce, Tabasco sauce, HP sauce, XO sauce, and so on.

Ketchup is the most popular sauce in the world, followed by Mayonnaise.

3.4.7 Contemporary Sauces:

As the name suggests, they are modern-day sauces that have been prepared in less time and it depicts the creativity of the chef. They are lighter in color, texture, and flavor as compared to other sauces. It has been the trend currently to prepare sauces of lighter texture and consistency and here contemporary sauces make their place. A few examples of contemporary sauces are as such: pesto sauce, romesco sauce, beurre blanc, harissa, and so on.

3.4.8 Miscellaneous Sauces:

Miscellaneous sauces are those which are prepared with lesser ingredients and are served as an accompaniment to many classic preparations. Examples of them are as such: mint sauce, apple sauce, bread sauce, etc.

3.4.9 Dessert Sauces:

As the name suggests, dessert sauces are sweeter and they are used in bakery or confectionary. They use sugar as one of the main ingredients; unlike all other sauces. Examples of them are as such: Chocolate sauce, caramel sauce, crème anglaise, and so on.

Check-Back Questions

1. List the various thickening agents used in kitchens.
2. List the six mother sauces with two derivatives of each.
3. What do you mean by proprietary sauces? Give any 2 examples of it.
4. What do you understand by the term Veloute? Give any 2 examples of fish veloute.

SUMMARY

Cooking is an amalgamation of art and science. To cook food, one needs to understand the basic cooking aspects and the fundamentals that make it happen. Cooking using the controlled application of heat transforms the raw ingredients into edible food products that are edible and digestible. There are three methods by which heat energy can be transferred to the food ingredients and they are conduction, convection, and radiation.

Food can be cooked by various methods and the most common methods are – the dry heat method and the moist heat method. Apart from this, Combination cooking methods and special cooking methods are also in use.

Stocks are highly nutritious liquids having the character of strong flavors. It is obtained by simmering certain ingredients in water for a long period. It is used further in preparing various dishes like soups, sauces, rice, curries, stews, and so on.

Thickening agents are ingredients that are used to thicken the sauces. It generally comprises starches, flour, eggs, cream, liaison, blood, etc. It helps sauces in attaining the perfect consistency and texture; thereby making the dish impeccable. It won't be an exaggeration to state that the thickening agent becomes the most crucial body of all the sauces lending them their basic character and feature.

Sauces provide body to many varied dishes and at times, they are even served as an accompaniment to numerous dishes and delicacies. Six mother sauces also referred to as leading sauces or basic sauces when added with certain food ingredients lead to the preparation of several derivative sauces. Apart from these mother sauces, the world of sauces is flooded with a few crucial proprietary sauces and contemporary sauces. The sweet sauces are referred to as dessert sauces and are used in varied dessert preparation.

REVIEW QUESTIONS

MULTIPLE CHOICE QUESTIONS (MCQ)

1. Which among them is not a moist heat method?

a. Boiling
b. Simmering
c. Sand roasting
d. Steaming

2. Which is a method of heat transfer technique?

a. Microwave
b. Deep-frying
c. Convection oven
d. Radiation

3. Brown sauce is also referred as :

a. Bechamel b. Espagnole
c. Hollandaise d. Emulsion

4. Identify the contemporary sauce among all these:

a. Soy sauce
b. Pesto sauce
c. Tabasco sauce
d. Mayonnaise sauce

5. Which equipment is used to facilitate the convection heat transfer?

a. Microwave oven
b. Solar cookers
c. Pressure cookers
d. Convection oven

FILL IN THE BLANKS

1. _____ is the French term for foundation liquid 'stock'.
2. _____ is the combination cooking methods that involves roasting and stewing.
3. The sauces that are prepared industrially are referred to as _____.
4. _____ is the combination of equal quantity of flour and butter cooked together.
5. _____ are used to thicken the sauces and provide proper consistency and texture to sauces.

TRUE OR FALSE

1. Bechamel is also referred as Brown sauce.
2. Tartare sauce is the derivative of Mayonnaise sauce.
3. The temperature to be maintained for Poaching is around 70°C-85°C.
4. Stewing is a combination cooking technique which involves broiling and roasting in it.
5. Contemporary sauces are usually thicker and heavier in consistency.

SHORT ANSWER QUESTIONS

1. List the various types of moist heat method.
2. What are the points to be kept in mind while storing the stock in kitchen?
3. Mention any three derivatives of Bechamel Sauce with their basic ingredients
4. What are the uses of Sauces in food production department?
5. How do thickening agents and sauces co-relate with each other?

LONG ANSWER QUESTIONS

1. What are the various means of heat transfer method? Explain in brief.
2. Explain in brief the various method of cooking by Dry heat method?
3. What do you understand by the term 'Thickening Sauces' and mention their uses in brief?
4. Prepare the classification chart of Sauces and provide with brief explain to each types of sauces.
5. What are the points kept in consideration while preparing stocks?

OPEN BOOK QUESTIONS

1. "Stock is the foundation liquid in the preparation of various stews and soups". Justify this statement by stating how stock plays a crucial role in the making of such dishes.?
2. "The addition of sauce in a dish enhances the taste, flavor, and texture of the dish" Justify this statement with detail to each mother sauce with 2 proper examples of each.

ACTIVITY

Activity

Students will be divided into a group of 4-5 students. As each group is now well aware of the various cooking methods used in the kitchen. So, each group is directed to list and identify as much equipment as possible that is involved in various cooking methods. They are also directed to click and paste the photographs of such equipment into assignment submission.

4

Chapter

PLANT-BASED CULINARY ART / SALADS / SOUPS / UNDERSTANDING EGGS AND FISH

Learning Objectives

Sr. No.	Sub Unit	Learning topics	Key learning objectives/At the end of the subunit, the learners will be able to :
1.	Plant-based culinary art	• Introduction • Classification of vegetables • Composition of Vegetables • Storage of Vegetables • Color Pigments in vegetables • Effects of heat on vegetables • 10 rules to follow while cooking vegetables • Selection Criteria of Vegetables • Cuts of Vegetables • Classification of fruits • Storage of fruits • Quality check and purchasing points • Nutritive value of fruits • Preparation of fresh fruits • Principles of cooking fruits • Methods of cooking Fruits	• Describe vegetables and fruits as per their use in cookery • Tabulate the pigments present in vegetables. • Explain the effect of heat on the pigments of vegetables in acidic, alkaline, and neutral mediums. • Elaborate on the various cuts of vegetables used in cooking • List down the rules to follow while cooking vegetables • Describe Fruits and classify them. • Explain the quality checking and storage of fruits. • Comprehend the nutritive value of fruits. • Understand the principles of preparation and cooking fruit.
2	Salads	• Definition • Classification • Service of salads • Parts of salad • Preparation of Salad	• Define salads • Understand and classify salads • Know when salads are served in a meal. • Understand the parts of salads • To prepare salads
3	Soups	• Definition • Classification of Soups • Recipe of Consommé soup • Consommé variations • Consommé Garnishes • International soups and country of Origin	• Define what is soup. • List the various types of soups and classify them. • Elaborate on the preparation of consommé soup, the variations of it, and the garnishes used.

4	**Understanding eggs**	• Introduction to egg Cookery • Structure of an egg • Grading and selection of eggs • The Action of Heat on Eggs • Foaming of Eggs • Points for handling eggs • Breakfast preparations of eggs • Uses of eggs in cookery	• Explain the structure of eggs. • Describe the selection points of eggs. • Explain the action of heat on eggs and the changes that happen. • Comprehend the method of foaming eggs. • Elaborate the process of handling of eggs. • Explain the various breakfast preparations made from eggs. • Elaborate the uses of eggs in cooking.
5	Understanding Fish	• Introduction to Fish Cookery • Classification of Fish with Examples • Difference between Flat and Round fish • Quality check of Fin Fish • Cuts of Fin Fish • Shell Fish • Quality check of shell Fish • Storage of Fish • Methods of Cooking Fish	• Describe fish and classify them. • Differentiate between flat and round fish. • Check the quality of the fish. • Explain the various cut of fish. • Classify shellfishes. • Comprehend the storage technics of fish. • Comprehend the portion size of fish served in meals. • Describe the methods of cooking fish.

4.1. PLANT-BASED CULINARY ART

4.1.1 Introduction:

Vegetables are defined as plants usually herbaceous that contain an edible portion, which are suitably served with the main course. Although the links between fruits and vegetables are sometimes vague, the stipulation that the plant should be herbaceous helps to clarify the issue. Beans, corn and partially all the vegetables die down when the growing season is over, a characteristic of the herbs. Typically, vegetables are served with the main course or in a salad rather than at the closure of the meal. A contrast is presented by rhubarb which does grow vigorously and then wither, but this plant food is classified as a fruit because its common use is in desserts such as pies and sauces.

4.1.2 Classification of Vegetables

1) **Underground: - they are classified further –**
   - **Roots: - carrot, radish, etc. are root parts.**
   - **Tubers:- potato, ginger, etc.**
2) Ground level :- bulb type for eg onions , garlic.
3) Above the ground :

- Stem – celery, sugar cane
- Leaves:- spinach, cabbage
- Flowers:- cauliflower.
- Fruit:- pulses, cereals, tomatoes, apples, etc
- Buds:- asparagus.

4.1.3 Composition of Vegetables

- They contain 70 – 80 % water.
- Most of the dietary minerals are obtained from vegetables.
- Carbohydrates are present in the form of starch and sugar.
- Protein quantity is less but in some, it is found in the form of pectin or fibers and cellulose.
- Vegetable oil is obtained from nuts and seeds.

4.1.4 Storage of Vegetables

- Vegetables should be stored in a dry place for eg onions and potatoes
- In the refrigerator, store vegetables except for onion and potatoes at 5°c to 7°c.
- Pulses, cereals, nuts, and seeds should be stored in a dry cool area.
- Root vegetables should be emptied from sacks and stored in bins or racks.
- Green vegetables should be stored in well-ventilated racks.
- Salad vegetables can be left in their containers and stored in a cool place.

Food values: Root Vegetables are useful in the diet because they contain starch (or) sugar for energy, a small but valuable amount of protein, mineral salts, and vitamins. They are also useful sources of cellulose and water.

Green Vegetables: The food value is not the same as root vegetables because no food is stored in the leaves. Therefore, little protein or carbohydrates is found in green vegetables. They are rich in minerals, salts, and vitamins, particularly vitamin E.

4.1.5 Color pigmentation in vegetables.

S.n.	Pigmentation	Subdivision	Color	Example
1.	Chlorophyll	Chlorophyll a	Intense bluish color	Lettuce, spinach
		Chlorophyll b	Yellow-green color	French beans, green peas, broccoli
2.	Pheophytin	Pheophytin a	Pale green gray	Green vegetables cooked for more than 7 min.
		Pheophytin b	Olive green	Green vegetables cooked for more than 7 min.
3	Carotenoids	a-carotene	Yellow-orange color	Winter squash
		b-carotene	Red-orange	Carrots, sweet potatoes
		Lycopene	Red	Tomatoes

4	Xanthophyll's		Yellow	Sweet corn
	Cryptoxanthin		Orange	Spinach
	Lutein		Orange	Spinach
5	Flavonoids	Anthocyanin	Red, purple, blue	Red cabbage
		Anthoxanthin	White	Cauliflower, onion.

4.1.6 Effect of Heat on Vegetables

Color changes occurring while cooking

Pigments	Action by acidic medium	Action by basic medium	Action by overheating
Chlorophyll : spinach or broccoli green in color	Gets destroyed in an acid medium and becomes olive green.	In a basic medium, the color of chlorophyll becomes bright green but the fibers get destroyed and become mushy and cant be stored for long	It becomes grey.
Carotenoids:- is reddish-orange in color:- eg. Carrot	It does not show any change in the acidic medium	It does not show any change in the basic medium	It becomes grey.
Flavonoids:- Anthoxanthin is white eg. Cauliflower. Anthocyanin is red for eg. Red cabbage.	Anthoxanthin and anthocyanin become more bright. If cooked covered then it gives the same result	Anthoxanthin becomes grayish while anthocyanin becomes pale in color	Anthoxanthin becomes pale in color while anthocyanin becomes grey.

4.1.7 10 rules to follow while cooking vegetables

- Do not overcook while cooking. Some must be crisp like spinach. Cabbage and others must be done and not overdone.
- Cook as close to service time as possible for quantity service.
- Under cook and chill; or cook in batches. Pre-preparation can be done before and can be refrigerated and further preparation can be done later.
- Do not use alkaline in cooking as fibers would be destroyed and they will become mushy.
- There should be even cuts for even cooking.
- Start with boiling salted water, except for whole potatoes and dry beans (pulses).
- Cook green vegetables and strong-flavored vegetables uncovered.
- Cook red and white vegetables in an acidic medium, which will enhance the color.
- Cook green and orange vegetables in a neutral medium.
- Do not mix batches of cooked food.

Cooking methods used in vegetable cooking.

1. **Boiling:**- mostly used.
2. **Glazing:**- carrots and spring onions.
3. **Braised:**- Cooking in stock eg. Vishy carrots.

4. **Grilling:**- pineapple and tomatoes are grilled.
5. **Broiling:**- tomatoes or brinjals on direct fire.
6. **Frying:**- After dipping it in the batter.
   Also, direct frying is used for French fries.
7. **Fondue :**- Blanch and then chop eg. tomato concasse'.
8. **Sautéing:**- fast cooking of vegetables in less butter.
9. **Blanching:**- spinach.
10. **Steaming:**- for potatoes, cabbage.

4.1.8. Selection Criteria of Vegetables

Vegetable	Selection Criteria
Artichoke	Plum is firm and heavy in comparison with size green scales with the absence of brown de-coloration.
Asparagus	Good green color extending down much of stalk, closed and compact tips, crisp and tender stalk.
French beans (green & wax)	Bright color for the variety, pods that are firm and crisp rather than flabby.
Beets	Fresh-looking tops if attached, the surface is smooth and deep red firm and round with a slim tap root.
Brussels sprouts	Green color void of yellow leaves tight outer leaves free of injury tight heads
Cabbage	firm head, fresh color in outer leaves, crisp leaves.
Carrots	Crisp rather than flabby good orange and color free from suborned green on top.
Cauliflower	Creamy white color with no trace of dark discoloration, solid and compact head, fresh leaves if attached.
Celery	Crisp stalk with a solid feel glossy surface on stalks crispy leaves, no de-coloration inside surface of large outer stalks.
Cucumbers	Firm, moderate size, green color
Eggplant	Smooth and firm with deep purple skin free of blemishes.
Green spinach	Crisp appearance with good green color. Free from rust and other blemishes no wilted or decaying areas.
Lettuce	The crisp quality of leaves free from decay and good color
Mushrooms	Caps closed around the steam surface of caps light color and the gills should be light smooth and firm cap.
Okra	Pods tender enough to bend under some pressure less than 4-inch-long green color and on blemishes.
Onion(dry)	Firm dry with a small neck no decay,

Onion(green)	Crisp, bright top, free from decay.
Peas	Crisp pods with fresh green color, full but not bulging,
Potatoes	Firm, free from suborned green areas, no decay, skin intact and free from blemishes
Sweet potato	Firm good color no sign of decay
Tomatoes	Smooth good color for ripeness, if not ripe, free from blemishes.

4.1.9 Cuts of Vegetables

Vegetables are cut into various shapes and sizes as per the need of the cooking. The purpose of cutting vegetables are:

- Smaller, more usable, and easily edible sizes.
- Faster cooking.
- Enhances the look of the product as the same vegetable can be cut into different shapes and sizes.

Name of Cut	Description	Purpose	Photograph
Chopping	Non-uniform finely diced cut	Garnishes/gravies/ sauces/ stuffing	
Mincing	It is finer than chopping	Gravies/sauces/ stuffing	
Mire pois	Roughly diced carrots. Onion celery	Stocks/ soups/ sauces/stews	

Matignon	Similar to mire pois but sliced	Stews / served with the dish	
Juliennes/ Allumettes	2.5mmX2.5mm X50mm long	Garnishes/ salads/Chinese preparations	
Brunoise	2.5 mm X 2.5 mm X 2.5 mm dices	Garnishing	
Jardinière/ Batons	5mmX5mmX50 mm long	Sautéed preparations	
Macedoine	5mmX5mmX5mm dices	Veg Preparations	
Dices	12 mm X 12mm X 12 mm dices	Veg Preparations	

Cubes	25mmX25mm X 25mm cubes	Veg Preparations	
Lozenge	Also known as diamond cut due to its slant-cut shape	Veg Preparations	
Slicing	Cutting thinly on the surface and shape is as per the vegetable	Veg Preparations	
Paysanne	Cutting thinly on the surface and shape should not exceed 20 mm	Veg Preparations	
Chiffonade	Shredded leafy vegetables	Garnishes/ salads/Chinese preparations	

Wedges	Round vegetables like lemon, and tomato cut into lengthwise	Stews, fries, garnishes, veg preparations	
Chateau/ Tourne	Barrel shape with 7 sides and length of 50 mm and a diameter of 30 mm	Veg Preparations	
Fluting	Semi-circular design made on the surface of mushrooms	Garnish/ Veg Preparations	
Parisienne	Scooped out with a Parisienne scooper	Salads/garnishes/ preparations	
Segment	Segments of citrus fruits	Salads/ garnishes	

4.1.10 Classification of Fruits

Fruits develop from the flowers of the plant and consist of its seeds and adjacent parts. The fleshy portion of the pericarp makes up the main edible part of the fruit.

Over the years, through common usage, the term fruit has come to apply to some fruits which are vegetables and botanically not fruits, and vice-versa. For example tomatoes - which are actually fruits but are commonly used as vegetables.

Pumpkin - which belongs to the vegetable marrow family is frequently used as a fruit and served in a sweet dish 'pumpkin pie'.

The many varieties of fruits available today in India are the result of hundreds of years of selection and cultivation. The earliest cultivation of fruit is traced to major areas. First, from the eastern Mediterranean to the Caspian Sea came apples, pears, cherries, figs, olives, plums, and grapes. Second, from the areas that stretch from China through Burma and the Indian subcontinent came peaches, apricots, bananas, mangoes, oranges, and lemons. As the inhabitants of these areas migrated to other parts of the world, they took with them cutting off their favorite plants for transplanting.

1. Citrus fruits

This group includes lemons, limes, citrons, oranges, grapefruit, etc. They are juicy fruits with a prominent sweet and sour taste and are highly rich in vitamin 'c'. These types of fruits are mostly cultivated in regions that have the Mediterranean type of climate ie. Cold and dry winters and warm scanty rainfall.

2. Fleshy fruits

This group includes apples, pears, bananas, melons, pineapples, etc. These fruits are fleshy and maybe with or without seeds. The taste may vary from fruit to fruit and the climate conditions required for cultivation may also vary, in India, apples are grown in the cold hilly tracks while melons are grown in the 'khaddar" region of river Ganges mostly in Uttar Pradesh.

3. Stone fruits

Apricots, peaches, plums, mangoes, cherries, custard apples, leeches, etc. Come under this group of fruits. These are the fruits that have a stone in the center which is then surrounded by fleshy parts all over.

4. Berry fruits

This group includes black, red, and white currants, cranberries, strawberries, raspberries, gooseberries, grapes, etc. Most of the fruits falling under this group are not cultivated in India except grapes and a little cultivation of raspberries and gooseberries and cape gooseberries.

5. Nuts

Coconuts, sweet chestnuts, almonds nuts, walnuts, pistachio nuts, cashew nuts, etc. fall under this group.

4.1.11 Storage of fresh fruits

Only a few fruits can be stored effectively. As far as nutrient retention is concerned in fresh fruits the commodities must be handled very carefully to avoid mechanical damage. If the cells of a fruit are damaged by careless handling, enzymes are released from within the cells, and such nutrients as vitamin C will be destroyed by an oxidation reaction. Other similar reactions will occur, contributing to not only a loss in nutritive value but also a loss of quality in the product.

Controlled low temperatures and proper air circulation must be employed to provide the best storage conditions, for fresh fruits to retard decay resulting from the natural respiration process of fruit and from microbial spoilage.

Low temperatures (close to 32 degree f) with a preferred relative humidity of about 85% furnish satisfactory conditions for commercial storage of fruit.

Stored fruits, however, do not have the same fresh taste as those that are newly harvested.

1. Hard fruit such as apples are left in boxes and kept in a cool store
2. Soft fruits should be left in their baskets in a cool room.
3. Stone fruits are best placed in trays and stored.
4. Citrus fruits remain in the delivery tray or boxes.
5. Bananas should not be stored in too cold places as the skin turns black.

4.1.12 Quality and purchasing points

1. Soft fruits deteriorate quickly so care must be taken while buying that they are not damaged or too ripe.
2. The fruits should appear fresh. There should be no shrinkage or signs of mold.
3. The color of certain soft fruits is an indication of ripeness.
4. Hard fruits should not be brushed; pears should not be over-ripe.

4.1.13 Nutritive value of fruits

Fruits are low in calories because their water content is very high ranging between 75% to 95%. Most fresh raw fruits contain less than 100 calories per serving.

Fruits, as a group, do not contain large amounts of proteins and fats. Fruits are excellent sources of fiber which helps in maintaining regular gastrointestinal function. The ripe fruit contains a higher percentage of sugar than unripe fruit does and the sugar is chiefly in the form of sucrose, glucose, and fructose.

Some fruits, such as citrus fruits, melons, and strawberries are exceptional sources of Vitamin 'C', if fruits are bruised, peeled, or cooked, or if they are exposed to air, alkali, or copper large amounts of the vitamins may be destroyed. The Vitamin B complex is present in only moderate amounts in fruits. Fruits that have deep yellow or green colors such as apricot, peaches, mangoes etc. are rich in Vitamin A. Most fruits are not considered good sources of minerals except for raisins and dried apricots, which have high iron content. Some fruits such as avocados, bananas, oranges, raisins, etc. are known for their high potassium values.

4.1.14 Preparation of fresh fruit

Proper preparation prevents poor product

Raw whole or cut fruit or a mixture of cut fruits is frequently served as an appetizer, as a salad, or for dessert. Fruits to be used as appetizers should be somewhat tart and need little or no sugar. Mixed-cut raw fruits are usually chosen with a view to the harmonious combination of appearance, flavor and texture.

All fruits must be washed in water that is safe for drinking purposes before use. Many fruits are sprayed with chemicals while in the growing stage and although most of the residue is removed before the fruit is marketed, there is still a chance of contamination.

Uncooked fruits may be served whole as dessert. Most varieties of fruits, perfectly ripened and chilled are most palatable and pleasing when served without alterations. Raw fruits that are to be sliced should be handled as little as possible. Sections of fruit that look ragged and worked over are not attractive. When citrus fruits are cut into slices or sections, a very sharp knife is needed to cut the fruit free of membrane or peel.

An easy way to peel citrus fruits is to steam them for 2-4 minutes. The fruit peel is scored into quarters without piercing the fruit and then peeled. The steaming loosens the membranes without injuring the flavor or nutritive value of the fruit. Apples and pears should be peeled by paring very thin slices away from the fruit with a potato peeler. Other fruits with skins that adhere to soft bodies such as ripe peaches and apricots should be blanched in boiling water for 30 seconds, then immediately cooled in cold water. The skin should slip off easily.

Fruit cups, appetizers, and salad plates are most appealing when the pieces of fruit used in the combination have not lost their identity through excessive handling or chopping. The proper use of a garnish of a contrasting color will set off fruit/fruit colors with a few minor exceptions; raw fruit is more palatable and has a higher nutritive value than cooked and processed versions. Under-ripe fruit, however, is unpalatable because many of the compounds contributing to its flavor are not completely developed until the fruit is ripe.

Most cut raw fruits, except those with a high acid content, turn dark on exposure to air. This can be prevented in the kitchen by:

(i) Immersing the fruit in lemon or orange juice or sprinkling with crystals of ascorbic acid

(ii) Dipping the fruit in pineapple juice

(iii) Covering the fruit in a sugar solution

(iv) Blanching the fruit.

4.1.15 Principles of cooking fruits

Although most fruits are edible raw, cooking is necessary to soften the cellulose of some fruits and to cook the starch in under ripe or very hard fruits. Fruits is cooked to provide variety in eating and much fruit is canned for future use. The factors considered in the cooking of fruit are the amount and quality of cellulose, the degree of ripeness and the amount of sugar and water used.

The amount of water used to cook fruit depends on its structure and water content. Berries, because they have little cellulose and will collapse quickly when cooked are best cooked in little water. Apples and pears require sufficient water to soften their cellulose structure.

When the fruit is cooked the walls of the fruit weaken and the cooked tissue becomes soft and temp: the color also turns translucent and the fruit eventually sinks in water. When fruit is cooked, the proteins in the cell membrane are denatured. When the fruit is cooked in sugar syrup, the syrup seeps into the fruit making it much sweeter and firm. The process of diffusion is a slow one; thus, fruits must be cooked in sugar for relatively long periods of time. During this time the outer portion of the fruit becomes more concentrated in sugar than the interior of the fruit. Cooking large pieces of fruit in a sugar solution will usually result in a lustrous, firm fruit that is highly palatable. However, hard fruits must be cooked first in plain water to tenderize them before they are cooked in a sugar syrup.

Texture changes:

Cooking softens the tissues of fruits hence softening the texture. If an alkali, such as baking soda is present during cooking, the fruit quickly becomes mushy, while if acids, sugar, and calcium salts are added, the fruit retains its firm structure. Fruit that is to be served as a sauce or that is to be softened is cooked to tenderness before the sugar is added.

Color changes:

Cooking is not only an art but a science.
Science of cooking and art of presentation

Change of color takes place during the cooking of fruit due to certain chemical changes. Some changes in grapes and cherries may occur when these fruits have come in contact with tin salts. Red fruits such as strawberries may lose color. When heated rapidly after storage in the refrigerator. Berries should be cooked slowly to retain their bright color.

Flavor changes:

Fruit cooked in syrup must be cooked longer to bring about evaporation of the water. A few fruits such as strawberries and cherries, develop an off flavor when cooked too long in a sugar syrup. These fruits should be quickly cooked in sugar rather than syrup. Fruits are cooked only for a short time to retain their characteristic flavor and aroma.

Changes in the Nutritive value of fruits:

The greatest loss in food value in cooked fruit is the loss of ascorbic acid through oxidation.

4.1.16 Methods of cooking fruit

Fruits are cooked by sautéing, stewing, or baking. The goal of cooking fruit is to improve its digestibility while retaining as much as possible of its flavor and color.

- **Stewing:**

  While stewing fruit, the usual procedure is to cook it in water or sugar syrup or sugar. Fruits for stewing should be fresh, sound, and not overripe.

a) for a fruit marmalade	...	Sugar %age - 20 to 40
b) for a jam	...	Sugar %age - 100%

- **Baking:**

  Fruits with heavy skins such as apples and pears, are good to bake because the peel serves as a protective covering and holds the steam necessary to soften the cellulose and decrease the loss of volatile flavors. Such fruits as plums, peaches, and bananas may be baked in covered baking dishes.

- **Poaching:**

  Fruits are simmered or boiled in sugar syrup to partially cook them. When a firm product is desired.

- **Sautéing:**

  Fruits can also be sautéed to cook. Very little fat should be used for sautéing fruits. While cooking fruits it should be observed that removing too thick a paring from apples and similar fruits is wasteful and detracts from the flavor, color, and nutritive value of the

cooked product. Cooked fruit is most palatable when served immediately. Fruit sauces and pies are most delicious when served shortly after preparation.

- **Frying:**

  Fruits can be fried by dipping them in a batter eg. Fried Fruits like banana fritters

- **Grilling :**

  Some hard fruits may be grilled eg. ineapple, pears

Check Back Questions

1. Classify Vegetables with examples.
2. Classify Fruits with 3 examples of each.

Project work

1. Carry out the yield test of five types of vegetables and fruits and record your observations.
2. Visit the Local market in a group of three and list down the vegetables and fruit available. Prepare a table with the type of vegetable, color, pigment present and the prevailing market rates.

4.2 SALADS

4.2.1 Definition

Salad is a mixture of cooked or uncooked vegetables and sometimes meat items seasoned with a dressing.

4.2.2 Classification

Salads can be broadly classified in the following ways

1. **Simple salads:-** these are those which are made up of single ingredients.

   compound salads:- these are those which are made up of two or more ingredients.
2. **Raw salads:-** these are those that are made up of salad greens, vegetables, and fruits which are uncooked.
3. **Cooked salads:-** these are made up of cooked ingredients like meat, fish, eggs, and even vegetables.
4. **Hot or cold:-** salads are generally served cold but some may be served warm or hot eg. German salad.

4.2.3 Service of Salads:

Salads are served as:

1. **Appetizers: - Russian salad, Prawn cocktail.**

2. **Accompaniments: - green salad, potato salad, cheese salad.**

3. **Main course: - chicken salad.**

4. **Dessert:- Waldorf salad, Fresh fruit salad.**

4.2.4 Parts of Salad

1. **Base or underliner:-**

Generally made of lettuce leaves, cabbage, or spinach leaves to give contrast to the salad.

2. Body:-

It is made of the main ingredient like vegetable or meat ingredients which gives the body to the salad.

3. Dressings:-

The dressing is a seasoned liquid of varying consistency to enhance the flavor and taste of the product. This is a mixture of liquid bases like oil, vinegar, lemon, honey, mayonnaise, and curd with seasoning like salt, pepper powder, mustard powder, sugar, and flavors like herbs and spices which is mixed with the main ingredient to give moisture, taste, flavor, and binding.

Types of Dressings

- Oil based- French/ Vinaigrette
- Mayonnaise based- Cocktail
- Cream Based-fruit salad
- Curd Based -Greek Salad
- Honey Mayonnaise- Walldorf

4. Garnish:-

Garnishes are used to improve plate presentation by adding color, intrigue, taste, and texture. It must be very simple and neat and it should not dominate the salad. It should complement and depict what is in the main meal.

Some commonly used garnishes are:

- Olives
- Grapes
- Parsley

4.2.5 Preparation of salad:-

1. Prepared meat, fish, fruit, etc, and cook them much in advance as per requirement.
2. Prepare garnish, marinade, and dressing and use accordingly.
3. Keep chilled if green vegetables are used so that the salad is not limp.
4. Marinate and bind with dressing just before service.
5. Arrange the base on a salad plate.
6. Arrange the body on the base after mixing with the dressing.
7. Give the garnish.
8. Hold for chilling, if to be served cold.

Check Back Questions

1 Define salad.
2 What are the various parts of a salad? Give two examples of each.
3 What are the various types of salads?
4 In which course of the menu can a salad be served?
5 Define dressings. Give some examples of dressings.

PROJECT WORK

Visit in groups of three local restaurants and list down the types of salads served on their menu and record the base, body, dressing and garnishes used in them.

4.3 SOUPS

4.3.1 Definition of soup

It is an aromatic, highly nutritive liquid, which can be thin or thick and can be served hot or cold. It also acts as an appetizer and meal in itself. It is made from meat, fish, vegetables, and cereals.

4.3.2 Classification of Soups with Examples

Soups are broadly classified as

Hot soups

Name of Soup	Texture	Description	Examples
Broths / Bouillons	Thin unpassed	a soup made with meat or vegetables simmered in stock and occasionally thickened with barley or other grains	Minestrone' Scotch Broth
Consomme'	Thin Passed	A consommé is a clear soup with a rich flavor that has been clarified by using egg whites to remove fat and sediment from the stock or broth	Consomme'
Puree	Thick pureed and strained	A thick, creamy soup called puree is created by cooking and in stock and then pureeing cooked meat and or vegetables.	Crecy
Cream	Thick and strained	A thick creamy soup made with stock, vegetable thickening agents like Panada (Thick bechamel) may be used.	Tomato
Veloute	Thick and strained	It is made from base stock which is thickened with blonde roux and flavored and colored with a puree of cooked vegetable or meat.	Mushroom Chicken
Bisque	Thick pureed and strained	It is a pureed soup made from shellfish	Prawn lobster
Chowder	Thick and not strained	It is seafood soup made from seafood stock and thickened with potatoes and finished with cream	Clam

4.3.3 Recipe of Consommé Soup

Cooking time:2 hr **Portion: 04**

Sr. No.	Ingredients	Quantity
1.	Mince of beef	250 gms
2.	Stock(brown)	3 liters
3.	Carrot	25 gms
4.	Onions	25 gms
5.	Celery	15 gms
6.	Leek	15 gms
7.	Pepper corn	3 gms
8.	Vinegar	10 ml
9.	Bay leaf	1no.
10.	Thyme	1 sprinkle
11.	Egg white	2 no
12.	Seasoning	To taste

Method: -

- Whisk the egg white in a thick bottom pan in which the consommé` is to be cooked.
- Add minced beef, mire pois, seasoning, pepper corn & vinegar and mix well.
- Add cold stock & mix well together.
- Heat gently to a simmer stirring slowly till a raft starts to form. Remove the stirrer and allow to simmer till a raft will be formed on top. Cook for 2hrs. The raft will settle down at the bottom
- Strain the consommé` through a fine muslin cloth with minimum disturbance to the raft.
- Check the seasoning of the clear amber-colored strained liquid.
- Serve hot garnished with chopped parsley.

4.3.4 Consommé' variations

Consommé's	Description
Alexandra	Chicken consommé thickened with tapioca and garnished with chicken dice/ quenelles and shredded lettuce
Andalouse	Consommé blended with tomato puree, garnished with dices of royal and tomato, julienne's of ham, boiled rice, vermicelli, and threaded eggs
Bretonne	Consommé garnished with juliennes of leek, celery, onions, mushrooms, and shredded chervil
Carmen	Consomme' mixed with tomato puree and garnished with juliennes of capsicum, tomato, and chervil
Colbert	Consomme' garnished with printanier of vegetables and small poached eggs

4.3.5 Consommé garnishes

Garnishes	Ingredients
Brunoise	Brunoise of veg.
Dubarry	Florets of cauliflower
Florentine	Juliennes of blanched spinach
Madrilène	Tomato dice and green peas
Paysanne	Paysanne of veg.
St. Germaine	Fresh green peas
Celestine	Julienne's thin pancake
Cereals	Rice and barley
Royal	Dice of savory egg custard
Diablotin	Diamonds of cheese biscuits
Egg drops	Beaten egg whites poured into hot consomme'

4.3.6 International soups and country of Origin

Sr no	Name	Country of origin
1	Minestrone	Italy
2	Petit marmite	France
3	Scotch broth	Scotland
4	Green turtle soup	The U.K.
5	Mullygutwany	India and Sri Lanka
6	Gazpacho	Spain
6	Gambo	South Africa
7	Cock-a leekie	Spain
8	Tom yam	Malaysia
9	Linen Suppe'	Germany
10	Camaro	Brazil

Check Back Questions

1. Define soups. Classify Soups with examples.
2. What is the difference between Mire pois and Matignon? What are their uses?

Project Work

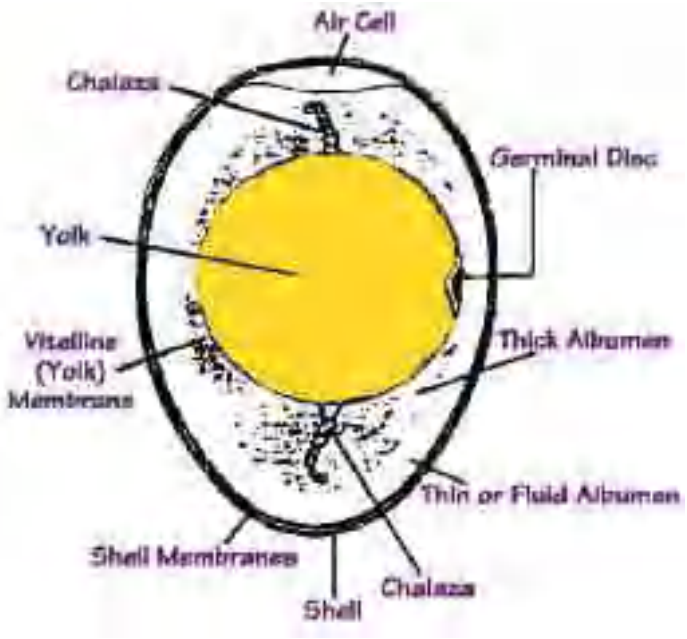
Visit 5/4/3 star hotels in your city and list down the soups served in their restaurants as per the classification criteria of soups.

4.4 UNDERSTANDING EGGS

4.5.1 Introduction to egg cookery

The egg is known as "Oeuf" in French. Eggs of different birds are used in cooking. Apart from hen, eggs of quail, duck, ostrich, plovers' pigeons are also used. An egg is a very versatile ingredient in the kitchen and finds many uses. Now day's convenience eggs are also available. It is dehydrated in powder form and by adding milk it can be again used. They can also be frozen for longer storage.

4.5.2 Structure of an egg



The central yellow part of an egg is the yolk. The color of the yolk varies due to the feed of the hen or bird. Yolk contains iron, vitamins, fat, protein **(Lecithin),** and the embryo. The embryo gives birth to the new progeny. Egg protein **'Lecithin'** is present in the egg yolk which acts as an emulsifier for preparing some dressings, mayonnaise, and hollandaise sauce Yolk is a fatty substance and is high in cholesterol. **Vitellin** is a clear seal that covers and protects the egg yolk. Egg white is rich in protein known as **albuminoid** and contains mainly water and little **Sulphur** Thick egg white or **albumen** covers the egg yolk and it becomes thinner as it becomes older. Thin albumin covers the outer side of the thick albumin **Chalaza** are twisted cordlike strands of egg white which hold the egg yolk in the center of the egg. Prominent chalazae indicate good quality. As the egg becomes older, the chalazae become weak and hence the yolk starts moving easily inside the white when shaken. The shell membrane is a clear thin skin-like structure that covers the egg from the inside. The outer shell is made of **calcium carbonate**, which is porous. It not only allows the moisture to go out but also the air to come in. The air sack is small when the egg is fresh but becomes bigger as the egg ages. Eggs, therefore, float on water when old or stale and are not fit for use.

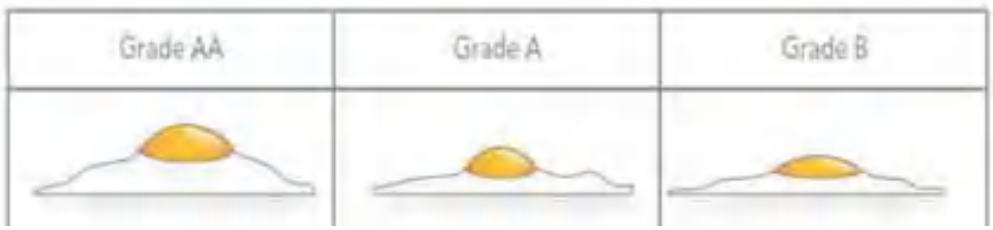
4.4.3 Grading and selection of eggs

The egg is generally **graded** as

- A.A: - it is the freshest and the best quality egg. Egg content covers a small area. White is firm and has a thick white surrounding the yolk and a small amount of thin white. The yolk is round and upstanding.
- A: - Good quality. Egg content covers a moderate area. White is reasonably firm and has a considerable amount of thick white and a medium amount of thin white. The yolk is round and upstanding.
- B: - Medium quality. The egg content covers a wide area. White is weak and watery, has no thick white, and a large amount of thin white is spread. The yolk is enlarged and

flattened.

- C: - bad (egg loss) it is not used.



Selection of Eggs:

- Color as per breed
- Size and weight should be proportionate.
- The standard weight of an egg is 50-55 gms.
- Free from cracks
- Free from any dirt/ filth attached to the shell
- Should sink if placed in water
- When seen against the light, there should not be any black spots inside
- When shaken near the ear, it should not produce any noise of movement inside.

4.4.4 Action of Heat on Eggs

1. Egg coagulates on heating.
2. Egg white coagulates at 60 degrees Celsius.
3. Egg yolk coagulates at 65 degrees Celsius.
4. Cooking causes a green color due reaction between the Sulphur of egg white and the iron of the yolk to form Ferrous sulfide which is not good for health.

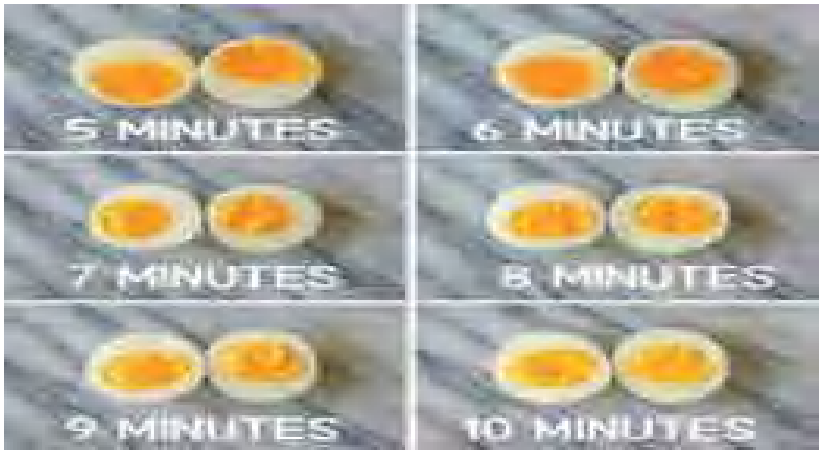
4.4.5 Foaming of Eggs

1. Egg white can be beaten into foam due to proteins. Fat prevents foaming therefore there should be no egg yolk in egg white.
2. Acid and salt help foaming.
3. Whereas sugar helps in stabilizing foam.

4.4.6 Points for handling eggs

1. Accept only fresh eggs on delivery.
2. Insist on cleaned eggs. As the cell is porous and can be contaminated by salmonella.
3. Store at 2 degrees.
4. Storage should be done at 2 degrees Celsius but away from strong-smelling compounds as the porous shell may absorb the smell of the strong compound.
5. Issue eggs based on (last in first out) lifo for breakfast (first in first out) FIFO for the bakery.
6. Handle with carefully.
7. Use a preliminary small container while breaking eggs in large quantities.
8. Do not keep broken eggshells on the work table to avoid contamination.
9. Do not separate egg yolk on your hands.
10. Store separated yolks covered with water to prevent the formation of skin.
11. Check eggshells before simmering in the shell.
12. Do not store egg wash for more than 24 hrs.
13. Wash carefully all the tools used in handling the eggs.

4.4.7 Breakfast preparations of eggs



1. **Shell on** --- boiled eggs.
   - **Hard boil** --- 10 minutes.
   - **Soft boil** --- 4-6 minutes.

After boiling transfer to cold water to prevent ferrous sulfide deposition on the egg yolk which gives a bluish layer to the surface of the egg yolk

2. Shell off --- not mixed

- Fried eggs: - they are of two types
  sunny side Up and **Turnover**.
  They are cooked in oil
- Poached: - they are cooked in water.

- En cocotte: - they are cooked with the help of steam in a bain-marie.

- Shirred eggs: - they are cooked with oil by radiant heat i.e. Under salamander

- Au plat: - butter is used and cooked by radiant heat.

3. Shell off --- mixed.

- Omelets: - there are 3 types **continental, Indian, and Spanish.**

- Scrambled eggs: - Egg, butter, cream, and seasoning are mixed and cooked over a double boiler or slow flame to soft creamy texture.

4.4.8 Uses of eggs in cookery

1. AA category eggs are used for frying and poaching.
2. A category of quality eggs is used for omelets and scrambled eggs.
3. B-category eggs are used in the bakery.
4. Color and flavors to bakery and cookery products. (egg wash).
5. The egg acts as a binding agent (pommes croquettes)
6. Acts as an emulsifier in mayonnaise and hollandaise.
7. It is used as an ingredient. (in the bakery).
8. Used for different breakfast preparation.
9. Used as a leavening agent (i.e. Raising of the product).
10. Add to the nutritive value of the product.
11. Used for decoration and garnishing of dishes.
12. Acts as a thickening agent (Liason of egg yolk and cream)
13. For coating of food products.
14. Good for invalids (weak) and for infants

Check Back Questions

1. Draw the structure of an egg.
2. What are the points to remember while handling eggs?

Project work

Visit 3-star and above-category hotels in your locality and list down the type of egg preparations that are served in their coffee shop.

4.5 UNDERSTANDING FISH

4.5.1 Introduction to Fish Cookery

In the catering sector, fish and seafood are often known as seafood. Fish is frequently referred to as the "fruit of the sea" or "sea fruit" throughout the world. In France, it is referred to as "Fruit de Mer" which means fruit of the sea. Fish is very delicate and has to be handled, stored, and cooked carefully.

On the French menu, fish is served in the "Poisson" course. Fish and shellfish are used around the world in cooking in a versatile manner. Fish has 75% of the water. Fish protein is known as **albuminoid** which is around 18% of the body mass**.** Fat content in fish varies from fish to fish**.** Eel fish has 26% of the fat Eel fish: - 26%, salmon, Trout: - 12%, Shad: - 8.2%, Herring: - 6%. Fish contains high % age of phosphorous or phosphorite compounds. It is easily digestible for sedentary workers and infants. Wastage of fish monger is high i.e., up to 35-40 %.

4.5.2 Classification of Fish with Examples

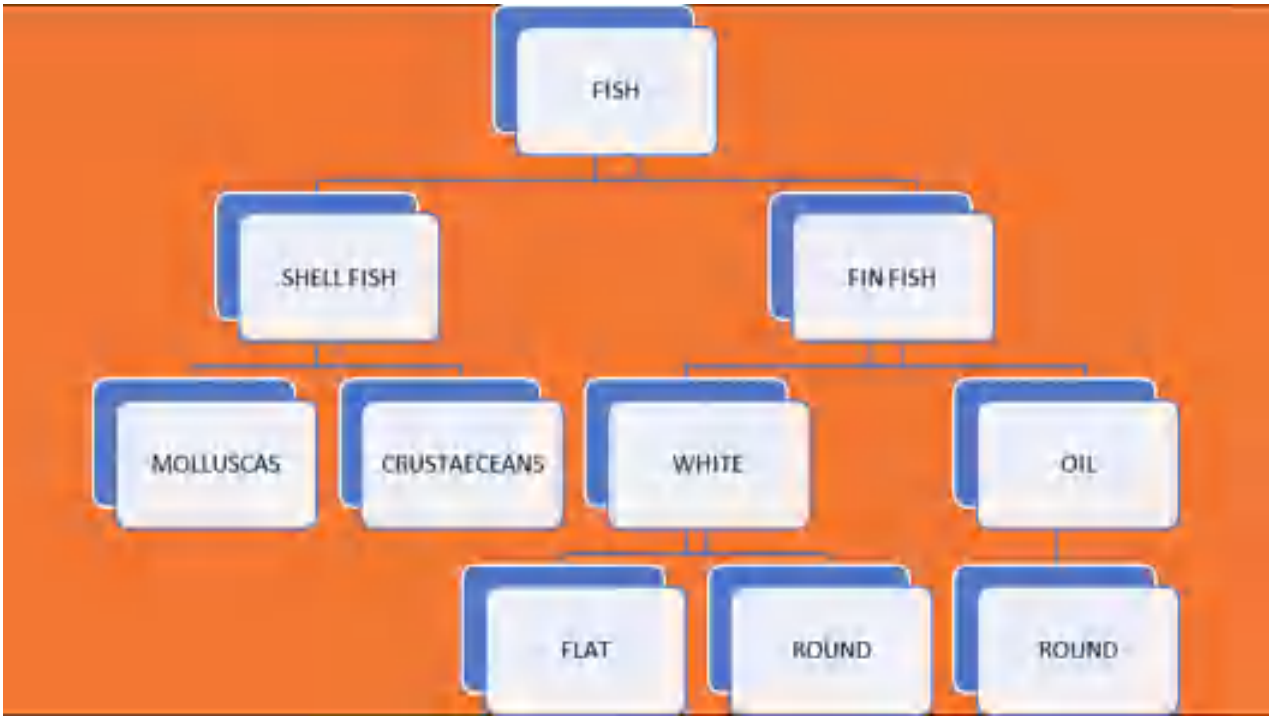
Fish are of 2 types

1) **Fin Fish**
   - Round: - They are generally found on the top (round due to low pressure).
   - Flat: - They are found deep in the bottom (due to high pressure).
2) **Shellfish**
   - Shellfish:-
     a. Mollusca's,
     b. Crustaceans.

Fish are classified based on their

1) **Habitat**
   - Fresh Water (rivers/ lakes)
   - Saltwater (Sea/ Oceans)
2) **Shape**
   - Flat
   - Round
3) **Flesh Type**
   - White- less fat
   - Oily- more fat

Classification of Fish



EXAMPLES

1. **Round Fish (white)**
   - a) Cod
   - b) Haddock
   - c) Red mullet
   - d) Whiting
2. **Flat Fish(white)**
   - a) Brill
   - b) Turbot
   - c) Sole
   - d) Halibut
3. **Round. Fish(Oily)**
   - a) Anchovies
   - b) Herrings
   - c) Mackerel
   - d) Salmon
   - e) Sardines
   - f) Trout
   - g) Tuna

4.5.3 Difference between Flat and Round fish

Flat Fish	Round Fish
1) Flat in Shape 2) Both its eyes are on the same side of the head. 3) The belly is white 4) Yields four fillets	1) Round in shape 2) Eyes on either side of the head 3) The belly color is the same as the dorsal side 4) Yields two fillets
	

4.6.4 Quality Check of Fin Fish

The eyes should be bright and moist it should be full and not sunken.

1. The gills should be bright pinkish red and should give a fresh smell.
2. The flesh should be firm and springy or elastic.
3. The scaler should be plenty full, firm and should not come out easily while handling.
4. Fish should have a fresh salty smell.

4.5.5 Cuts of Fin Fish

Name	Description	Image
Cotelette	A cut on the bones	
Darne	Slices of fish on the bones of round fish	

Tronc'on	Round stakes cut from a flat fish, are thick pieces	
Fillet	Boneless slice of fish, without the skin	
Supreme / Pave	Large fillet cut into slants for large round or flat fish	
Delice	Neatly folded fillet into two, for small fillet	
Goujons and Goujonettes	Strips of fish fillet . ½ cm * ½ cm by 8 cm. Same as goujons of 4 cm. Mainly used as a garnish can be crumbed and fried.	
Butterfly	Whole flat fish debone into a butterfly shape	

Paupiettes	Thin cuts of fillet, which are stuffed with fish or prawns and then fold into a cylindrical shape.	
Medallion	Round steak cut from a fillet, which can also be prepared from minced fish	

4.5.6 Shell Fish

Shellfish are those which have shells on them

They are classified into two

1) **Mollusca's**-have a hard shell that is not edible. They are further subdivided into
   - univalves (Single shell),- Abalones, Snails, conches
   - Bivalve (Double shells) –Clams, cockles, oysters, scallops
   - Cephalopods (legs on the head)- Octopus, squid
2) **Crustaceans**—have a hard crust or shell on top which acts as a protective covering. They contain a pigment called "Astaxanthin" which when heated turns into an orange-red color.

Mollusca

Name (French terms)	Description	Image
Snails (les escargots)	They are available on the land.	
Oyster (les huitres)	Can be raw, fresh from the sea, or can be poached in their juice.	

Mussels (le modules)	found in both freshwater and seawater	
Scallops (le coquilles)	Twice the size of oysters	
Cockles (Le coques)	Bivalve type.	
Clams (le clovises)	Bivalve type.	

Crustaceans

Name	French terms	Image
Shrimps	Crevettes	
Prawns	Crevettes	

Lobster	Hommard	
Scampies	Langoustine	
Crayfish	Ecrevise	
Crawfish	Langouste	
Crabs	Crabe	
Squids	Calmars	

Octopus	Pieuvre	

4.5.7 Quality check of shell Fish

They should always be eaten during the season fresh.

1. They should be medium size and good weight.
2. The claws of crabs should be springy and not hanging down.
3. Eyes should be bright.
4. The tail of lobsters should spring back when stretched out.
5. Shrimps and prawns should be crisp.
6. Oyster shells should be tightly closed.
7. Muscles should be fresh.

4.5.8 Storage of Fish

- Preferably fish should be used fresh.
- Fish should be cleaned, washed, dried, and then refrigerated at 30 to 34 degrees F. or 1 to 2 degrees C.
- If to be kept for a longer period it should be kept frozen at -18^0 C.
- Quickly freeze fish and store till required but once partially thawed, should not be refrozen.

4.5.9 Method of cooking fish

1. Boiling of fish --- with cold water or cooking liquor (Fish stock and white wine) either with small or large pieces.
2. Boiling "Point Au Bleu" --- shellfish e.g. lobster, crab are dipped head down alive into boiling water till they are cooked.
   a. Poaching --- Cooking liquor barely covers fish covered with grease-proof paper and poached in an oven. Cooking liquor may be used for making sauces. This method is suitable for small whole fish cuts of fillet.
3. Stewing --- Fish cooked in this method is generally served as a soup in the form of a broth known as "En Matelote".
4. Shallow frying --- Covered with seasoned flour and shallow fried known as 'Meunier'.
5. Deep-frying --- fish is treated " a la Anglais(batter and breadcrumbed) , deep fried and served with Colbert butter.
6. Baking --- Marinated without oil and baked by covering with foil or leaves.
7. Roasting --- Marinated along with oil and cooked similarly to baking without covering.
8. Braising --- Keeping fish in little stock and baking it.

10. Grilling --- cooked over griller after dusting
11. Au gratin --- Covered with a sauce, tomato sauce, fish velouté and then baked.

Check Back Questions

1. Classify Fish?
2. How do we check the quality of fin fish?

Project Work

Visit the local fish market in your city and list down the fish sold as per their classification and their prices. List down the preparation of each type of fish

SUMMARY

This unit has dealt with the various sub-topics. In the first sub-topic, we read about vegetables and fruits. It has information on vegetables and fruits, their classification, and methods of cooking them to retain nutrients and color. Different kinds of vegetables and fruits are used in our kitchens daily which provide a major part of our dietary requirements like carbohydrates, proteins, fats, minerals, and Vitamins. Without a proper understanding of their characteristics and the method of cooking, we shall not be able to get the benefits out of them.

The second topic dealt with salads and their preparations. Salads are today an integral part of any meal and in contemporary times their use in meals has increased due to awareness generated about its benefits.

The third sub-topic of Soups is a very important part of a menu. Due to its variety, ease of preparation, and also health benefits, people are attracted to it. This sub-topic deals with the basic preparations of soups, their classification, and some international soups.

The next sub-topic of Eggs deals with one of the most versatile ingredients in the kitchen which is used in so many cookery and bakery products. It is a very good source of protein and is easily digestible so it is also used to supplement the protein intake of invalids and infants.

The last sub-topic of Fish gives information about the various types of fish, their classification, processing, and cooking. Fish is a very delicate item and a very good source of easily digestible protein. There are so many sources and varieties of fish found all over the world and hence we find numerous preparations of it. Understanding fish and their processing, storage, and cooking is very crucial to get the best products out of fish.

Understanding these basic ingredients and their cooking methods is very important to become a good chef as these form the base of any cooking. This unit is designed to be easily understandable. The format emphasizes and highlights key points in bold type and numbered sequences, so basic information can be located and reviewed at a glance. Review Questions

REVIEW QUESTIONS

MULTIPLE CHOICE QUESTIONS

1. The dominant pigment present in Red cabbage is

a) Chlorophyll
b) Carotenoid
c) Anthocyanin
d) Xanthophyll

2. The grade of egg used for making Fried eggs is

a) B
b) A
c) AA
d) C

3. Mussels is a type of

a) Vegetable
b) Salad
c) Shellfish
d) Soup

4. Vinaigrette is a type of

a) Lettuce
b) Dressing
c) Flavoring
d) Base of salad

5. An example of thin passed soup is

a) Consommé'
b) Minestrone
c) Bisque'
d) Chowder

FILL IN THE BLANKS

1. Blanched and chopped tomatoes is known as_____.
2. Prawn cocktail is served as an _____ in the courses of menu.
3. The thick layer formed while clarification of consommé is known as_____.
4. On heating Egg white coagulates at_____ degree celcius.
5. Flatfish gives _____ number of fillets.

TRUE AND FALSE QUESTIONS

1. While boiling spinach, the container should be covered to retain its color---T/F
2. The presence of fat in egg white will prevent its foaming—T/F
3. En Cocote is a type of shellfish----T/F
4. Chicken salad is served as an accompaniment—T/F
5. Consommé can be served both hot and chilled----T/F

SHORT ANSWER TYPE QUESTIONS

1. List the points that should be kept in mind while cooking vegetables.
2. Tabulate the difference between flat and round fish.
3. Classify soups with examples.
4. List at least 10 uses of eggs in cookery and bakery.
5. List down the process of assembly of a salad

LONG ANSWER TYPE QUESTIONS

1. Explain the various breakfast preparations of eggs.
2. Define the process of making a consommé with a recipe for 4 portions.
3. Elaborate at least 10 cuts of fish.
4. Explain at least 10 cuts of vegetables.
5. Describe the parts of a salad.

OPEN BOOK QUESTIONS

1. Vegetables play an important role in designing a menu. Elaborate in detail.
2. 'Eggs are very versatile'. Justify your answer with the necessary examples.

5

Chapter

BASIC PRINCIPLES OF BREAD & CAKE MAKING

Learning Objectives

S.No	Sub Unit	Learning Topics	Key learning Objectives / At the end of the sub-unit, the learners will be able to:
1	Introduction	The Basics of Baking and cake making	• Elaborate on the importance of baking and cake making
2	Bread	Introduction to Breads	• List the outline of Bread making
3	Ingredients Used in Bread making & their role.	What are the ingredients used in Bread making?	• Explain the role of each ingredient used in bread making. • Explain the structural component of bread.
4	Steps in Bread Making	Procedures involved in Bread making	• Important aspects of each step involved in bread making. • Comprehend the time sequencing of each step involved in bread making. • Explain the drawback if any step in bread making is missed out.
5	Methods of Bread Making.	What are the various methods involved in bread making?	• Analyze the difference in each method of bread making. • Identify which method of breadmaking will be suitable for the organization. • List the alternative ways of bread making.
6	Bread Faults.	Why is the outcome of the bread not good?	• Elaborate the various faults that occur in bread. • Explain how to rectify each fault. • Comprehend how effectively get the best bread
7	The beneficial role of microbes	What are the beneficial roles of microbes in the food industry?	• Elaborate chemical change that takes place because of microbes. • List the beneficial products that are made with the help of microbes. • Explain what type of microbe and ingredient is used to get the difference in products.

8	Probiotics	What is Probiotics?	• Define Probiotics. • Explain why are probiotics important in the food industry. • List the beneficial effects of Probiotics.
9	Cake	Introduction to cake making	• Differentiate bread and cake making
10	Ingredients used in cake making	What are the ingredients used in cake making?	• List the different ingredients used in cake making. • Explain the importance of each ingredient used in cake making.
11	Methods of cake making	What are the various methods of cake making?	• Explain the different ways cakes can be made. • Elaborate on what method to adopt for the right product. • Analyze the sequencing of ingredients according to the type of method followed.
12	Cake faults	Various faults occur in cake production	• Evaluate why are the results not good. • Explain different the corrective measure and sequencing of ingredients to rectify the fault.

5.1 INTRODUCTION

There have been baked goods for countless years. Early in the Roman Empire, the art of baking was created. Romans liked baked products and frequently requested them for key occasions like feasts and weddings, making it a very well-known form of art. Around 300 BC, baking was made popular as a profession and occupation for Romans due to its fame as a culinary craft. Beginning with the use of mills to crush grain into flour for their loaves, bakers started making bread at home in ovens. The first bakers' guild was founded in Rome in 168 BC as a result of the persistent demand for baked goods. The need for baked goods encouraged baking across Europe and into eastern Asia. Bakers began producing bread and other goods at home and sold them on the streets.

This practice spread, and soon baked goods were being served on the streets of cities like Rome, Germany, London, and others. As the demand for baked goods significantly increased, a delivery system for households emerged. This led bakers to set up shops where customers might buy their goods. Since Paris's establishment of the world's first outdoor bakery market, people frequently visit bakeries to eat delectable treats and mingle.

A bakery is an establishment that produces and sells flour-based food baked in an oven such as bread, cookies, cakes, doughnuts, bagels, pastries, and pies. Some retail bakeries are also categorized as cafés, serving coffee and tea to customers who wish to consume the baked goods on the premises.

Bakery and baked goods categories like bars, bread (bagels, buns, rolls, biscuits, and loaf bread), cookies, desserts (cakes, cheesecakes, and pies), muffins, pizza, snack cakes, sweet goods (doughnuts, Danish, sweet rolls, cinnamon rolls, and coffee cake) and tortillas.

5.2 BREAD:

It is a basic food made from flour and water dough, often with yeast, which can be prepared in several different ways such as, baked in the oven or a tandoor or on a griddle or can be deep fried or it can also be steamed.

When yeast is used as the raising agent, it gives bread its characteristic texture.

After the raw material for bread making is correctly selected, the formula should be correctly balanced. The strength of flour, the type of product to be made, fermentation time to be given, are some of the basic factors to be taken into consideration while balancing the formula. After balancing the formula, the raw materials should be weighed accurately. the basic process of baking yeast bread starts with measuring and mixing the various ingredients to make the dough and adding yeast so that it rises. The dough is then kneaded to develop the gluten and is again allowed to rise. The kneading and rising steps may be repeated several times. Next, the dough is shaped into a loaf and baked. Baking cooks the dough, firms the loaf and forms a crust on it, and improves the flavor. Finally, the loaf of bread may be sliced before being wrapped. Commercial bakeries have machines that do the work of measuring, mixing, kneading, baking, slicing, and wrapping.

Skilled bakers run the machines, and nothing is left to chance. The ingredients are weighed precisely, the temperature and humidity are closely monitored, and the individual steps of the baking process are carefully timed.

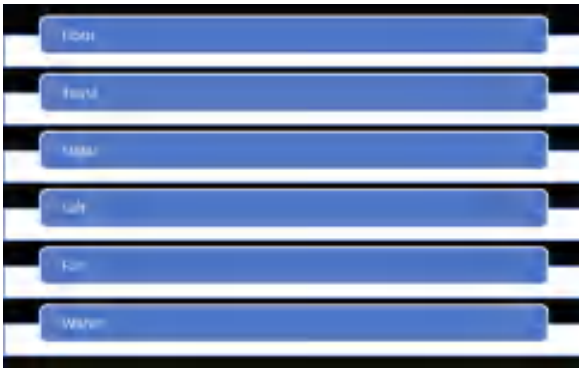
Every bakery uses a special blend of flour, produced by mixing the wheat before or after it has been milled. In most large bakeries the manufacturing process begins in bins on a high floor so that gravity can draw the flour or dough from one machine down to the next.

5.3. ROLE OF INGREDIENTS IN BREAD MAKING

Bread is a food product made up of mainly flour and water. Other ingredients like yeast, fat, sugar, salt, etc. give it fluffiness and more flavor. The invention of leavened bread is attributed to the Egyptians. The Greeks baked on grids in an oven-like structure. The bread making comprises 3 main operations i.e. kneading, fermentation, and baking.

There are various ingredients used in bread making, which have a significant role in getting a good finished product. Any deviation in the quality or quantity of the ingredients may result in an inferior product.

The following are the basic ingredients used in bread making:



- **Flour** – It is the main component of bread as it provides structure to the bread. Various types of flour are used in bread making. Flours can be classified into two main categories:
  - Strong flours
  - Weak flours

  Strong flours have high protein content which makes them suitable for leavened breads whereas weak flour contains less protein and is mainly used in the preparation of flat breads and breads with low gluten content. Complex sugar present in flour also acts as the food for yeast. Yeast breaks down this complex sugar into simple sugar and then feeds on it to produce carbon dioxide gas and alcohol.
- **Yeast –** Yeast acts as the heart of bread, it is this ingredient that gives typical bread its fluffy and spongy texture. It's a variety of fungus. The strain/variety that is mainly used for the fermentation of bread is "Saccharomyces cerevisiae". It carries out a process called fermentation in which yeast feeds on sugar in the presence of moisture and warm temperature to produce carbon dioxide gas, ethyl alcohol, and a bit of heat. It comes in various forms such as
  - Active Dry yeast
  - Fresh/ baker's yeast
  - Instant active dry yeast
- **Sugar** – there must be sufficient sugar in the dough so that yeast can perform the fermentation process effectively. As the yeast takes time to break down the starch present in flour into simple sugar, therefore, some simple sugar is externally added to the yeast and water mixture to activate it quickly. The characteristic brown color of the crust of the bread comes from the sugar present in the flour. As sugar also has a dispersing action on the gluten of flour therefore its quantity should be properly measured.
- **Salt –** another important ingredient in bread making is salt. Apart from its basic role i.e. imparting flavor in bread it also controls the fermentation process. Being hygroscopic it holds moisture and keeps the bread fresh for a longer time. It is also indirectly responsible for the crust color of the bread.
- **Fat –** fats used in small quantity act as gluten lubricant as a result it holds more air and the resulting product comes out spongier. Fats like butter, help in adding more flavor to the bread. The addition of fat in bread dough should be done at a later stage, if added in the initial stages it might harm the water absorption power of the flour which might result in a poor end product.
- **Water/liquid** – this is the ingredient that holds all the other ingredients together to form a dough. Water content for bread will depend on the type of flour used. Strong flour will absorb more water whereas weak flours absorb less water.

Check back Questions:

1. How would you differentiate strong flour and weak flour?

2. What are the various ingredients used in Bread making?

5.4. STEPS IN BREAD MAKING

Bread is a basic food made from flour and water dough, often with yeast, which can be prepared in several different ways such as, baked in the oven or a tandoor or on a griddle or can be deep fried or it can also be steamed.

When yeast is used as the raising agent, it gives bread its characteristic texture.

After the raw material for bread making is correctly selected, the formula should be correctly balanced. The strength of flour, the type of product to be made, fermentation time to be given, are some of the basic factors to be taken into consideration while balancing the formula. After balancing the formula, the raw materials should be weighed accurately.

1. **Preparation of raw materials**

   The first ferment is prepared as the first step of bread making. Take lukewarm water (minimum 6 times the weight of the yeast) of water; add a little sugar and mix. Let it soak for around 5-7 min. until yeast starts floating on top of the water. Add enough flour to make a thick paste. Keep this batter in a warm place for around 10-15 min to allow it to rise. This batter is known as "**flying ferment**".

2. **Mixing**

   While the flying ferment is underway, the other ingredients are weighed and prepared. The dough could be mixed by hand as well as by machine. Flour contains gliadin and glutenin which joins together and form gluten when water is added to flour and it is mixed.

   The initial stage of mixing is known as the "**Pick-up"** stage when flour picks up water and all the ingredients are in the process of distributing themselves evenly throughout until the whole mass becomes homogenous. During this stage, the dough seems to be slack but as the mixing proceeds, the gluten takes up water and the dough seems to be drying up, this is termed as "**Drying up"** stage. As the mixing proceeds, the dough cleans the sides of the bowl and pulls away from the mixing arm. This is known as the "**Clean-up"** stage. After this comes the "**Development stage"** when the dough is considered to be properly mixed. When the dough is properly mixed, the surface of the dough becomes smooth. A small piece of correctly mixed dough can be stretched between fingers into a thin translucent film.

3. **Fermentation**

   After the dough is correctly mixed, it is fermented for a predetermined time. Fermentation is a process whereby yeast feeds on sugar and produces CO^2 gas and alcohol. Carbon dioxide raises the dough fabric.

   There are three sources of sugar in fermented dough;

   1. Natural sugar present in the flour,
   2. Formula sugar is added in the mix, and
   3. Sugar produced from the starch of flour through enzyme action.

If the dough is allowed to over-ferment, it becomes soft and sticky due to over action of protease enzymes and acids. Due to over-fermentation, the bread may have an excessive volume with a very open texture or it may collapse during proofing or baking.

An under-fermented dough will produce bread with less volume and a harsh reddish-brown crust color. The texture will be close and compact. The bread will dry out very soon and will tend to be crumbly due to insufficient conditioning of the gluten.

4. Knock back

After the dough is fermented for two-thirds of its estimated fermentation time, it is knocked back. The process of knocking back should be carried out correctly. The stretching action to which the gluten is subjected during the knocking back operation has a beneficial effect on the finished product as this action helps proper conditioning of gluten. After knocking back the dough is again fermented for the remaining one-third period during which the dough is filled with gas and the gluten becomes pliable and in a fit condition for further processing, this is called "**floor time"**

5. Dividing and rounding

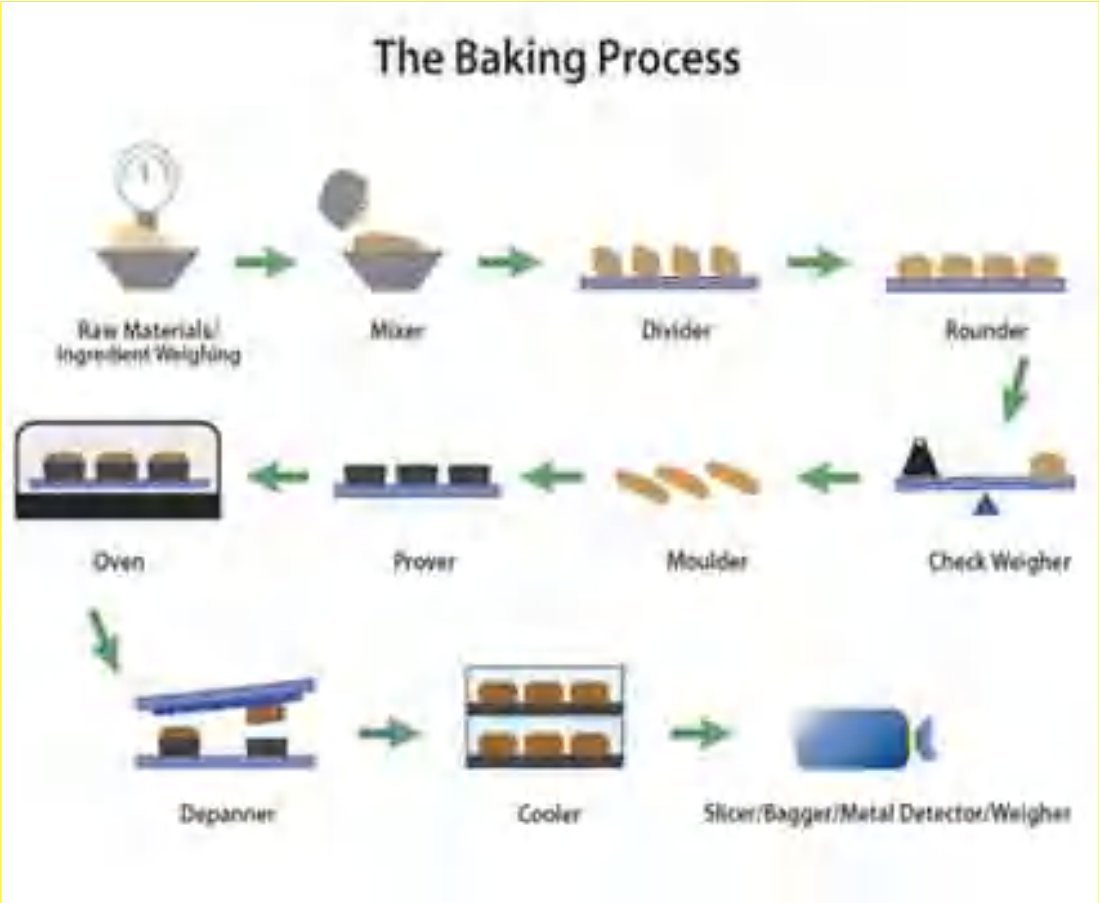
The dough is cut into pieces of desired weight according to the size of the mold. While dividing the dough by hand, it is desirable to cut the dough with a regular dough cutter. When the dough is cut, the cut surface is exposed while the remaining surface has a stretched gluten film. Some gas gets escaped from the cut surface (technically known as **bleeding**). If the piece is molded in this state, the texture of the bread will also be uneven. Therefore, the dough piece is rounded to make it uniform.

6. Intermediate Proofing

Whenever fermented dough is handled, some of the gas escapes, and gluten strands collapse, making the dough tight. If the dough is manipulated when it is in tight condition, it will tear off leaving a rough surface. Therefore before manipulating the dough further, it should be rested for 10-15 min. This resting of the rounded dough piece is known as "intermediate proofing"

7. Moulding and Panning

The dough piece, soft and pliable after intermediate proof, is molded according to the desired shape of the finished product. The dough piece should not be molded too tight or too loose. Too tight molding may tear off the surface. The too-loose molding will open up the texture to an undesirable extent.



8. Proofing

After panning, the bread is proofed under suitable conditions (temp 95-98 deg. F) to allow it to rise again and acquire volume. When gluten is in such perfect condition, and the temperature and humidity of the proofing cabinet are ideal, the rise of bread is faster. During the proofing operation, the yeast should have sufficient food to affect faster gas production.

9. Baking

After the bread has acquired full volume, it is baked. The temperature of the oven is set according to the quantity of the product to be baked, its size, and its formulation. Normally, bread products are baked between 400-480 deg F. Open-top loaves are baked at a lesser temperature than sandwich bread.

The difference in the size of a product from the time it was kept in the oven to the time it is properly baked is known as **"Oven-spring".** During this period of baking, the yeast should get an appropriate quantity of food to produce gas. This much-needed food is provided by the breakdown of starch into maltose sugar. As the temperature further rises the yeast cell starts getting inactive and completely ceases functioning at around 140 deg F.

Bread molds should always be placed in an oven at a distance of about half an inch from, and parallel to each other, which will ensure proper circulation of heat and evenly baked product. If the molds are loaded too close to each other, the sides of the bread which are in close contact will be insufficiently baked without proper crust color.

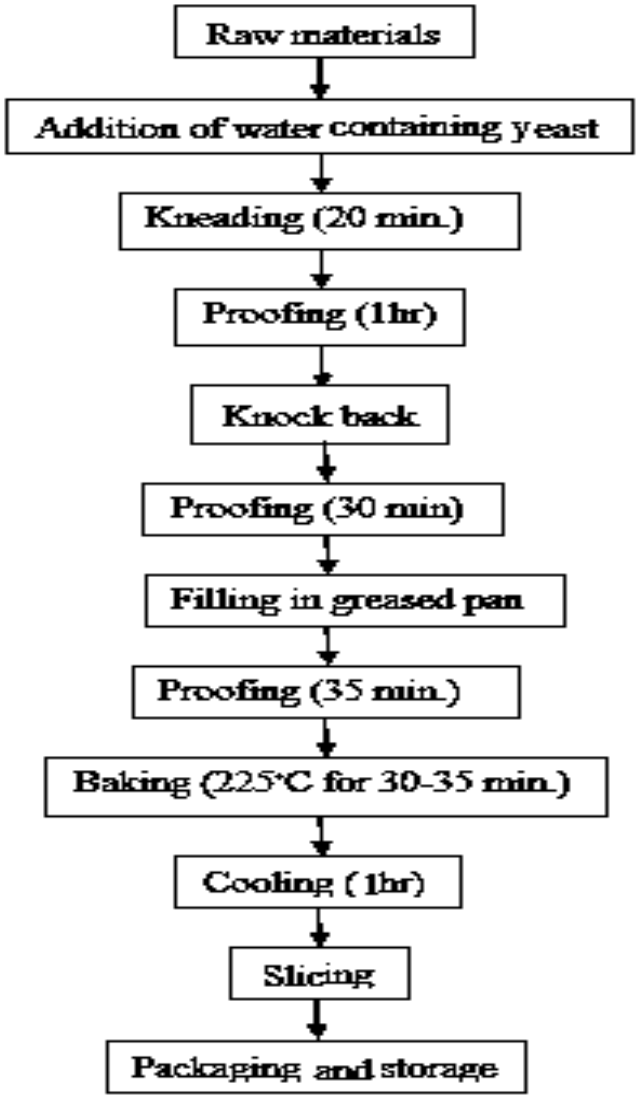


Figure 2 - The Bread making process

10. Cooling

Bread should be released from the mold immediately after baking, otherwise, the moisture trapped between the bread and the surface of the mold will make the product soggy, technically known as **"Sweating".** When the bread is hot, starch granules are in a swollen state and held unstably by the gluten framework. If the bread is sliced in this state, the unstably positioned starch granules will lump up together giving a very poor appearance to slice. After the bread comes to room temperature they are passed through the slicer.

11. Packing

Bread is packed to preserve its freshness and to protect it from the hazards of external contamination. The bread should be allowed to breathe but not unduly exposed.

Check back Questions:

1. **Why do we need to add yeast when making bread?**
   - **A. To reduce the baking time**
   - **B. To boost the flavor**
   - **C. To make the dough rise**
2. **Which of the following is the main ingredient in bread?**
   - **A. Cereal**
   - **B. Sugar**
   - **C. Flour**
3. **Why do we knead the dough before baking bread?**
   - **A. To give bread structure and strength**
   - **B. To improve the sweetness**
   - **C. To bring crust crispiness**
4. **What is the name of the elastic and sticky protein substance that gives bread its texture?**
   - **A. Celiac**
   - **B. Gluten**
   - **C. Histamine**

5.5. DIFFERENT METHODS OF BREAD MAKING.

Present day bread production scenario has changed to a very large extent in comparison with conventional methods. There are different methods of bread making and the method varies from one organization to the other depending on various factors like time, quantity, ingredient availability, availability of machinery and infrastructure, etc. The quality of the bread remains the same irrespective of the method that is adopted for the production process.

Following are some of the conventional methods of bread making:-

5.5.1. Straight Dough method

In this method, all the ingredients are mixed and the dough is fermented for a predetermined time. The fermentation time of straight dough depends on the strength of the dough. Strong flours require more fermentation time to mature adequately. As the temperature rise has an immediate effect on fermentation speed, it is very necessary to control the temperature of straight dough by:-

a. Using shorter fermentation periods.

b. Adjusting the temperature of kneading water.

c. By fermenting the dough at room temperature i.e. around 78-80 deg F.

Figure 3 - Straight Dough Method

5.5.2. Salt-delayed method

Figure 4 - Salt–Delayed Method

This is a slight variation of the straight dough method, where all ingredients are mixed except the salt and fat. As the salt has a controlling effect enzymatic action of yeast, the speed of fermentation of salt-less dough will be faster and a reduction in total fermentation time could be affected. The salt is added at the **knock backstage.** This method is especially suitable if strong flours are to be used.

5.5.3 No-Dough time method

Figure 5 - No-Dough time method

In this method, the dough is not fermented in the usual manner. It is just allowed for a brief period. Since the dough is not fermented, the twin functions of fermentation (i.e. production of gas and conditioning of gluten) are achieved to some extent by increasing the quantity of yeast. Although it is possible to make fairly acceptable bread by using this method, the product has poor keeping quality and lacks aroma. As there is an increased quantity of yeast present, the bread may have a strong yeast flavor.

5.5.4. Sponge and Dough method

Figure 6 - Sponge and Dough Method

Strong flours are more suitable for sponge and dough methods of bread making where the problem of controlling the dough temperature is not as acute as the total fermentation time is divided into two separate segments. A sponge dough is indicated as 60/40 sponge-dough, or 70/30 sponge dough, where the first numbers i.e. 60 or 70 indicate the percentage of the flour used in the sponge and the second numbers i.e. 40 or 30 indicate the percentage of flour mixed at the time of dough making.

In this method, as a first step, a part of flour, a proportionate amount of water, yeast, and yeast food are mixed. This sponge is fermented for a predetermined time. Sponge fermentation time depends on the amount of flour in the sponge and the flour quality. When the sponge is ready, it should be broken down properly with formula water, so that its even mixing in the dough is assured. Mixing operation should be carried out to the right degree. After the dough is mixed, it is rested for 30-45 min. Preconditioned gluten of the sponge hastens the conditioning process of the gluten of fresh flour during the period and the dough is in a perfect state for further manipulation i.e. cutting, molding, etc.

5.5.5. Ferment and Dough method

Figure 7 - Ferment and Dough Process

This is a variation of the sponge and dough method. Very often bread may contain milk, eggs, and a substantial quantity of fat and sugar, as in the case of sweet bread, Danish pastry, and other sweet fermented products. All these formula ingredients will have a retarding effect on yeast activity. If all the formula (recipe) yeast, part of flour, yeast food, and sufficient water are mixed, the yeast gets initially an environment that is conducive to vigorous activity and at the end of fermentation time, it is in a fit condition to take on the extra load of fermentation in the presence of milk, eggs, excessive fat, etc.

When the ferment is ready, it is mixed in the dough along with the remaining ingredients and allowed to ferment for the second stage of fermentation. This method is used to make enriched bread, buns, Danish pastry, etc.

5.5.6. Bread Culture Method

Figure 8 – Bread Culture Method

This is an old method of bread making; it is sometimes also called as sourdough method of bread making. It a time consuming method, as before preparing bread a starter/leaven/culture has to be prepared, which takes usually 2 weeks to develop. For preparing culture/leaven equal quantities of flour and water is mixed and left overnight at room temperature. The next day approximately 75% of the mixture is discarded and the same amount of flour and water is added to the leftover mixture. This process of discarding and refilling is repeated for almost two weeks. After 15 days the available mixture is called culture/leaven/starter. To prepare bread, 20% of the culture is added to the flour with salt and water.

Check back Questions:

1. **What are the different methods of Bread Making?**
2. **Differentiate the Straight dough method and Salt delayed method.**
3. **What do you mean by the Sour dough method of bread making?**
4. **Explain about sponge and dough method.**

5.6 BREAD FAULTS

Most of the commercially produced bread in the country is sandwich type & open top loaves are rarely seen in the market. However, for judging the various characteristics, open-top bread should be tested. When the lid is put on the sandwich bread before baking, the expansion of the bread during baking is restricted, which in turn will affect the crumb structure of the bread & some other characteristics also. To make a complete assessment of the quality of bread, it should be examined both for external as well as internal characteristics.

External Faults	Internal Faults
a. Volume	a. Colour
b. Symmetry of shape	b. Structure
c. Bloom	c. Texture & Sheen
d. Crust Colour	d. Flavour & Aroma
e. Evenness of bake	e. Crumb Clarity & Elasticity
f. Oven Break	f. Moistness
	g. Cleanliness

5.6.1. External Faults

Figure 11 - Symmetry of shape

Volume: - The volume of bread should always be considered in its weight. For particular bread, the volume should neither be too big nor too small. Too much volume for the weight of the bread indicates too open texture which leads to crumbliness, early staling, etc. On the other hand, a small volume of bread shows too close & compact crumb structure, lack of flavor, etc. Factors required for acquiring good volume in bread are sufficient strength in flour, adequate fermentation, and sufficient diastatic capacity of flour, proper proofing and baking conditions.

The symmetry of shape:- In the case of open loaf breads the lower part (trunk) is guided by the walls of the mold, while the upper part (dome) has free expansion. There should be such a harmony between these two parts of bread that it presents a pleasing appearance. Excessive use of bread improvers, too much or under fermentation, excessive or insufficient proofing, improper proofing, and baking conditions are some of the factors which are responsible for imparting round shoulders, caved-in sides, or bottom and jagged upper crust.

Bloom:- This characteristic requires very fine judgment to differentiate it from crust color. Bloom is that natural shine that can be acquired in bread only by the use of good raw materials and proper care at every stage of processing.

Crust Colour:- Crust of bread is supposed to have a pleasing golden brown color. Since caramelization of sugar is responsible for imparting such color to the crust, the intensity of color will depend on the quantity of sugar available at the time of baking. If more sugar is consumed by the yeast during fermentation time, the crust color will be pale or light brown. Conversely, if there is a lack of yeast activity, there will be more sugar left which will make the crust color reddish. Apart from this, some other factors also influence crust colors, such as proofing conditions, oven temperature, milk content, type of bread improvers used, and consistency of the dough.

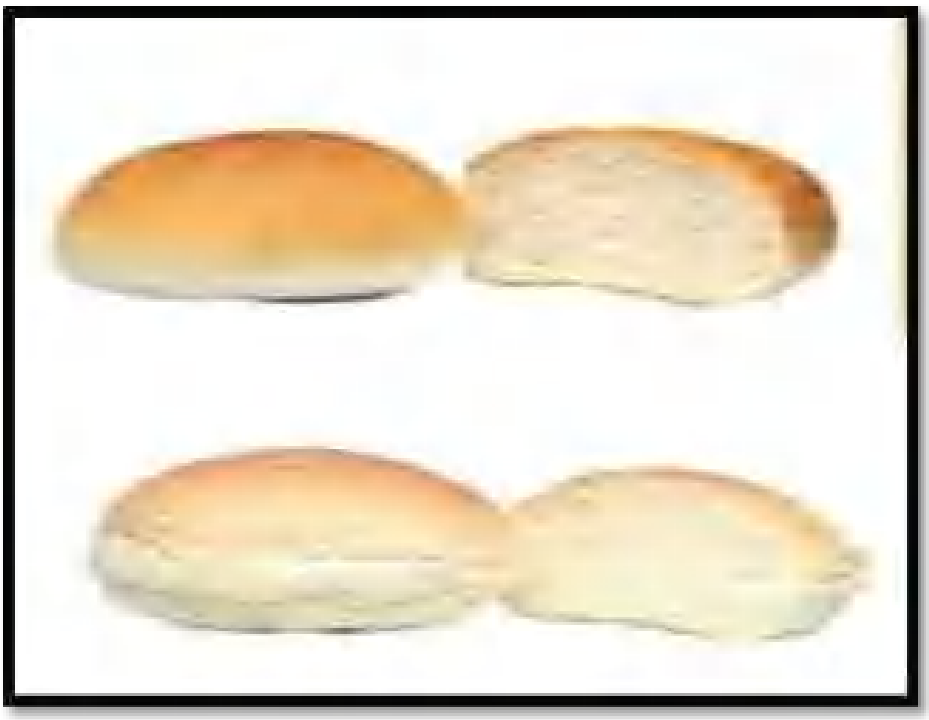


Figure 10 - Evenness of bake

Evenness of bake: - Bread should have an even golden brown color all around. If in case single bread molds are used in a bakery, bread is likely to have uneven crust color if the molds are set in the oven too close to each other. For this reason, the molds should be set in the oven half an inch apart and parallel to each other to allow free and even flow of heat. In ovens also there are likely to be hot and cold spots. In that case, too, the bread will have uneven crust color.

Figure 9 - Excess Volume

Oven Break: - When an open-top loaf is being baked, crust formation on the sides and top of the bread takes place earlier. When the expansion takes place in the inner part of the bread, the gas stretches this weaker part and escapes through the opening thus created. This is called 'Break'. The characteristic of the break (smooth, rough, exaggerated) is known as 'Shred'. If the flour is of good strength, the dough is correctly fermented, and proofing and baking conditions are proper, then the break must be smooth. If the dough is under fermented, the gluten will have more resistance and it may tear apart under the pressure of expanding gas giving an exaggerated break or even a 'flying top'. Apart from proper fermentation, the 'break-shred' is also affected by correct molding and adequate proofing.

5.6.2 Internal Faults.

Color: - Colour of the bread will be influenced by the grade of flour. Color is also enhanced by the amount of light reflected from the crumb surface. A crumb structure, made up of small, even-sized gas cells, will reflect more light as compared to a crumb which has a structure made of uneven-sized cells. Factors that influence the crumb structure are the quality of flour, degree of fermentation, processing of dough, proofing, and baking conditions.

Structure: - If the crumb structure of different bread is closely observed it will be seen that the shape and size of the cells varies considerably. In the case of whole meal bread, the cells will be very small due to the presence of 'bran' which has a cutting action on gluten strands

thus preventing them from stretching. The structure of different kinds of bread may vary due to differences in the formula, fermentation process, baking condition, etc.

Figure 12 - Structure Variance

Texture: - If a cut surface of the bread slice is gently pressed, the sensation could be that of smooth silkiness or hardness, or coarseness. This sensation of touch is known as the 'texture' of the bread. The texture which is soft, silky, and still with a certain degree of firmness, is considered good. A slack dough or too much final proofing will produce bread having open crumbs. Such texture is known as 'wooly texture'. Bread made from the under-fermented or too-tight dough will have a texture that will be very tough and is known as 'dummy texture'.

Flavor and Aroma: - In the case of bread, several acids and other by-products are produced during fermentation. When these acids come in contact with heat during baking they impart a special flavor to bread. If the dough remains under-fermented, there will not be enough by-products present and the bread will lack flavor. On the other hand over fermentation will produce excessive quantities of acids etc and the flavour will be too strong. Some ingredients used in bread making also, either impart flavor to bread or enhance the natural flavor of other ingredients. E.g. Salt, sugar, milk, etc.

Crumb clarity and Elasticity: - When a thin slice of bread is held against bright light the whole surface should appear translucent. But at times dark spots are likely to be seen through which light will not pass. Such dense spot which feels hard to touch is known as the 'core'. Improper mixing of dough is a major cause of having 'cores' in bread. Dense layers in crumb structures are known as 'seams'. If a fully expanded loaf is mishandled while placing it in the oven, some portion of the gluten may collapse resulting in the formation of 'seams'. When the crumb of bread is gently pressed, it should not break and should come back to its original shape once the pressure is released. This quality of bread is known as 'elasticity'. Good quality flour and adequate fermentation influence the elasticity of bread.

Moistness: - Quality of freshness of bread is judged by the degree of its moistness. Moistness is influenced by the condition of gluten and starch in bread. If the gluten is adequately conditioned during fermentation it will form a very fine web-like structure thereby enhancing the moisture-holding capacity of bread. Proper conditioning of starch also improves the moisture-holding capacity of bread. Some of the ingredients like salt, sugar, fat, and malt help in retaining moisture in the bread. Baking bread in low temperature will increase its baking time and as a result, more moisture will be evaporated. Bread should be stored in a place where the relative humidity is around 60%.

Cleanliness: - Cleanliness of the product depends on the care a baker takes in handling the production. Absolute care is necessary during baking, de-molding, cooling, slicing, and packing operations. It is the responsibility of the baker to maintain proper hygiene and cleanliness of the establishment.

Check back Questions:

1. **What could be the reason for bread to get early staling?**
2. **What would be the fault in bread if excess bread improver is used?**
3. **What do you mean by Bloom in Bread?**
4. **What are the reasons for the dark crust color in bread?**
5. **What are the reasons for bread to get uneven crust color?**
6. **Explain about oven break.**
7. **What are the reasons for bread to get a woody texture?**
8. **What are the faults that bread would develop if the moisture content is less?**

5.7. BENEFICIAL ROLE OF MICROORGANISMS

Microorganisms are an important part of the food industry as they are helpful in food preservation and production. Usually, microorganisms are used in making dairy products (yogurt and cheese), fermented vegetables (olives, pickles, and sauerkraut), fermented meats (salami), and sourdough bread. They are also useful in the beverage industry in the manufacturing process of beer, wine, etc.

5.7.1 Fermentation of Milk to curd:

Milk is converted into curd or yogurt by the process of fermentation. Milk is converted into curd with the help of bacteria called Lactobacillus. These bacteria convert lactose present in the milk into lactic acid. The lactic acid coagulates the milk protein casein and results in the formation of curd.

5.7.2 Alcoholic Fermentation:

Alcoholic fermentation takes place in the cytosol of the cell and releases the energy from glucose molecules into usable cellular energy called ATP. Alcoholic fermentation also creates ethanol (alcohol) as a waste product, from which the process of alcoholic fermentation gets its name.

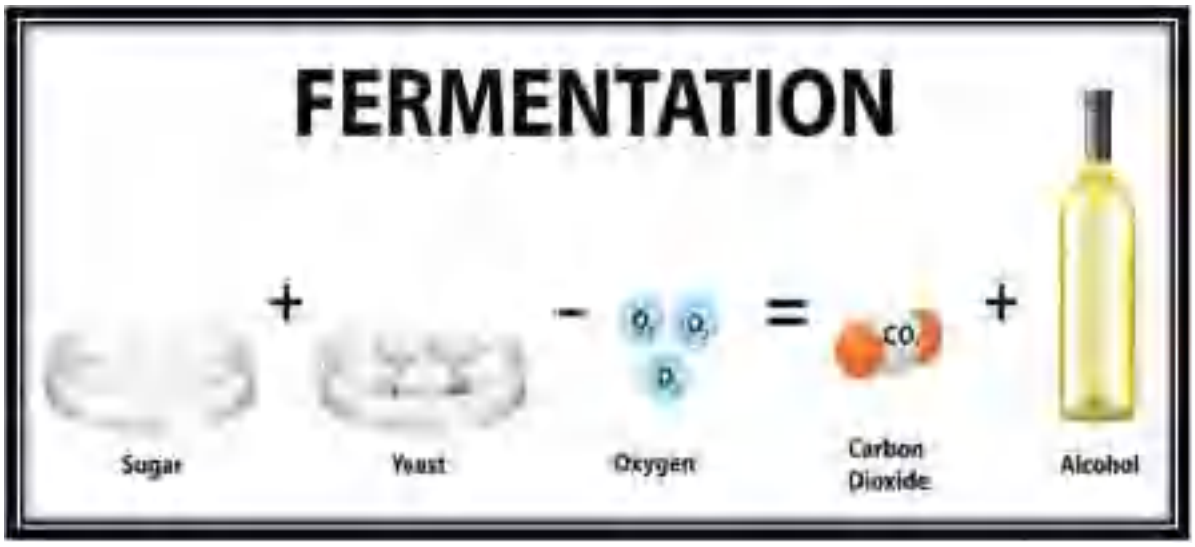


Figure 13 - Fermentation for the production of Alcohol

5.7.3. Manufacturing of Vinegar:

Vinegar is produced through a two-stage fermentation process, the first being the conversion of fermentable sugars into ethanol by yeasts, generally Saccharomyces species, and the second being the oxidation of ethanol by bacteria, generally Acetobacter species.

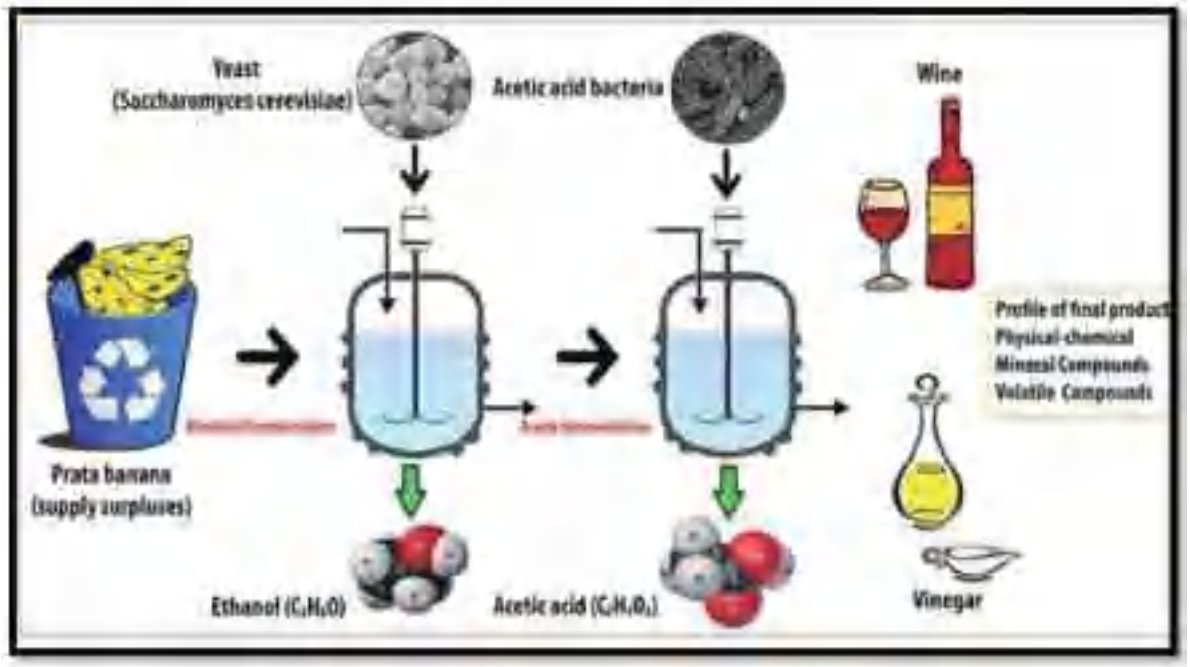


Figure 14 - Manufacturing of Vinegar

5.7.4. Microbes in Food Production:

Fermentation is a chemical process that breaks down organic materials. This process is carried out by microorganisms such as bacteria, yeasts, and molds. The microorganisms that bring about food fermentations may be added as a culture, e.g., cheese manufacture, or they may be naturally present in adequate numbers in the food, e.g., no culture needs to be added to idly batter for fermentation to take place. In bread dough, sugars are fermented by the yeast Saccharomyces cerevisiae to ethanol and carbon dioxide which give flavor and a light spongy texture to the bread.

S. No.	Food Product	Ingredients Used	Microorganism involved
1	Idly	Rice + black gram	Leuconostoc mesenteroides, Streptococcusn faecalis Pediococcus cerevisiae
2	Tempeh	Soya beans	Aspergillus oryzae, Streptococci, Lactobacilli
3	Soya sauce	Soya beans + rice	Aspergillus tamari
4	Coffee	Coffee berries	Pectinolytic bacteria, Leuconostocm mesenteries, Lactobacillus brevis, Lactobacillus plantarum, Streptococcus faecalis
5	Cocoa	Cocoa beans	Candida yeast enzymes
6	Vinegar	Starchy vegetables, malted grains, sugars, and fruit juice.	Saccharomyces cerevisiae var ellipsoids(alcoholic fermentation), Acetobacteraceti, and Gluconobacter (acidic fermentation)
7	Curds	Milk	Streptococcus lactis, Streptococcus cremoris, Leuconostoc cremoris
8	Pickles	Cucumber, dill, olives, or other vegetables	Pediococcus cerevisiae
9	Cheese & Yoghurt	Milk	Streptococcus lactis, Lactobacillus casei Propionibacterium freudenreichii Penicillium roqueforti Penicillium camemberti Streptococcus thermophilus Streptococcus faecalis Streptococcus thermophilus Lactobacillus bulgaricus

Check back Questions:

1. **What is the beneficial role of microbes in Food Production?**
2. **Name five fermented products in food production?**
3. **Why is the fermentation of milk important in food production?**

5.8. PROBIOTICS

The live bacteria and yeasts that are present in yogurt (curd) and other dairy products are known as probiotics. To lessen the gastrointestinal adverse effects of drugs, doctors typically advise patients to take antibiotics to do this.

It can be found in yogurt, which is made from milk fermented by lactic acid and bifid bacteria, buttermilk, some cheeses with live bacteria, kefir, a probiotic milk drink made with kefir grain culture, tempeh, a fermented soybean product, kimchi, a fermented cabbage dish, kombucha, a fermented tea beverage, and other foods like pickled cucumbers and sauerkraut.

It's important to realize that anyone doesn't necessarily know which beneficial bacteria they should consume. Consuming probiotics is also merely a wishful assumption that some bacteria will turn out to be advantageous. There are two types of bacteria in our bodies: good bacteria and bad bacteria. Good bacteria like lactobacillus and bifid bacterium are the foundation of probiotics. By battling harmful germs, they support health and the body's ability to function. Saccharomyces boulardii, a type of beneficial yeast, is included in probiotics and helps to promote health.

When probiotics are alive, they are beneficial, but they can expire over time, especially in hot environments. What kinds of health advantages do they offer still present a significant conundrum? But different probiotic species are useful in treating irritable bowel syndrome (IBS), pediatric diarrhea, and several other bowel illnesses. Probiotics also inhibit the development of infections by producing antibiotic substances.

Probiotics have been proven to be damaged by digestive enzymes and stomach acid. Therefore, it is preferable to combine them with foods that protect probiotics by acting as a buffer between stomach acid and digestive enzymes. Probiotics can be taken with meals to improve digestion because it quickens during and after meals.

5.8.1. Benefits of Probiotics

- Helps to reduce hypertension
- It enhances the digestive health
- Reduces risk of antibiotic-related diarrhea
- Provides relief from stomach disorders by improving mental health.
- Helps to reduce hypertension
- Check on one's cholesterol levels

- Gastrointestinal
- Prevents rotavirus-related illnesses in young children; encourages the synthesis of nutrients; strengthens the immune system; and promotes intestinal tract health. reduces the likelihood of allergies in those who are susceptible

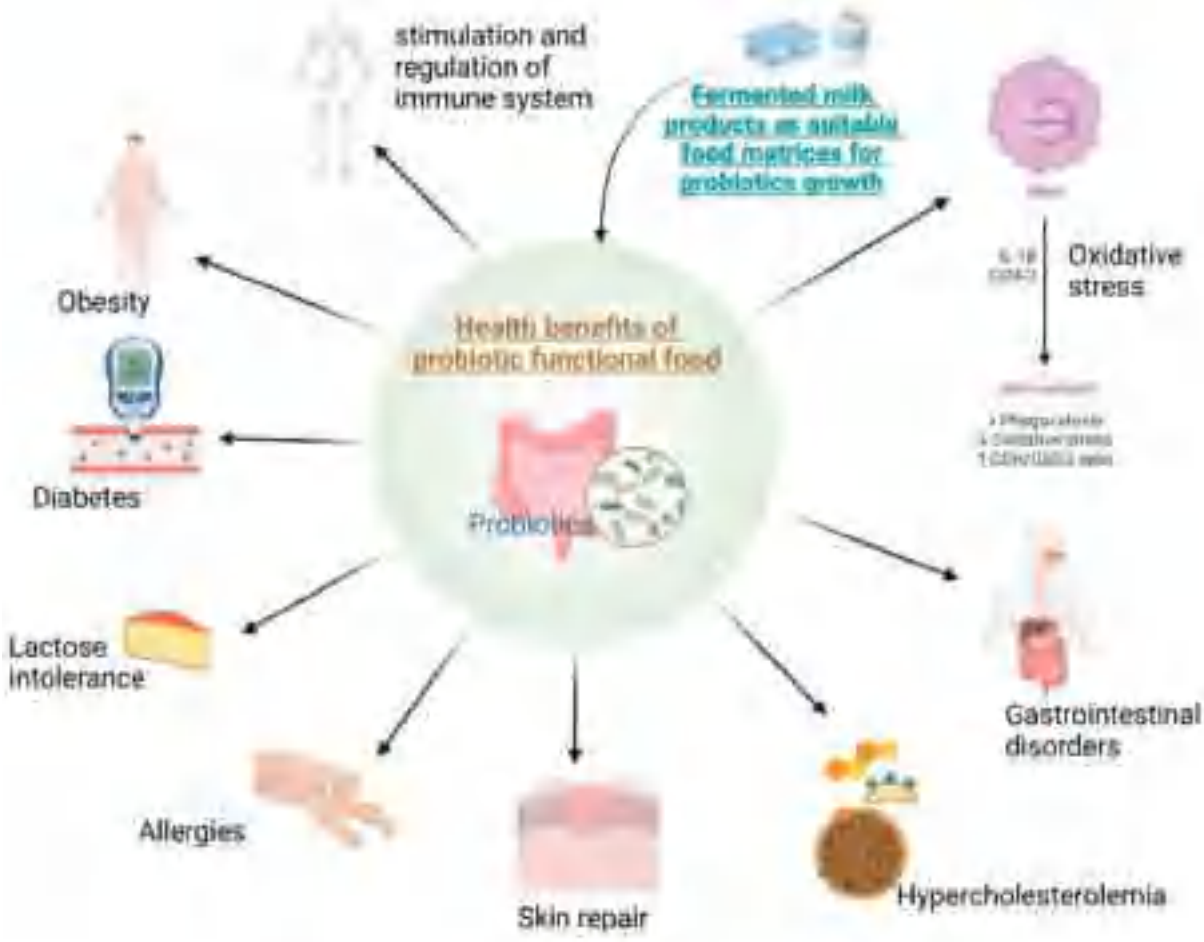


Figure 15 - Benefits of Probiotics

Probiotics are therefore unquestionably loaded with multiple advantages and work wonderfully in conjunction with prebiotics. Simply put, prebiotics feed the probiotics, and they both operate to improve the digestive system at the same time, improving one's general health. Probiotic living organisms can be thought of metaphorically as seeds that consume prebiotic fiber and use it as water and fertilizer to thrive.

Check back Questions:

1. **What do you mean by probiotics?**
2. **What are the benefits of probiotics?**

5.9 CAKE MAKING

(Combining ingredients, Forming air cells, and developing texture) Combining Ingredients into a Homogeneous Mixture Two of the major ingredients in cakes—fat and water (including the water in milk and eggs) are, by nature, un-mixable. Therefore, careful attention to mixing procedures is important to reach this goal. A uniform mixture of two un-mixable substances is called an emulsion. Part of the purpose of mixing is to form such an emulsion. Properly mixed cake batters contain a water-in-fat emulsion; that is, the water is held in tiny droplets MIXING Surrounded by fat and other ingredients. Curdling occurs when the fat can no longer hold the water in the emulsion. The mixture then changes to a fat-in-water mixture, with small particles of fat surrounded by water and other ingredients. The following factors can cause curdling: 1. Using the wrong type of fat. Different fats have different emulsifying abilities. High-ratio shortening contains emulsifiers that enable it to hold a large amount of water without curdling. You should not substitute regular shortening or butter in a formula that calls specifically for high-ratio, or emulsified, shortening. Butter has a desirable flavor but relatively poor emulsifying ability. Butter is, of course, used in many cake batters, but the formula should be specifically balanced so it contains no more liquid than the batter can hold. Also, remember that butter contains some water. Egg yolks, as you will recall, contain a natural emulsifier. When whole eggs or yolks are properly mixed into a batter, they help the batter hold the other liquids. 2. Having the ingredients too cold. Emulsions are best formed when the temperature of the ingredients is about 70°F (21°C). 3. Mixing the first stage of the procedure too quickly. If you do not cream the fat and sugar properly, for example, you will not form a good cell structure to hold the water (see "Forming Air Cells," below). 4. Adding the liquids too quickly. In most cases the liquids, including the eggs, must be added in stages—that is, a little at a time. If they are added too quickly, they cannot be absorbed properly. In batters made by the creaming method (p. 381), the liquid is often added alternately with the flour. The flour helps the batter absorb the liquid. 5. Adding too much liquid. This is not a problem if the formula is a good one. However, if you are using a formula that is not properly balanced, it might call for more liquid than the fat can hold in the emulsion. Forming Air Cells Air cells in cake batters are important for texture and leavening. A fine, smooth texture is the result of small, uniform air cells. Large or irregular air cells result in a coarse texture. And recall that air trapped in a mix helps leaven a cake when the heat of the oven causes the air to expand (p. 96). When no chemical leavening is used, this trapped air, in addition to steam, provides nearly all the leavening. Even when baking powder or soda is used, the air cells provide places to hold the gases released by the chemical leavener. Correct ingredient temperature and mixing speed are necessary for good air cell formation. Cold fat (below 60°F/16°C) is too hard to form good air cells, and fat that is too warm (above 75°F/24°C) is too soft. The mixing speed should be moderate (medium speed). If mixing is done at high speed, friction warms the ingredients too much. Not as many air cells are formed, and those that do form tend to be coarse and irregular. Granulated sugar is the proper sugar for creaming-method cakes. Confectioners Sugar is too fine to produce good air cells. In the case of egg-foam cakes (sponge, angel food, chiffon), the air cells are formed by whipping eggs and sugar. For the best foaming, the egg and sugar mixture should be slightly warm (about 100°F/38°C). Whipping may be done at high speed at first, but the final stages of whipping should be at medium speed to retain air cells. Developing texture both the uniform mixing of ingredients and the formation of air cells are important to a cake's texture. Another factor

of mixing that affects texture is gluten development. For the most part, we want very little gluten development in cakes, so we use cake flour, which is low in gluten. Some sponge cake formulas call for cornstarch to replace part of the flour, so there is even less gluten (the high percentage of eggs in sponge cakes provides much of the structure). In contrast, some pound cake and fruit cake formulas need more gluten than other cakes for extra structure and to support the weight of the fruit. Thus, you will sometimes see such cake formulas calling for part cake flour and part bread flour. The amount of mixing affects gluten development. In the creaming method, the sponge method, and the angel food method, the flour is added at or near the end of the mixing procedure so there is very little gluten development in properly mixed batters. If the batter is mixed too long after the flour is added, or if it becomes too warm during mixing, the cakes are likely to be tough. In the two-stage method, the flour is added in the first step. However, it is mixed with high-ratio shortening, which spreads well and coats the particles of flour with fat. This coating action limits gluten development. It is important to mix the flour and fat thoroughly for the best results. Observe all mixing times closely. Also, keep in mind that high-ratio cakes contain a high percentage of sugar, which is also a tenderizer.

Check back Questions:

1. **Why does the combination of ingredients play an important role in cake making?**

5.10 INGREDIENTS USED IN CAKE MAKING.

The various ingredients used in cake making are

Flour:

All cakes of a light nature need a weaker soft flour (one with low gluten) to obtain a more crumbly result. If this type of flour is not available, all-purpose flour can be used with the addition of some corn flour to make it softer.

Fat:

The use of butter is recommended. For creaming, butter should be soft, not oily and the amount of fat that is added to a sponge batter will determine its texture. The fa heavier will be the sponge.

Egg:

When using eggs in cake preparation, you should warm the eggs either by placing them in hot water or by warming them along with the weighed sugar with gentle heat in a bain-marie. The reason for doing this is to produce strong whisked foam which has the stability to withstand the additional mixing of other ingredients. If the foam loses its incorporated air, the result will be a heavier cake.

Emulsifier:

Commercially prepared stabilizers are used in sponge batters to help keep the batter from breaking down, thus forming a perfect, light emulsion. It is available in powder forms or even gel forms.

Flavoring Ingredients:

Many other types of ingredients can be added to the sponge mixes, depending upon the usage that the sponge will be put to. For example, if the sponge is being made for chocolate cake then it is advisable to substitute 20 percent of the flour with cocoa powder to give a dark rich chocolate-flavored sponge.

Cake Improvers:

A cake improver is a special enzyme-based technology that enables you to improve the functionality of your batter or final cake. It acts as the missing piece of your cake puzzle that allows you to attain excellence. The key functionalities of cake gel are: Texture Dense or heavy Too little leavening Too much liquid Too much sugar Too much shortening Oven not hot enough Coarse or irregular Too much leavening Too little egg Improper mixing Crumbly Too much leavening Too much shortening Too much sugar Wrong kind of flour Improper mixing Tough Flour too strong Too much flour Too little sugar or shortening Over mixing Poor flavor Poor-quality ingredients Poor storage or sanitation Unbalanced formula

- Boost cake volume through improved aeration of cake batter, increased cake batter viscosity, and preventing coalescence of air bubbles during batter floor time and baking.
- Provide quick whipping properties.
- Allow the use of a single-step process or „all-in-method in industrial cake production, in comparison to the conventional two-stage cake-making method.
- Improve cake batter stability through increased cake batter viscosity to extend batter floor time. 5. Improve the emulsification of oil and water in the cake batter.
- Impart a uniform and fine crumb structure.
- Improve the softness of cake products and extend shelf life.

Check back Questions:

1. **What are the various ingredients used in cake making?**
2. **Why does cake improver play an important role in cake manufacturing?**

5.11 METHODS OF CAKE MAKING:

The raw materials are procured from vendors as per production requirements and stored in the raw material warehouse. All types of raw materials are brought from the raw material warehouse and fed to their respective holding tanks via appropriate material handling equipment. All the raw materials for cake batter are introduced in the drum of the batter mixing machine in the required quantity as per the required sequence. The mixing speeds for different components are different and are maintained to obtain the most suitable batter characteristics. The cake batter is thus obtained. The baking tray is appropriately greased with oil and butter paper of appropriate shape i.e. shape of the bottom is placed at the bottom of the tray. Then the cake batter is poured into a baking tray, followed by which the batter is appropriately leveled and fed to the oven which is already preheated. The baked cake is obtained from the oven, it's allowed to cool in the pan itself before de-panning. The

butter paper is then gently removed from the cake, followed by which outer skin of the cake is also removed with a knife, and then the cake is divided into multiple layers depending on the thickness of the cake. Simultaneously Whipping Cream and Icing Sugar are beaten by a simple beater until sufficiently stiff, which is then fed to the holding tank of the cake decorating machine. A layer of cake is placed on caked decorating and icing machine, followed by which the layer is appropriately soaked in pineapple juice, followed by which a cake decorating machine is used to quickly spread a layer of whipped cream over the cake, followed by which a layer of chopped pineapples is placed and another layer of cake slice is placed over the pineapple layer. The same process is repeated until all layers are placed, at the last layer only a layer of whipping cream is whipped over the cake followed by some quick decorating by the machine and then final finishing manually. The cake is placed in a refrigerator at an appropriate temperature until it's sold. The various methods of cake-making include:

5.11.1. Sugar batter method

In this method, all the fat is creamed until it gets light white color. Then the sugar added gradually continuing the creaming process. When adequate aeration is achieved, the fat & sugar mixture will be light & brighter in appearance. Then add beaten eggs gradually into the mixture. The beaten eggs should be added to the batch-wise. If more eggs are added at a time, it will curdle. Other liquids can be added at this stage. Next, the prepared fruits into the mixture. Add sieved flour into the mixture. After adding the flour, if the batter is very stiff, add some quantity of water or milk to adjust the batter's consistency.

Figure 16 - Sugar batter method

5.11.2. Flour batter method:

In this method, cream the fat & a quantity of flour not exceeding the weight of the fat till it becomes light & fluffy. At the same time in other machine, beat the egg & equal quantity of sugar, till it becomes stiff & frothy. Then add this mixture into the first mixture. At this stage,

second mixture should be added in small quantity at a time. It should be mixed thoroughly & then only the next portion should be added. The remaining sugar is dissolved in milk or water & added to the mixture. Any colour or flavour is added along with this liquid. Lastly the remaining flour is sifted with chemicals & mixed. This method is suitable for lean cakes. Because lean cakes acquire most of the aeration due to baking powder & there is no risk of losing aeration achieved in fat.

Figure 17 - Flour batter method

5.11.3. Blending method:

In this method fat, flour, baking powder & salt are whipped together till it comes to a very light & fluffy condition. Sugar, milk, or any other liquids, color & essence are mixed & added to the previous mixture. Eggs are added & the whole mass is mixed into a smooth batter. This method is suitable for high-ratio cakes. High ratio cake means the quantity of sugar is more than the quantity of flour.

Figure 18 - Blending method

5.11.4. Boiled method:

In this method, butter or fat is heated with water till it reaches the boiling point. Then remove from the fire & add 2/3 of flour & mix it thoroughly. Beat the eggs & sugar until it becomes stiff & add color& essence. Then this mixture is added to the previous mixture gradually. It is mixed thoroughly & the remaining flour can be added at this stage. This method is used for making Madeira cake & Genoese sponges.

Figure 19 - Boiled method

5.11.5. Sugar water method:

In this method, all the sugar & half the quantity of water is agitated in a bowl till all the sugar is dissolved. Then the remaining ingredients, except the egg are added & the mixture is well agitated to achieve aeration. Lastly, the egg is added & the mixture is cleared. Due to more aeration & better emulsification obtained in this method, the cakes so produced have better texture & longer shelf life.

Figure 20 - Sugar water method

5.11.6. All in one process:

In this method, all the ingredients are mixed in the mixing bowl. Aeration of the mixture is achieved by controlling the speed of the mixture as well as the mixing time. Wire whip is used for this method because it ensures a faster breakdown of ingredients & it helps to achieve good aeration After adding all ingredients to a mixing bowl, mix on slow speed for one minute, then high & medium speed for two minutes & again on slow speed for one minute. This method is mainly used for gel sponges. If the formula contains oil it should be added in the last stage.

Figure 21 - All in one process

5.11.7. Foaming method:

In this method, beat the egg till it becomes fluffy & frothy. During the beating, the small air cells are incorporated into the mixture. This air incorporation helps to increase the volume. Then add sugar gradually in continuous beating till it becomes thick & creamy. Essence & color can be added at this stage. The flour should be sifted with baking powder & added with just the necessary movements of the hand without disturbing the foam. If you give rough folding or uneven mixing, the incorporated air will escape. Then the finished product will be of very poor quality & flat one.

Figure 22 - Foaming method

Check back Questions:

1. **Explain in detail the various methods of cake making.**
2. **Differentiate the Sugar batter method and flour batter method.**
3. **What do you mean by an all-in-one process of cake making?**

5.12. CAKE FAULTS

There are various reasons for the cake to get faults which would affect the quality and also reduce the quantity and the shelf life of the product. The various cake faults include,

5.12.1. Cakes rise and fall during baking:

An unbalanced formula is commonly responsible for this condition. Too much liquid or sugar will weaken the structure. Less flour or weak flour will not produce the structure required to support the leavening action. An excess of baking powder will produce excess gas that will weaken the structure and cause collapse. Too much aeration caused by over-beating will also stretch the cell structure causing it to weaken. Excess fat may overburden the flour and egg structure causing the cake to rise initially and then collapse. Also, if during baking, the cake in the oven is shifted about before it is fully set, it will tend to fall back.

Figure 23 - Cakes rise and fall during baking

5.12.2. Cakes sink after baking:

Cakes that are rich in sugar and fat but not supported by sufficient flour and egg will tend to sink after baking. Excess moisture in the cake may cause shrinkage. Too rapid cooling of freshly baked cakes can also cause shrinkage.

Figure 24 - Cakes sink after baking

5.12.3. Cakes have Peaks:

Peaks are often caused by too strong flour. High gluten content will make the batter stringy and binding. Lack of liquid results in a firmer batter that does not expand evenly and peaks are formed from the forced breakthrough of the expanding gas and steam.

Figure 25 - Cakes have Peaks

5.12.4. Fruits Sink to the Bottom of the Cake:

Moderately strong flour must be used to make fruit cakes. There should be a sufficient amount of gluten developed to hold the fruits in suspension. Some amount of extra gluten can be developed by mixing the batter well, after the addition of the flour. This will provide a structure that is strong enough to hold the fruits and the nuts. Weak flour will allow the fruits to sink to the bottom as the fat melts and liquefies and sugars are in a syrup form. Also, large pieces of fruits will settle as they are too large to be supported. Fruits that come in a sugar syrup must be drained properly. Excess liquid will act like a lubricant and allow the fruits to move rapidly through the batter during the baking process.

Figure 26 - Fruits sink to the Bottom of the Cake

5.12.5. Cakes crumble when sliced:

An open grain and a weak structure are the primary cause of cakes getting crumbly. It may be due to over creaming, excess shortening or sugar, or even improper mixing. A weak structure is caused because of a weak flour or lack of the flour–egg combination. An excess of sugar creates a very open grain that will not hold the fruits. Fruits that are not soaked and are dry will absorb the moisture and make the cake crumble.

Figure 27 - Cakes crumble when sliced

Check back Questions:

1. **What are the various faults that we get in a cake?**
2. **Why does cake crumb while we slice?**
3. **What are the reasons for the fruits and nuts to sink at the bottom of the cake?**

5.13 SUMMARY

Bread dough is composed of a mixture of wheat flour and water plus a small amount of salt and possibly other materials, such as preservatives or yeast. Dough theology plays an important role in the quality of baking products and poses many intriguing questions about mechanical behavior.

The cake batter is composed of a mixture of weak flour with fat and sugar with the flavoring agent. The process of making the batter plays an important role in getting the right product.

The use of microbes also plays an important role in the bakery industry, especially in the production of bread making.

REVIEW QUESTIONS

MULTIPLE CHOICE QUESTIONS (MCQ)

1. The shine on top of the bread is got by

a. Good Temperature
b. Egg Wash.
c. Bloom.
d. Sugar.

2. The netted structure of the bread, concealed in a crust is called

a. Bloom
b. Crust.
c. Crumb.
d. Texture.

3. The Process of mixing flour and liquids using a paddle attachment is

a. Blending.
b. Binding.
c. Beating.
d. Whisking.

4. Which of the following helps in intestinal tract health? reduces the likelihood of allergies?

a. Yeast.
b. Fungus.
c. Probiotics.
d. Proteins.

5. Which of the following is not a fermented vegetable?

a. Olives.
b. Pickles.
c. Sauerkraut.
d. Salami.

FILL IN THE BLANKS QUESTIONS

1. _____ and _____ join together to form the gluten
2. _____ is converted to curd and yogurt by the process of fermentation.
3. _____will allow the fruits to sink to the bottom as the fat melts and liquefies and sugars are in a syrup form.
4. High _____content will make the batter to become stringy and binding.

_____ is added to give a dark rich chocolate-flavoured sponge.

TRUE OR FALSE QUESTIONS

1. Rubbing in is the method of mixing in flour and butter with finger tips to resemble breadcrumb texture.
2. No culture needs to be added while making idly batter.

3. Probiotics helps to keep one's cholesterol levels.
4. Strong whisked foam helps in the stability to withstand the additional mixing of other ingredients.
5. Strong flour has high protein content.

SHORT ANSWER TYPE QUESTIONS

1. What is the role of water in bread making?
2. What could be the reason for uneven texture and large holes in bread?
3. Write a short note on the Bread Culture method.
4. What is flying ferment?
5. What do you mean by the term Oven Spring?

LONG ANSWER TYPE QUESTIONS

1. List the role of ingredients used in cake making.
2. List down the ingredients used in bread making and give the functions of any two of them.
3. Breadmaking is an art and science with many steps involved in the process. Justify the importance of each step in bread making.
4. Enlist the different methods of bread making.
5. What are the different methods of cake making?

OPEN BOOK QUESTIONS

1. Different faults occur in the production of cake. Justify your answer with the reason for the various faults that occur in the cake.
2. Probiotics play an important role in human life. List dist down the ways and means by which probiotics are helpful for mankind.

ACTIVITY

1. Make a display of the various ingredients used in bread making.
2. Students may be given the task of getting different samples of bread with different faults.
3. Draw the flow process of bread making procedure.
4. Find out the different breads of various nations.
5. Students may be permitted to visit a nearby industrial bakery and submit a report on the flow process of an industrial bakery.

CULINARY TERMS

1. **A'la:** in the style of
2. **A'la crème:** served with cream or cream-based sauce.
3. **A'langlaise:** in the English style.
4. **Al dente:** cooked but firm to taste
5. **Ala crème:** served with cream or cream-based sauce.
6. **Allumettes (fr):** strips of deep fried potato, between french fries and julienne, in size also vary light pastry cut into strips and filled like an appetizer.
7. **Arrowroot:** starch made from grinding the root of an American plant of the same name. Mainly used for thickening sauces.
8. **Au four:** baked in the oven
9. **Au gratin:** cooked food, covered with a sauce, sprinkled with crumbs or grated cheese, dotted with butter, and browned under a grill.
10. **Bain Marie:** a large pan of hot water, or bath in which a smaller pan is placed for cooking contents or to keep food warm.
11. **Batter:** a mixture of flour and liquid such as milk, egg, etc. Of such consistency that can be beaten or stirred.
12. **Béarnaise:** a rich sauce resembling hollandaise sauce, made from butter, egg yolk, and vinegar and flavored with peppercorns, shallot chervil, and tarragon.
13. **Bechamel:** a rich white sauce.
14. **Beurre manie:** equal quantities of flour and butter used for thickening sauces.
15. **Beurre noir:** browned butter.
16. **Bisque:** a rich thick, cream soup, usually made from shellfish.
17. **Blending:** combining ingredients with a spoon, beater, or liquidizer to achieve a uniform mixture.
18. **Bouillon:** unclarified broth or stock made from fresh meat.
19. **Bouquet garni:** a bunch of herbs tied in a muslin cloth, used for flavoring soups and stews.
20. **Brioche:** soft bread made of rich yeast dough, slightly sweetened.
21. **Carte dujour :** menu of the day.
22. **Cartilage:** connective tissue of meat or poultry also called gristle
23. **Cereals:** grains such as wheat, including semolina, oats, barley, rye, rice, etc.
24. **Champignons:** mushrooms.
25. **Chapelure:** browned bread crumbs.
26. **Chiffonade:** julienne of sorrel, lettuce, etc., or also a salad dressing with chopped hard egg with sweet peppers

27. **Chinois:** a conical strainer.
28. **Chowder:** thick soup with potato and other veg.
29. **Cocotte:** small ovenproof earthenware, porcelain, or metal dish used for baking individual egg dishes, mousses, or soufflés.
30. **Coddling:** cooking slowly in simmering water. Applied to eggs.
31. **Colander:** perforated metal or plastic basket used for draining away liquids.
32. **Compote:** fruits stewed in syrup.
33. **Concasse:** to blanch and chopped roughly.
34. **Confiture:** jam and fruit preserves.
35. **Conserve:** whole fruit is preserved by boiling with sugar and used like jam.
36. **Court bouillon:** a well-flavored cooking liquor for fish.
37. **Crecy:** a term used for dishes containing carrots.
38. **Crème:** anything of the creamy consistency can be thus described.
39. **Croissants:** french rolls crisp and light.
40. **Croquettes:** cooked foods molded in small shapes, dipped in egg and crumbs, and deep fried.
41. **Croute / crouton:** small squares of bread slices deep fried and served as garnish for soups.
42. **Deglacer:** diluting pan juices by adding wine/stock/cream to make gravy.
43. **Dredge:** cover with a thin sprinkling.
44. **Dressing:** sauce for a salad; and also stuffing for meat or poultry.
45. **Duxelle:** a mixture of parsley, mushrooms, and shallots used for stuffing.
46. **Éclair:** *choux paste filled with custard or cream. Can be coated with chocolate.*
47. **Eminence:** finely sliced or shredded.
48. **Emulsion:** a mixture of oily or fatty ingredients held in a suspension of a liquid ex' mayonnaise
49. **Entrée:** a dish served in the first part of a dinner, usually a made-up dish with sauce. Or it can be the main dish of a less formal meal.
50. **Entremets:** hot or cold sweets.
51. **Espagnole:** a rich brown sauce.
52. **Estouffade :** brown stock.
53. **Farce:** any kind of stuffing.
54. **Farina:** fine flour made from wheat, nuts, and potatoes.
55. **Fecule:** starch flour, e.g. Arrowroot, potatoes, rice, corn. Filet: a strip of tender meat with bone and skin from fish or meat.

56. **Flambe:** flamed e.g. Food tossed in a pan to which burning brandy or other alcohol has been added.
57. **Florentine:** of fish and eggs; served on a bed of buttered spinach and coated with cheese sauce. Thin pet t four biscuits made of nuts, glace fruits, and chocolate.
58. **Flute:** a long crisp roll of bread (french) used to garnish soups or to serve with soup.
59. **Frangipane:** confectionery custard.
60. **Frappe:** sweetened fruit juice, half frozen.
61. **Freezing:** solidifying or preserving food by chilling and storing it at 0°c
62. **Fritters:** fruit, meat, vegetables, or fish coated with batter and fried, usually in deep fat fry.
63. **Friture:** a frying kettle.
64. **Garniture :** decoration.
65. **Gateaux:** this can be a cake, ice cream, or anything made in the shape of a cake and lavishly decorated.
66. **Genoise:** a rich butter sponge used as a base for gateaux, and as a base for savoy fingers, etc.
67. **Glace:** ice.
68. **Gratinee:** to brown a food sprinkled with cheese or breadcrumbs or a sauce
69. **Grecque:** in the Greek style – cooked in stock with olive oil. Dishes are garnished with savory rice and dressed with oil and vinegar.
70. **Griddle:** flat metal plate used to bake bread and cakes on the top of the stove.
71. **Grissini:** breadsticks.
72. **Hollandaise:** a rich sauce of Dutch origin, made by emulsion method.
73. **Hors d'oeuvres:** small savory tidbits, usually cold, served as an appetizer at the beginning of the meal.
74. **Jardiniere:** assortment of fresh vegetables in baton shape.
75. **Julienne:** food cut into long strips. A clear soup in this name consists of finely shredded vegetables.
76. **Legumes:** 1. Vegetables 2. Plants with seed pods such as peas and beans.
77. **Liaison:** the process of thickening liquid such as sauces and soups
78. **Lyonnaise:** in the Lyon style usually with onions.
79. **Macaroons:** small crisp cake made from almond, coconut, etc.
80. **Macedoine:** small 6.5 mm dice of fruits and vegetables.
81. **Marmite:** earthenware stock pot.
82. **Mayonnaise:** a thick sauce made of egg yolk, oil, vinegar, mustard, etc. Used as a dressing for salads of all kinds.

83. **Mousse:** a light sweet or savory cold dish made with cream, whipped egg white, and gelatin.
84. **Mousse:** frozen dessert with fruits, flavors whipped cream and sugar, egg white, and gelatin.
85. **Muffin:** a drop batter baked in small individual molds and eaten hot with butter.
86. **Nutmeg:** pungent spice in whole or ground form.
87. **Oregano:** herb with a pronounced aroma. may is fresh or dried.
88. **Panada:** a thick paste of flour and butter with a little liquid used to bind together ingredients that would fall apart by themselves.
89. **Pare:** to peel in a circular motion for fruits like apples.
90. **Paysanne:** to cut into even, thin pieces, triangular or round, or square.
91. **Petit-pois:** tiny young green peas.
92. **Pimento:** red or green pepper pods used in salads or often as a colorful garnish.
93. **Pistachio:** green-colored nut kernels. Used as garnish.
94. **Pith:** in citrus fruits the white cellular lining to the rind covering the flesh.
95. **Plat du jour:** a special dish of the day.
96. **Poach:** cook just below the boiling point in the hot liquid in an open pan.
97. **Potage:** a nourishing broth or soup.
98. **Praline:** burnt almond flavoring.
99. **Printaniere:** a garnish of vegetables.
100. **Provencal:** in the provencal style, e.g. Cooked with garlic and tomatoes.
101. **Raft:** floating layer of meat veg etc which forms consommé.
102. **Rotisserie:** rotating spit used for roasting or grilling meat or poultry.
103. **Tarragon:** fresh/dried herb with long leaf with semi-pungent aroma.
104. **Thyme:** type of herb, which is gray used in chowder soups &stuffing.
105. **Truffle:** edible fungi, which grow underground. Used to garnish a main course.
106. **Tureen:** a deep vessel for serving soup.
107. **Veloute:** white sauce made from fat flour and white stock (fish/chicken)
108. **Vinaigrette:** French dressing with chopped capers, herbs, oil, &vinegar

RESOURCE BOOKS

1. J. Fuller, J.B. Knight & C.A. Salter (1985). The Professional Chef's Guide to Kitchen Management. Van Nostrand Reinhold Company. ISBN 0-442-22624-1
2. Singh Yogesh (2015). A Culinary Tour of India. I.K. International Publishing House Pvt. Ltd. ISBN – 978-93-84588-48-9
3. Achaya K.T. (1994). Indian Food a Historical Companion. Oxford University Press.
4. Singh Yogesh (2017). Principles of Food Production Operations (1st ed.). I.K. International Publishing House Pvt. Ltd. ISBN – 978-93-85909-25-2
5. Bali, Parvinder S.(2009). Food Production Operations (1st ed.). Oxford University Press. ISBN 0-19-806181-1
6. Escoffier, August. (2000). Ma Cuisine (Revised ed.).Hamlyn.
7. The Culinary Institute of America. (2006).The Professional Chef (8th ed.).John Wiley & Sons, Inc.
8. O'Reilly, Anthony. (1993).The Complete Cookery Manual (1st ed.). Pitman Publishing. ISBN 0 273 61333 2
9. Singh, Yogesh (2017). Principles of Food Production Operations (1st Edition) I.K. International Publishing House Pvt. Ltd. ISBN 978-93-85909-25-2
10. Cesarani, Kinton (1993). Practical Cookery (7th Edition) ELBS with Hodder and Stoughton ISBN 0-340-53907-0
11. O'Reilly (1994). The Complete Cookery manual (1st Edition) ELBS with Pitman ISBN 0-273-61333-2
12. Roday, Sunetra.(2019). Food Science and Nutrition (3rd ed.). Oxford University Press. ISBN 978-0-19-948908-4.