

YEAR2016-17

FOOD PRODUCTION & PATISSERIE – 1

MUCA
ADMINISTRATOR

UNIVERSITY OF MUMBAI) | MUMBAI

MUCA(FPP)

FOOD PRODUCTION & PATISSERIE-I

(Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	Food Production & PatisserieI(USHO 101)
Course Code	Title	Credits	
USHO101	Food Production & Patisserie-I	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	2					
Credit	2	2					

Class Room Instruction Face to Face									Notional			Credits				
Per Week			Per Sem			Per Sem Hrs										
L	P	T	L	P	T	L	P	T	L	P	T	Total	L	P	T	Total
3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4

SEMESTER – I

OBJECTIVES:

- To inculcate a right attitude and the required basic knowledge and technical skills in the art of culinary and the food production department.
- To introduce the various equipment's and utensils used in the kitchen.

UNIT .	Ch. No. TOPIC	LEC.
	1 Introduction to the Food Production Department	
	1.1 Levels of Skills and Experience	
	1.2 Attitude and Behaviour in the Kitchen	
	1.3 Kitchen Uniforms	
	1.4 Personal Hygiene	
	1.5 Safety Procedures for Handling Equipment	
2	Culinary History and Culinary Terms (Explanation with Examples)	02
	Origins of Modern Cookery	
	Modern Development in Equipment and Technology	
3	Equipment and Hand Tools used in Kitchen & Different Types of Fuels	04 used in Kitchen
	3.1 Hand tools and utensils used in Kitchen	
	3.2 Various Fuels used in the Kitchen	
	3.3 Advantages & Disadvantages of Various Fuels	
	3.4 Various Equipment used in the Kitchen	
4	Introduction to Cooking	04
	4.1 Aims and Objectives of Cooking	
	4.2 Classification of Various Raw Materials according to Functions	
	4.3 Various Textures and Consistencies	
	4.4 Methods and Techniques of Preparation	
5	Stocks	02

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SEMESTER – I

		5.1 Definition of Stock	
		5.2 Types of Stocks	
		5.3 Preparation (Recipe), Storage, Care and Precautions in Preparation	
	6	Culinary Terms	02
UNIT	Ch.No.	TOPIC	LEC
I	7	Methods of Cooking 04	
		7.1 Various Methods of Cooking Foods (Roasting, Grilling, Frying, Baking, Boiling, Poaching, Microwave)	
		7.2 Principles of each Method and Precaution to be taken	
	8	Hierarchy and Kitchen Staffing	03
		8.1 Classical Kitchen Brigade	
		8.2 Modern Staffing in Various Category Hotels	
		8.3 Duties and Responsibilities of Various Chefs	
		8.4 Role and Duties of the Executive Chef	
		8.5 Inter-Departmental Co-operation and Co-ordination	
	9	Egg	02
		9.1 Selection of Eggs	
		9.2 Structure of Eggs	
		9.3 Uses of Eggs	
		9.4 Nutritive Value of Eggs	
	10	Vegetables & Fruits	04
		10.1 Classification of Vegetables	
		10.2 Colour Pigments in Vegetables and Effects of Heat, Acid and Alkali on each of them	
		10.3 Cuts of Vegetables	
		10.4 Classification of Fruits	
		10.5 Uses of Fruits	

SEMESTER – I

	10.6 Salad & Salad Dressing	
11	Bakery & Pastry	
	Sugar	02
	11.1 Importance of Sugar	
	11.2 Types of Sugar	
	11.3 Cooking Stages and Temperature of Various Stages	
	11.4 Uses of Sugar	

UNIT	Ch. No.	TOPIC	LEC
II	12	Sauces 04	
		12.1 Classification of Sauces / Composition	
		12.2 Mother Sauces and its Recipes (1 Litre)	
		12.3 Derivatives	

BECHAMEL (WHITE SAUCE)	VELOUTE	ESPAGNOLE	TOMATO	HOLLANDIAISE
Mornay	Allemande	Demi- glaze	Barbeque	Béarnaise
Cream	Supreme	Madeira	Italian	Maltaise
Parsley	Mushroom	Chasseur	Provençal	Mousseline
Mustard	Ivory	Robert	Portugaise	Noisette
Onion	Caper	Bordelaise	Milanaise	Choron

Mayonnaise – Tarter, Cocktail, Thousand island, Mustard, Vincent

SEMESTER – I

13	Bakery & Pastry	
	13.1 Bread Making	03
	Principles of Bread Making	
	Role of Each Ingredient	
	Simple Yeast Bread	
	Baking Temperature & its Importance	
	13.2 Cookies	
	Types of Cookies	02
	Methods of Preparation	
	13.3 Flour – Structure of Wheat	
	Types of Wheat	04
	Types of Flour	
	Milling of Flour	
	Nutritive Value	
	13.4 Raising Agents	
	Classification and Role of Raising Agents	02

Au gratin	Bake	Barbeque
Baste	Batter	Béarnaise
Beat	Béchamel	Beurre Noir
Beurre Manie	Blanch	Blend
Bouquet garni	Broil	Brunoise
Brush	Bouillon	Caramel
Consommé	Court Bouillon	Croutes
Croutons	Custard	Dough
Mince	Estouffade	Espagnole
Fume	Garnish	Glaze
Hollandaise	Infusion	Liason
Beurre Maître d' Hotel	Marinate	Mire Poix
Mis-en-place	Par boil	Pare
Poach	Roux	Sabayon
Sauté	Stock	

Semester - I : Unit 1: Chapter 1.1
Introduction To Food Production Department

Definition of Cooking

Cooking is defined as a chemical process involving the application of heat and withdraws of heat; proper mixing of ingredients decision-making and technical knowledge and skill but with the changing definition cooking is defined as both an art as well as technology.

In French the word ‘cuisine’ means the art of cooking and preparing dishes and the place kitchen where they are prepared.

The art of cooking is ancient and generally originated when by chance a chunk of meat fell into fire and came out to be more tasty and tender and it was from this point only that cooking has evolved to reach the present level of sophistication.

1.1 LEVEL OF SKILLS AND EXPERIENCE

SKILLS may be grouped into 3 general categories.

1) SUPERVISOR:

The head of the food service, whether called Executive chef or head chef or kitchen director, must have management and supervisory skills as well as through knowledge of food production.

He should be able to:

- Organize and motivate people under him.
- Planning menus and production procedures.
- Controlling costs and managing budgets.
- Purchasing food supplies & equipment.
- Must be an experienced chef in order to schedule food production.
- Train and instruct workers.
- Control quality.

2) TECHNICAL:

The cooks are the backbone of the kitchen. These workers carry out the actual food production. They must have knowledge of and experience in cooking techniques. They must be able to function well with their fellow workers and co-ordinate with other departments. Food production is a team activity.

3) ENTRY LEVEL:

This level of workers usually requires no particular skills & experience. The jobs assigned to them are stewarding or basic pre-preparation of vegetables. As their knowledge, skill & experience increases, they may be given more complex task which will eventually make them skilled chefs. Many ex-chefs begin their career as pot washers. Beginning in an entry level position and working one's way up has been the traditional way of advancing in a food service career. Today however, who are a graduate from hotel management start at entry level already possessing a general knowledge of food production practices, which would give them a head start over other beginners who have no knowledge.

1.2 ATTITUDES AND BEHAVIOUR OF KITCHEN

The only one aspect that is required for any food production personnel other than the required skill is his attitude towards the job. Sometimes this component becomes more important even than the skill of the individual, as this factor is responsible in maintaining the proper professional decorum of the department. It is rightly said that when any fresher is employed in the organization, his level of skill is limited as much as his experience. The main area where he is judged during his entry interview is on the attitudes where it is seen whether he/she has the capabilities to lead the team in the future. Few of the acceptable attitudes that is required for a kitchen professional are :

1) Positive Attitude Towards the work

Kitchen personnel must like what he has been assigned do and do it well, whatever the job is, from washing a pan or peeling potatoes to making sugar work or larder decorations. Pressure hours will seem difficult but when one masters the techniques, he will enjoy them too.

Professionals are proud of their work and performance. There can be immense job satisfaction as well as self-satisfaction when the work done is appreciated. Job or responsibility avoidance is considered a coward's act and in today's world these kinds of professionals are not accepted in the corporate world as it is against the culture and a negative factor in the path of improvement.

2) Staying power

A day's work will seem very long in the beginning and one has got to get used to it. As time passes the staying power gets increased. This will be due to the fact that as a professional one will know how to save steps by thinking and planning, improve the speed at work, so that minimum time is needed for a particular job with the best of efficiency.

3) Communicating

Communication is one of the most important factors for the success of any business. Internal communication helps the superiors know the difficulties of the junior staff and with good communication skills, there can be sharing of knowledge from the colleagues or learn from them. Communication also helps in maintaining good relation with the other departments.

4) Creativity

The chef acts as an artist on the plate and the creativity has made us reach new eating experiences. Food production is a field where sky is the limit as far as creativity is concerned.

5) Learning

Life is not long enough to learn everything about cookery. Food production is a vast subject and is changing every day with immense speed. It is a continuous, never ending process and we tend to learn and experience different aspects of cooking every day in our life. It is essential to keep oneself up - dated as to what the world demands currently. Surprisingly, new trends are becoming back dated so quickly. This can well be noticed in the presentation styles of today and few years back. Sauces are drizzled today instead of the traditionally dropping, and dusting with crushed pepper corn or chocolate powder or coffee powder on the rim of the plate has become a modern trend. These trends have to be learned sooner the better and should not be avoided at any cost.

6) Aiming for quality

Whatever is done must have a distinctive sign of quality. Quality can be obtained everywhere, not only in 5 Star hotels, but in institutional catering, industrial canteens, or any unit in the hospitality sector. If we aim for the sky we might reach the star, is well significant even in food production.

7) Experience

Doing the same job again and again for years is not a very valuable experience. If you want to be an experienced chef, you need more and more practice in the different sections of the kitchen as a cook. Just a college qualification alone is not sufficient to transform oneself into a good chef. The more variety one has in terms of job descriptions and specifications in the organization the stronger is his experience.

8) Return to basics

In order to create, remember to always come back to the basics. If the foundation is strong, there is possibility of great achievements in the future. All innovations and creativity lies on few basic principles which has to be mastered for excellence.

1.2 BEHAVIOUR EXPECTED IN THE KITCHEN

The attitudes of kitchen personnel are reflected in the regular behaviour of kitchen personnel. It is very important that the behaviour of the kitchen personnel is positive and maintains the right decorum for productivity.

a) Care:

The personnel should ensure proper care of equipment's in the kitchen, and should have a sense of entrepreneurship and taking responsibility for any loss in the company.

b) Usage:

The use of the ingredients should be in such a manner that the wastage is reduced to the minimum. Wastage is direct cost and this must be understood and followed for the success of the operation.

c) Initiative:

The behaviour of kitchen personnel should always be positive and should come forward for any job as required by the department. Direct interaction gives us experience and no kitchen personnel should avoid in the name of diplomacy.

d) Safety:

Kitchen is a dangerous place to work with accident prone equipment's and work procedures. Every kitchen personnel should ensure a safe working condition for oneself and also for his fellow mates and colleagues.

e) Integrity:

One of the most important behaviour that majority of the people of our country lacks. There are situations where we are not in a position to serve the food, but for the sake of saying Yes to our guest, we indulge in malpractices. Sometimes we follow certain practices due to our sheer ignorance and practice. Before serving a dish to a guest we should ask ourselves one question Can I eat this food. If the answer is

Yes, then it is fine, if No, it should not be served. There is no smartness in cheating a guest who has believed in you. It is rather we are polite to say No then to serve food which is not safely prepared.

f) Neatness:

A quality indispensable for any chef working in the kitchen. A neat appearance shows how neatly the chef works on his plate. Neatness in all terms starting from uniforms to the plate should be neatly done to appraise the sense of neatness of the individual and the organisation as a whole.

g) Efficiency:

This is another basic character of any individual, which is achieved with constant practice. Efficiency is actually productivity, which is measured in terms of achievement or the success story.

1.3 Kitchen Uniforms

It is important that people working in the kitchen should wear suitable clothing and footwear. Suitable clothing must be

- Protective
- Washable
- Of a suitable colour
- Light in weight and comfortable
- Strong
- Absorbent

1. Chef Coat/Chef Jacket

Clothes worn in the kitchen must protect the body from excessive heat. For this reason, Chef's Jackets are double breasted and have long sleeves. They are to protect the chest and arms from the heat of the stove and to prevent hot foods or liquids burning or scalding the body.

2. Chef's Trousers

The kitchen trousers should be straight and without cuffs, which can trap debris and any hot liquid spills. It is advisable to have a snapped fly and elastic waist band and it should be worn without belt, so it can be removed easily in case of hot liquid spills or even fire.

3. Scarf/ Neckerchief

Chefs wear white neckerchiefs, which are knotted in the front. These were originally designed to absorb perspiration. Nowadays, chefs wear the neckerchiefs to keep the tradition and finish the look of their uniforms. In some cases scarves are used to represent various levels in a kitchen hierarchical grid.

4. Aprons

These are designed to protect the body from being scalded or burned and particularly to protect the legs from any liquids which may be spilled; for this reason, the apron should be of sufficient length to protect the legs.

5. Chef's Hat

This is designed to enable air to circulate on top of the head and thus keep the head cooler. The main purpose of the hat is to prevent loose hairs from dropping into food and to absorb perspiration on the forehead. The use of lightweight disposable hats is both acceptable and suitable.

6. Footwear

This should be stout and kept in good repair so as to protect support the feet. As the kitchen staff are on their feet for many hours, boots (for men) and clogs (for men and women) give added support and will be found most satisfactory.

Modern industrial safety shoes with steel toecaps are to be encouraged. Sandals, training shoes etc.; are insufficient protection from spillage of hot liquids.

1.4 Personal hygiene

Most food borne illness/disease may also be caused or spread by food handler also. Some examples of situations in which cross contamination can occur include the following.

1. Mixing contaminated left over with a freshly cooked batch of food.
2. Handling ready to eat food with unclean hands. Handling several types of foods without washing hands in between.
3. Cutting raw chicken and then using the same cutting board unsanitary to cut vegetables.
4. Placing ready to eat food on a lower refrigerator shelf and allowing juices from raw fish and meat to drip on to them from an upper shelf.
5. Wiping down work surface with a soiled cloth.

Good personal hygiene

Even when we are healthy, we have bacteria all over our skin and in our nose and mouth. Some of these bacteria if given the chance to grow in food will make people ill.

1. Do not work with food if you have any communicable disease or infection.
2. Bath or shower daily.
3. Wear clean uniform.
4. Keep hair neat and clean always. Always wear hat or hair net (inside the kitchen)
5. Keep moustaches and beard trimmed and be clean shaved.
6. Wash hands and exposed parts of arm before work and as often as during work including
 - ◆ After eating/drinking or smoking.
 - ◆ After using toilets.
 - ◆ After touching or handling anything that may be contaminated with bacteria.

Procedure for washing hands

1. Wash hands in/with hot running water. Use water as hot as you comfortably stand. Hot at least 100°f/38°c is best suited.
2. Apply enough soap, to make good lather.
3. Rub hands together thoroughly for 20 seconds or longer, washing not only the hands but the wash and the lower part of the forearm.
4. Using a nail brush cleans be neat the finger nails and fingers.
5. Rinse hands well under hot running water. If possible, use a clean paper towel to turn of the water to avoid contaminating the hands by contact with soiled towels.
6. Dry hands with clean single use paper towels or warm air hand dryer.

Use of gloves

1. Use gloves to handle/serve/touch ready to eat foods. For which doesn't need any further cooking.
2. Wash hands before putting in gloves or when changing to another pair. Gloves are not a substitute for proper hand washing.
3. Remove and discard gloves, wash hands one change to a new pair of gloves after handling one food item and before starting work on another.
4. Gloves are for single use only.

1.5 SAFETY PROCEDURE FOR HANDLING EQUIPMENT

Safety procedure for handling of equipment

1. Do not wash equipment unless you understand the operation.

2. Use all guards & safety devices on equipment.
3. Do not touch or remove food, from any kind of equipment, while it is running.
4. Remove particles of food with cloth, palette knife, needle or brush from cutting machine.
5. Unplug electrical equipment before disassembling or cleaning.
6. Make sure the switch is off before plugging in equipment.
7. Do not touch or handle electrical equipment including switches, if your hands are wet or if you are standing in water.
8. Test that it is properly assembled, plug in and switch on.
9. Wear properly fitting clothing and tuck in apron string to avoid getting caught in machinery.
10. Use equipment only for the purpose intended.
11. Stack pots, pans and other equipment properly on racks so that they are stable and not likely to fall.

Semester - I : Unit 1:Ch.No 2

Culinary History & Culinary Terms

Definition:

Cookery is defined as a "chemical process", the mixing of ingredients; the application and withdrawal of heat; decision-making, technical knowledge and manipulative skills. In the more advanced stages a further element occurs- that of creativity. Cookery is considered to be both an art and technology.

Food preparation is a modern term in professional cookery. It denotes preparation and cooking. It follows a flow pattern which commences with the purchasing and selection of materials, their handling, processing and the ultimate presentation of the dishes to the customer, where "food service" takes over. In French, the word "Cuisine" denotes the art of cooking- preparing dishes, and the place- the kitchen in which they are prepared.

Origins of modern Cookery

The art of cooking is ancient. The first cook was a primitive man, who had put a hunk of meat close to the fire, which he had lit to warm himself. He discovered that the meat heated in this way was not only tasty but it was also easier to masticate. From this moment in unrecorded past cooking has evolved to reach the present level of sophistication.

Classes of Professional Cookery:

There are 3 classes of professional cookery, associated with the craftsman and they are graded according to the quality of the materials used. The classes are:

- (1) Cuisine simple, or plain cookery, where the basic necessities are used and the craftsman produces dishes of the highest standard possible with a minimum number of materials.
- (2) Cuisine Bourgeoise, or middle class cookery. This type of cookery provides better materials and in the hands of the craftsman these materials produce more complicated dishes of a better quality.
- (3) Cuisine Haute, or high cookery is that in which the very best possible materials are used. The craftsman uses these materials to their best advantage and produces dishes of the best quality. This class produces highly complicated dishes i.e. classical dishes.

Modern Development in equipment & Technology

Today the term "convenience foods" is widely used in the catering industry. This is probably due to the rapid progress in food technology over the past decade. The term "convenience foods", strictly translated, refers to any type of food, where some stage of preparation has been completed beforehand.

Processes by which convenience foods are classified:

Accelerated Freeze-drying: By using high-vacuum techniques it is possible to produce specific conditions of temperature and pressure which create ideal conditions for dehydration

Of food without the collapse of cells. There are only a limited amount of foods on the market, as production costs are relatively high.

Additives: Non nutritive substances added to food to improve its appearance, texture, flavor and storage properties.

Aseptic Canning: A newer development in canning designed for these products adversely affected by heat within sealed containers. Products like fruit juices are sterilized then placed into sterile cans under microbe free conditions.

"Boil in the bag" Ready food: A convenience entrée or vegetable commodity. Portioned items are packed in special plastic bags, sealed then frozen. To reconstitute, the unopened bag is dropped into boiling water for a predetermined period.

Dehydration: A method of preserving food by reducing the moisture content to such a level that microbes cannot grow and reproduce. The methods used depend on the

food, but popular techniques include tunnel, roller and spray drying. Nutritionally the products lose little value, but the texture, specially in fruits and vegetables, is suspect.

Dehydro-freezing: A method of preservation where the moisture content of certain food is reduced by 70% then quick-frozen. Because the cells do not collapse, the product has good texture retention. Product must be stored in frozen state.

Freezer Burn: In any frozen storage room there is a steady removal of moisture from unprotected foods which may result in unpleasant irreversible changes to the color, texture, flavor and nutritive values.

Freezing: Foods freeze over a wide range of temperatures, although freezing points are unidentifiable. Because of high water content in many foods, they freeze at temperatures between 32F and 25F.

Preservation: Stored foods tend to deteriorate under the influence of its own enzymes, chemical action and through the growth and reproduction of micro-organisms. The techniques developed for preservation aim to retard these reactions or destroy the cause

Of deterioration.

Spray Drying: A method of dehydrating food by spraying a slurry of the commodity into a hot air chamber, which dries the material immediately forming a powder.

Smoked Preservation: This process is applied to a wide variety of raw and prepared foods. E.g. smoked fish.

Semester - I : Unit 1:Ch.No 3

EQUIPMENTS & HAND TOOLS USED IN THE KITCHEN

In early kitchens the equipment consisted of an open fire for cooking, which was generally placed on the floor, the fuel being coal, wood, sun dried cow dung cakes or balls lighted between two or three bricks on which the cooking vessel is placed. This is still practiced in rural India.

Over the years, the activities of catering establishments have become more and more professional and the objectives have been constantly directed towards utilizing equipment for maximum efficiency, and at the same time maintaining a service that is clean and attractive to both worker and viewer.

Thorough knowledge of equipment is essential for success in the kitchen. Few food service operations depend on nothing more than range and oven, an assortment of pots and pans, and knives and other hand tools. Modern technology continues to develop more and more specialized and technically advanced tools to reduce kitchen labour.

Much of this equipment is so complex or so sophisticated that only first-hand instruction and practice will teach you how to operate it effectively and safely. Other items, especially hand tools, is simple, and need no explanation, but require much practice to develop good manual skills.

There is a vast array of specialized equipment that is available for today's kitchens. It would take a large book, not just a short chapter, to explain all of the many items you will come in contact with in your career – items such as pasta machines, crêpe machines, burger formers, breading machines, cookie droppers, beverage machines, Greek gyro broilers, doughnut glazers, conveyor fryers, and so on. In this technological age, nearly every year brings new types of tools to simplify various tasks.

DIFFERENT TYPES OF EQUIPMENT & FUELS USED IN THE KITCHEN

3.1 Hand tools & Utensils used in the kitchen

Hand Tool and Small Equipment

1. Ball cutter, melon ball scoop, or parisienne knife – Blade is a small, cup shaped half sphere. Used for cutting fruits and vegetables into small balls.
2. **Cook's fork** – heavy, two-pronged fork with a long handle. Some for lifting and turning meats and other items. Must be strong enough to hold heavy loads.
3. **Straight spatula or palette knife** – A long flexible blade with a rounded end. Used mostly for spreading icing on cakes and for mixing and bowl scraping.
4. **Sandwich spreader** – A short, stubby spatula. Used for spreading fillings and spreads on sandwiches.
5. **Offset spatula** – broad blade, bent to keep hand off hot surfaces. Used for turning and lifting eggs, pancakes, and meats on griddles, grills, sheet pans, and so on. Also used as scraper to clean bench or griddle.
6. **Rubber spatula or scraper** – Broad, flexible rubber or plastic tips on long handle. Used to scrape bowls and pans. Also used for folding in egg foams or whipped cream.
7. **Pie server** – A wedge shaped offset spatula. Used for lifting pie wedges from pan.
8. **Bench scraper or dough knife** – A broad, stiff piece of metal with a wooden handle on one edge. Used to cut pieces of dough and to scrape workbenches.
9. **Pastry wheels or wheel knife** – A round, rotating blade on a handle. Used for cutting rolled –out dough and pastry and baked pizza.
10. **Spoons:** solid, slotted, and perforated – Large stainless steel spoons, holding about 3 ounces. Used for stirring, mixing, and serving. Slotted and perforated spoons are used when liquid must be drained from solids.
11. **Skimmer** – Perforated disc, slightly supped, on along handle. Used for skimming forth from liquids and for removing soled pieces from soups, stocks and other liquid.
12. **Tongs** – spring type or scissors type tools used to pick up and handle foods.
13. **Wire whisk** – Loops of stainless steel wire fastened to a handle. There are two kinds of whips :

a) Heavy whips are straight, stiff, and have relatively few wires. Used for general mixing, stirring, and beating, especially heavy liquids.

b) Balloon whips or piano wire whips have mainly flexible wire. Used for whipping eggs, cream, and hollandaise, and for mixing thinner liquid.

14. China cap – Cone shaped strainer. Used for straining stock, soups, sauces and other liquids.

Pointed shaped allows the cook to drain liquids thorough a relatively small opening. Fine china cap or chinois (shee-nwah) China cap with very fine mesh. Used when great clarity or smoothness is required in a liquid.

15. Strainer Round-bottomed, cup-shaped strainer made of screen-type mesh or of perforated metal. Used for straining pasta, vegetables, and so on.

16. Sieve Screen-type mesh supported in a round metal frame. Used for sifting flour and other dry ingredients.

17. Colander Large perforated bowl made of stainless steel or aluminum. Used to drain washed or cooked vegetables, salad greens, pasta, and other foods.

18. Food mill A tool with a hand-turned blade that forces foods through a perforated disk. Interchangeable disks have different coarseness or fineness. Used for puréeing foods.

19. Grater A four-sided metal box with different sized grids. Used for shredding and grating vegetables, cheese, citrus rinds, and other foods.

20. Zester Small hand tool used for removing the colored part of citrus peels in thin strips.

21. Channel knife Small hand tool used mostly in decorative work.

22. Pastry bag and tubes Cone-shaped cloth or plastic bag with open end that can be fitted with metal tubes or tips of various shapes and sizes. Used for shaping and decorating with items such as cake icing, whipped cream, duchesse potatoes, and soft dough.

23. Pastry brush Used to brush items with egg wash, glaze, etc.

24. Can opener Heavy-duty food service type can openers are mounted on the edge of the workbench. They must be carefully cleaned and sanitized every day to prevent contamination of foods. Replace worn blades, which can leave metal shavings in food.

KNIVES, HAND TOOLS, AND SMALL EQUIPMENT

Knife Materials

The metal that a knife blade is made of is an important consideration, since the metal must be able to take and hold a very fine edge.

1. Carbon steel is the traditional favorite, because it can be honed to an extremely sharp edge. Its disadvantages are that it corrodes and discolors easily, specially when used with acid foods and onions. Also, it discolors some foods (such as hard-cooked eggs) and may leave a metallic taste.

2. Stainless steel will not rust or corrode, but it is much harder to sharpen.

3. High carbon stainless steel is a restively new alloy that combines the best aspects of carbon steel and stainless steel. It takes an edge almost as well as carbon steel, and it will not rust, corrode, or discolor. Knives made of this material are highly prized and are relatively expensive.

Knife Handles

The tang is the portion of the metal blade that is inside the handle. The best quality most durable knives have a full tang, which means that the tang runs the full length of the handle.

Knives and Their Uses

1. French knives or chef's knife – Most frequently used knife in the kitchen, for general purpose chopping, slicing, dicing and so on. Blade is wide at the heel and tapers to a point, blade length of 10 inches (260 mm) is most popular for general work. Larger knives are for heavy cutting and chopping. Smaller blades are for more delicate work.

This is your most important tool, so you must learn to handle it and care for it well.

2. Utility or salad knife – Narrow, pointed knife 6 to 8 inches (160 – 200 mm) long. Used mostly for pantry work, cutting and preparing lettuce, fruits, and so on. Also useful for carving roast chicken and duck.

3. Paring knife – Small pointed blade 2 to 4 inches (50-100 mm) long. Used for trimming and paring vegetables and fruits.

4. Boning knife – Thin, pointed blade about 6 inches (160 mm) long. Used for boning raw meats and poultry. Stiff blades are used for heavier work. Flexible blades are used for lighter work and for filleting fish.

5. Slicer – Long, slender, flexible blade up to 14 inches (360mm) long. Used for carving and slicing cooked meats.

6. Serrated slicer(knives)- like a slicer, but with serrated edge. Used for cutting, breads, cakes, and similar items.

7. Butcher knife- heavy, broad, slightly curved blade. Used for cutting, sectioning, and trimming raw meats in the butcher shop.

8. Scimitar or steak knife- curved, pointed blade. Used for accurate cutting of steaks.

9. Cleaver – Very heavy, board blade. Used for cutting through bones.

10. Oyster knife – Short, rigid, broad bladed knife with a slight edge. Used for opening oysters.

11. Clam knife – Short, rigid, broad bladed knife with a slight edge. Used for opening clams.

12. Vegetable peeler – Short tool with a slotted, swiveling blade. Used for peeling vegetables and fruits.

13. Steel – Not a knife, but an essential part of the knife kit. Used for truing and maintaining knife-edges.

14. Cutting board – This is an important partner to the knife. Hard wood boards are favored by many chefs. Hard rubber or plastic boards are thought to be more sanitary, but there is some evidence that bacteria survive longer on plastic and rubber than wood. Cutting boards must be kept very clean.

3.2 Various fuels used in kitchen

Fuel	Description	Usage
L.P.G.	Liquefied petroleum gas is the generic name for commercial propane and butane, compost fuel in the kitchen to fuel gas burners. This gas is supplied in industrial cylinders or in bulk storage tanks. It is supplied to the kitchen through a pipeline. The	One of the most essential fuels used in the kitchen & is

	LPG cylinders are stored in a separate place usually called a gas bank and it is usually operated by the kitchen stewarding department. A certain gas pressure is maintained by the stewarding department as certain ranges require high pressure for cooking LPG is liquefied under pressure & converts into gas when the pressure is released.	known for its efficiency. Used for cooking ranges, ovens & salamanders.
C.N.G	Compressed natural gas is slowly gaining popularity in fuel efficiency and environment friendly.	Used in eco friendly hotels
Coal	It is a very crude form of fuel to be used in a modern kitchen and still very popular. The smoky flavor which the charcoal imparts is much desired. It should always be stored away from food area ideally in a cool dark room away from moistures	In tandoors and grills for BBQ
Wood	Wood ovens are normally used today in pizza restaurants. Even though it is operated by LPG few logs of wood are placed inside to impart a smoky flavour to the pizza	Used in a pizza oven
Electricity	It is used to operate many types of equipment. In India equipment works on 220 volts. Some of the heavy duty equipment use 3 phase electricity current & some use only a single phase.	Used to operate most equipment as it is easy to control
Steam	Most of the hotels produce steam which is used to cook or operate equipment. It is supplied to the kitchen through insulated pipes	Used in dishwashers and steamers
Solid Fuel	This is made from petroleum jelly and comes in small tins. Normally used under the chaffing dishes.	Used in F & B
Solar Energy	The heat from the sun is used as a fuel. Many eco-friendly hotels have solar cookers that are used for cooking	Solar cookers utilize solar heat to cook food.

3.3 Advantages & Disadvantages of various fuels

Fuel	Advantage	Disadvantages
Wood	(a) Cleanliness, (b) cheerful fire, (c) quick increase of heat, (d) cheap in some localities.	(a) Low fuel value, (b) large storage space necessary, (c) labor in preparation, (d) scarcity, (e) does not hold fire long, (f) unsteady heat.
Oil	a) High heat value, (b) immediate increase of	Needs attention unless fire pot is deep,

	heat, (c) cleanliness, (d) small storage space necessary.	(a) High price, (b) difficulty of safe storage.
Gas	(a) Ease of control, (b) cleanliness, (c) convenience, (d) immediate increase of heat.	(a) High price in many places.
Coal	a) Low price, (b) availability, (c) high heat value (in the best grades), (d) low percentage of inert matter	(a) Dirty, (b) smoke produced, (c) more attention to fire and furnace necessary than with anthracite.

3.4 Various equipment's used in the kitchen

INTRODUCTION TO QUANTITY (LARGE) FOOD EQUIPMENT

Food Equipment can be Dangerous. Modern cooking and food processing equipment has an extraordinary capacity to burn, cut, smash, mangle, and amputate various parts of the tender human body. It is not meant to intimidate you or scare you but to inspire a healthy respect for the importance of proper safety and operating procedures.

Not All Models Are Alike. Each manufacturer introduces slight variations on the basic equipment. While all convection ovens operate on the same basic principles, each model is slightly different, if only in the location of the switches. It is important to study the operating manual supplied with each item or to be “broken in” by someone who already knows that item well and has operate it.

Cleaning Is Part Of The Operating Procedure

Thorough, regular cleaning of all equipment is essential. Most large equipment can be partially disassembled for cleaning. Again, every model is slightly different. Operating manuals should give these procedures in detail. If a manual is not available, you must get the information from someone who knows the equipment.

Conserve Energy

At one time it was standard procedure for the chef to turn on the ovens and ranges first thing in the day and keep them on all day. Today high-energy costs have made such practices very expensive. Fortunately, modern equipment has shorter preheating times. Know the preheating time for all your cooking equipment, so you don't need to turn it on before it's necessary. Plan production so that high energy using equipment is not in use.

Your Hands Are Your Best Tools

Machines are intended to be labour saving devices. However, the usefulness of specialized processing equipment often depends on the volume of food it handles. It takes less time for a cook to slice a few pounds of onions by hand than to set up a

slicing attachment, pass the onions through it, and then break down and clean the equipment. This is why it is so important to develop good manual skills.

COOKING EQUIPMENT

Range Tops

The range is still the most important piece of cooking equipment in the kitchen, even though many of its functions have been taken by other tools, such as steamers, steam kettles, tilting skillets, and ovens.

Ovens

The oven and the range top are the two workhorses of the traditional kitchen, which is why the two are so often found in the same units. Ovens are enclosed spaces in which food is heated usually by hot air or, in some newer kinds of ovens, by microwaves or infrared radiation.

In addition to roasting and baking, ovens can do many jobs normally done on the range top. Many foods can be simmered, stewed, braised, or poached in the oven, freeing the range top and the chef's attention for other tasks.

There are many other kinds of ovens beyond those discussed here, but many of them are for specialty or high-volume uses. These include conveyor ovens, which carry foods through the oven on a steel conveyor belt; holding ovens or warmers, which are designed to hold many types of foods at serving temperatures for extended periods without drying out or overcooking (this category includes ovens that also cook the food, then automatically switch to holding temperature); and high-volume roll-in ovens, with large doors into which one can roll carts loaded with trays of food.

Conventional Ovens

These ovens operate simply by heating air in an enclosed space. The most common ovens are part of the range unit, although separate oven units or ovens as part of a broiler unit are also available. Stack ovens are units that consist of individual shelves arranged one above the other. Pans are placed directly on the oven deck rather than on wire shelves. Temperatures are adjustable for each separate unit.

Convection Ovens

These ovens contain fans that circulate the air and distribute the heat rapidly throughout the interior. Because the forced air, foods cook more quickly at lower temperatures. Also, shelves can be placed closer together than in conventional ovens, without blocking the heat flow.

Revolving Ovens

These large ovens, also called reel ovens, are large chambers containing many shelves or trays on a ferris-wheel type attachment. This oven eliminates the problem of hot spots or uneven baking, because the mechanism rotates the foods throughout the oven. Revolving ovens are used in bakeshops and in high volume operations.

Slow-Cook-and-Hold ovens

While the traditional oven is nothing more than a heated box equipped with a thermostat, some modern ovens have more sophisticated features, such as computerized, electronic controls and special probes that sense when a roast is done and tell the oven to switch from cooking temperature to holding temperature. Many of

these ovens are designed to be especially useful for low-temperature roasting. The sensitive controls make it possible to cook at steady, reliable temperatures of 200oF (95oC) or lower and to hold foods at 140oF (60oC) for long periods. Large cuts of meat take many hours to roast at a low temperature like 200oF (95oC). By setting the controls in advance, the operator can even let meats roast overnight, unattended. These ovens are available as convection ovens and as regular, stationary-air ovens.

Combination Steamer Ovens

A relatively new kind of oven is one that can be operated in different modes: as a convection oven, as a convection steamer, and, with both functions on at once, as a high-humidity oven. Injecting moisture into an oven while roasting meats can help to reduce shrinkage and drying.

Barbecue Ovens or Smoke Ovens

Barbecue ovens are like conventional ovens, but with one important difference: they are able to produce wood smoke, which surrounds the food and flavours it while it bakes or roasts. Special woods, such as hickory, mesquite, or various fruit woods such as apple or cherry, must be added to the smoke-producing part of the oven, according to the manufacturer's instructions. This device is usually nothing more complicated than an electric heating element that heats small blocks or chips of the wood so that they are hot enough to smoke but not hot enough to burst into flame. Depending upon on the model, various cooking features are available. Thus, ovens may have smokeless roast/bake cycles, cold-smoke cycles (with the smoke element on but the oven off), holding cycles, and broiling capabilities.

Microwave Ovens

In these ovens, special tubes generate microwave radiation, which creates heat inside the food. Microwave cooking is discussed in detail as a separate chapter.

Broilers and Salamanders

Broilers are sometimes called overhead broilers to avoid confusing them with grills. Overhead broilers generate heat from above; food items are placed on a grate beneath the heat source. Broiling is a favourite way of preparing steaks, chops, chicken, and many other items. Heavy-duty broilers produce very high heat and consume vast quantities of energy. Some broilers are said to go as high as 2000oF (1100 oC) at the burner. Foods must be watched closely to avoid burning. Cooking temperature is adjusted by raising or lowering the grate that holds the food. Salamanders are small broilers used primarily for browning or glazing the tops of some items. They may also be used for broiling small quantities during off-peak hours. Salamanders are usually mounted above the range.

Grills

Grills are used for the same cooking operations as broilers, except the heat source is below the grid that holds the food rather than above it. Many people favour the taste of grilled foods, because of the “charcoal” taste that is actually created by smoke from meat fats that drip into the heat source. Although smoke from meat creates the taste that people associate with grilled foods, actual wood smoke flavours, such as hickory or mesquite smoke flavour, and can be added to foods if those woods are burned in the grill under the food. In order to do this, you must use a grill designed to burn such fuels.

Griddles

Griddles are flat, smooth, heated surfaces on which food is cooked directly. Pancakes, French toast, hamburgers and other meats, eggs, and many potato items are the foods most frequently cooked on a griddle. Griddles are available as separate units or as apart of a range top. Clean griddle surfaces after every use, so that they will cook at peak efficiency. Polish with a griddle stone or griddle cloth until the surface shines. Follow the grain of the metal to avoid scratching. Condition griddles after each cleaning or before each use, to create a no-stick surface and to prevent rusting. Procedure: spread a thin film of oil over the surface and heat to 400oF (200oC). Wipe clean and repeat until griddle has a smooth, no-stick finish.

Rotisseries

Rotisserie broilers cook meats and other foods by turning them slowly in front of electric or gas-powered heating elements. Even though classical cooking theory categorizes spit cooking as roasting, these cookers are more closely related to broilers, because the foods are cooked by the infrared heat of the elements. Although they are especially suitable for chicken and other poultry, rotisseries can be used to cook any meat that can be fastened to a spit. Both enclosed (oven like) rotisseries and open or unclosed units are available. Small units hold about 8 chickens and size range all the way to very large models that can hold as many as 70 chickens. Because the heating elements are on the side (or sometimes above), the fats and juices don't drip into the flames as they do with grills. Drip pans catch juices, which can be used for basting or gravy making.

Deep Fryers

A deep fryer has only one use – to cook foods in hot fat. Yet because of the popularity of fried foods, this function is an important one. Automatic deep fryers are powered by either gas or electricity and have thermostatic controls that maintain fat at preset temperatures. Automatic fryers remove food from the fat automatically after a present time. Pressure fryers are covered fry-kettles that fry foods under pressure. Foods cook faster, even at a lower temperature.

Tilting Skillet

The tilting skillet, also known as the tilting brazier and tilting fry pan, is a versatile and efficient piece of equipment. It can be used as a griddle, fry pan, brazier, stew pot, stock pot, steamer, and bain marie or steam table. The tilting skillet is a large, shallow, flat-bottomed pot. Or, to look at it another way, it is a griddle with 6-inch high sides and a cover. This skillet also has a tilting mechanism that enables liquids to be poured out of it. Power may be gas or electric. Clean the skillet immediately after each use, before food has time to dry on. Add water, turn on the skillet to heat it, and scrub thoroughly.

Steam-Jacketed Kettles

Steam-jacketed kettles, or steam kettles, are sometimes thought of as stockpots that are heated not just on the sides as well. This comparison is only partly accurate, because steam kettles heat much more quickly and have more uniform and controllable heat than pots on the range.

Steam Cookers

Steam cookers are ideal for cooking vegetables and many other foods rapidly and with minimum loss of nutrients and flavour. For this reason, they are becoming more common in both large and small kitchens.

PROCESSING EQUIPMENT (SMALL EQUIPMENT)**Mixers**

Vertical mixers are important and versatile tools for many kinds of food mixing and processing jobs, both in the bakeshop and in the kitchen.

FOOD CUTTER, CHOPPERS

The food cutter or food chopper, familiarly known as the “buffalo chopper,” is a common piece of equipment used for general chopping of foods. A variety of attachments make it a versatile tool.

Slicer

The slicer is a valuable machine because it slices foods more evenly and uniformly than can be done by hand. Thus it is valuable for portion control and for reducing cutting loss.

Vertical Cutter/Mixer and Food Processor

The vertical cutter/mixer (VCM) is like a large, powerful, high-speed blender. It is used to chop and mix large quantities of foods very rapidly. It can also be used for puréeing (soups, for example) and for mixing liquids.

HOLDING AND STORAGE EQUIPMENT**Hot Food Holding Equipment**

Several types of equipment are used to keep food hot for service. This equipment is designed to prevent the growth of bacteria that can cause disease. Because food continues to cook at these temperatures, it should be held for as short a time as possible.

1. Steam tables are standard holding equipment for serving lines. Standard-size counter pans or hotel pans are used as inserts to hold the foods. Flat or domed covers may be used to cover the foods.
2. A bain marie is a hot water bath. Containers of foods are set on a rack in a shallow container of water, which is heated by electricity, gas, or steam. The bain marie is used more in the production area, while the steam table is used in the service area.
3. Overhead infrared lamps are used in service areas to keep plated food warm before it is picked up by the service staff. They are also used for keeping large roasts warm.

Cold Food Storage Equipment

The quality of the food you serve depends to a great degree on refrigeration equipment. By keeping foods cold, usually below 40°F (5°C), the refrigerator (known in the trade as the ‘cooler’ or the ‘box’) guards against spoilage and bacterial growth. Freezers are used to hold foods for longer times, or to store foods purchased in frozen form. There are so many sizes, models, and designs of refrigeration equipment that it would be futile to try to describe them all.

To enable refrigerators and freezers to work at top efficiency, observe the following rules:

1. Place items far enough apart and away from inside walls of refrigerator so that cold air can circulate. Freezers, on the other hand, work most efficiently when they are full.
2. Keep the door closed as much as possible. When storing or removing an item, do it quickly and shut the door.

3. Keep stored foods well wrapped or covered, to prevent drying and transfer of odours.
4. Keep refrigerators spotlessly clean.

POTS, PANS, AND CONTAINERS

Metals and Conductivity

A good cooking utensil should distribute heat evenly and uniformly. If it does not, it will develop hot spots that are likely to burn or scorch the food being cooked. Two factors affect a pan's ability to cook evenly:

Thickness of the metal. A heavy-gauge pot cooks more evenly than one made of thin metal. Thickness is most important on the bottom.

Kinds of metals. Different metals have different conductivity, which means the speed at which they transfer heat.

Pots and Pans and Their Uses

1. Stock pot. A large, deep, straight-sided pot for preparing stocks and simmering large quantities of liquids. Stockpots with spigots allow liquid to be drained off without disturbing the solid contents or lifting the pot.
2. Sauce pot : Round pot of medium depth. Similar to stock pots, but shallower, making stirring or mixing easier. Used for soups, sauces, and other liquids. Sizes: 6 to 60 quarts (or liters)
3. Sauce pan. Similar to a small. Shallow, light sauce pot, but with one long handle instead of two loop handles. May have straight or slant sides. Used for general rangetop cooking. Sizes: 1 ½ to 15 quarts (or liters)
4. Sauté pan, straight sided. Similar to a shallow, straight-sided saucepan, but heavier. Used for browning, sautéing, and frying. Also used for cooking sauces and other liquids when rapid reduction is required, because of broad surface area. Sizes 2 ½ to 5 inches (65-130mm) deep, 6 to 16 inches (160-400 mm) in diameter.
5. Sauté pan, slope sided. Also called fry pan. Used for general sautéing and frying of meats, fish, vegetables, and eggs. Sloping sides allow the cook to flip and toss items without using a spatula, and they make it easier to get at the food when a spatula is used. Sizes: 6 to 14 inches (160-360mm) top diameter.
6. Cast iron skillet. Very heavy, thick-bottomed fry pan. Used for pan frying when very steady, even heat is desired.
7. Double boiler. Lower section, similar to a stockpot, holds boiling water. Upper section holds foods that must be cooked at low temperature and cannot be cooked over direct heat. Size of top section: 4 to 36 quarts (or liters)
8. Sheet pan or bun pan. Shallow (1inch or 25 mm deep) rectangular pan for baking cakes, rolls, and cookies, and for baking or broiling certain meats and fish. Sizes: 18x36 inches (full pan), 18x13 inches (half pan) (46x66 cm and 46 x33 cm, respectively).
10. Bake pan. Rectangular pan about 2 inches deep. Used for general baking. Comes in a variety of sizes.
11. Roasting pan. Large rectangular pan about 2 inches deep. Used for general baking. Comes in a variety of sizes.
12. Hotel pan also called counter pan, steam table pan, or service pan. Rectangular pans usually made of stainless steel. Designed to hold foods in service counters. Also used for baking and steaming, and foods can then be served from same pan. Also used for storage. Standard size: 12x20 inches. Fractions of this size (½, 1/3, etc) are also available. Standard depth: 2 ½ inches (65 mm). Deeper sizes are also available.

(standard metric pan is 325 x 530 mm)

13. Bain marie insert, usually called simple bain marie. Tall, cylindrical stainless steel containers. Used for storage and for holding foods in bain marie (water bath (. Sizes 1 to 36 quarts (or litres)

14. Stainless steel bowl. Round bottom bowl. Used for mixing and whipping, for production of hollandaise, mayonnaise, whipped cream, egg white foams. Round construction enables whip to reach all areas. Comes in many sizes.

MEASURING TOOLS AND EQUIPMENTS

The following equipment is discussed in terms of U.S measurements. Comparable items in metric units also available.

1. **Scales:** most recipe ingredients are measured by weight, so accurate scales are very important. Portion scales are used for measuring ingredients as well as for portioning products for service.

2. **Volume Measures** used for liquids have lips for easy pouring. Sizes are pints, quarts, half gallons, and gallons. Each size is marked off into fourths by ridges on the sides.

3. **Measuring Cups** are available in 1-, ½ , 1/3, and ¼ -cup sizes. They can be used for both liquid and dry measures.

4. **Measuring Spoons** are used for measuring very small volumes: 1 tablespoon, ½ teaspoon, and ¼ teaspoon. They are used most often for spices and seasonings.

5. **Ladles** are used for measuring and portioning liquids. The size, in ounces, is stamped on the handle.

6. **Scoops** come in standard sizes and have a lever for mechanical release. They are used for portioning soft solid foods. The number of the scoop indicates the number of level scoop-fuls per quart (or liter). In actual use a rounded scoop-ful is often more practical, so exact weights will vary.

7. **Thermometers** measure temperatures. There are many kinds for many purposes.

a. A meat thermometer indicates internal temperature of meats. It is inserted before cooking and left in the product during cooking.

b. An instant read thermometer will give readings within a few seconds of being inserted in a food product. It reads from 0oF to 220oF. Many chefs carry these in their jacket pockets like a pen, ready whenever needed. Instant-read thermometers must not be left in meats during roasting, or they will be damaged.

c. Fat thermometers and candy thermometers test temperatures of frying fats and sugar syrups. They read up to 400oF

d. Special thermometers are used to test the accuracy of oven, refrigerator, and freezer thermostats.

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INTRODUCTION TO COOKING

What is cooking? What does ‘*cooking*’ mean?

Can cucumbers and salads be called ‘*cooked* foods’?

Cooking means exposing food materials to heat. The medium of transfer of heat from its source could be water, air or oil. This will be dealt with in detail at a later stage. First let us understand why we need to ‘cook’ food. Cooking is the **Application of heat** to food for the purpose of making it more digestible, safer to eat, more palatable and to change its appearance. In the cooking processes heat breaks down the cellulose in plant foods, softens some of the connective tissues of meat, breaks down and gels starches present, changes and blends flavours within the food, destroys bacteria and makes food more acceptable to humans and human digestion.

4.1 Aims & Objectives of Cooking

1. **Sterilization**: It is the process of killing pathogenic bacteria and worms present in the food. Boiling and freezing are two popular methods of sterilization.
2. **Preservation**: Cooking also helps to preserve the food for a longer time with the help of spices, oils and sugar syrups, etc., mixed with it while being processed.
3. **Digestibility**: Cooking also helps in digestibility of certain vegetables and raw food which cannot be digested if taken uncooked.
4. **Appetizing**: Cooking gives an appearance to the food which makes it presentable and also appetizing. On application of heat, the red colouring matter such as haemoglobin in meat decomposes and changes the red colour to brown. Flavours are developed, which stimulate the digestive juices. The colours of vegetable are brightened.

5. Enhancement of nutritive value: Though cooking may destroy certain vitamins it usually enhances its nutritive value by breaking up heavy materials like fat into digestible particles.

6. Variety: Cooking produces variety from the same ingredients. Several type of preparation can be made from one raw ingredient.

OBJECTIVE

1. Retaining nutritive value of the food.
2. Retaining the original colour of the food.
3. Prevent clash of flavours.
4. No under cooking or over cooking.

4.2 Classification of Various Raw Materials according to functions

1. For the preparation of good, tasty, colourful dishes, it is essential to have a basic knowledge of the raw materials, their characteristics and the special part they play. This knowledge helps to substitute materials when necessary, or to rectify the texture and taste if something goes wrong. Also it helps to improve the quality and get standard end product.
- 2.
3. **SALT:** it brings out the flavour of other ingredients. Having a distinctive taste, salt transforms an insipid dish to a wonderful dish. It should be used skillfully, or too much of it could spoil the dish.
4. **LIQUIDS:** They are important as they are used for the purpose of cooking, binding and coating. They prevent foods from burning, bind dry ingredients, help in maintaining the right consistency. It is important that the correct amount of liquid should be used, or too much would make the food soggy or watery.
5. **SWEETENING:** When sweetening is used with other foods it enhances the combined sensations of odour and flavour of the dish produced. It also adds its own sweetness, and is a versatile food product. Its uses in the kitchen are varied. Sweetening is available in various forms:- granulated, fine-grained, powdered or in liquid form.
6. **FATS AND OILS:** are nutritionally useful and in some form economical sources of energy give a satiety value to the dish. They also contribute characteristic palatability, qualities of flavour and texture. They are popularly used as the medium of cooking.
7. **RAISING OR LEAVENING AGENTS:** Leavening is increasing the surface area of a dough or batter by creating within myriads of gas bubbles puffing up, thus increasing the volume and making it light. The expansion of these gases during baking increases the volume of the product and give a desirable porous structure. The aeration of flour products is affected by the following :-
 - (1) Biological (yeast)
 - (2) Chemical (baking)

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- (3) Mechanical (whisking, beating)
- (4) Lamination (folding, rolling)
- (5) Combination of the above.
8. **THICKENING AND BINDING AGENTS:** Thickening agents give body, consistency, and palatability, when used. They also improve the nutritive value. Binding agents are used to form a mixture of ingredients into a cohesive mass.
9. **FLAVOURINGS AND SEASONINGS:** Spices and herbs give flavouring and seasoning to the dishes. To get effective results, not only should the food please the eye, but should also flatter or stimulate the palate. The success of cooking largely depends upon the help we obtain from flavouring and seasoning. The spice we use for this purpose should be used sparingly as well as with skill. All palates may not crave for highly spiced food, yet majority of people demand that the food be moderately flavoured with the right constituents. Seasoning should bring out the natural flavours of the main ingredients and blend with them.
10. **EGGS :** are rich in proteins and contain valuable amounts of iron and vitamins A & D. Eggs are essential to all kinds of cooking, not only in preparation but as a food in its own right. They produce meals that are economical in price, and with a minimum of waste and time. It is used in all culinary preparations requiring binding, colour enriching, etc.

Various Textures & Consistencies

As explained above, raw foods get exposed to some form of heat and then are called 'cooked' for consumption. The term TEXTURE is used to describe the characteristics of a finished (ready-to-eat) food product. The final product will have a certain texture depending on

- the order in which ingredients are added
- the way of mixing
- the method of cooking

A correct texture has to be brought about in the food. The chef should not only know the correct texture, but should be able to produce the same in the food. The various textures which are listed down, are difficult to explain in words, they should be felt and understood better. There are very thin differences between some of these, which one should learn better during practical.

1. Firm and close – biscuits and plain short pastries can explain this texture. Raising agents are used while preparing these, but they do not make the product very light or brittle. In fact they are hard as a result of many tiny air bubbles created by raising agents. But the biscuits are not too hard either, because of the fat included.

2. Short and crumbly – nankhatai and tarts are good examples of this texture. Fat included is more than that in biscuits, so it breaks more easily into smaller particles.

3. Spongy – Swiss rolls, sponge cakes, idli and dhokla are spongy. A soft, elastic texture due to incorporation of more air results in this texture.

4. Light – Madeira cake has plenty large holes in it, making it 'light'. It is firm, but not hard and tough. It is neither as short as a tart nor as spongy as a Swiss roll.

5. Flaky – chiroti, lacchha paratha, chicken or veg puffs and khara biscuits are flaky. Thin, crisp layers are formed by spreading fat in between two layers of dough which get separated during baking / frying and remain separated due to air pockets. The flakes by themselves should not be tough / hard. Ideally the layers break easily and melt in the mouth.

6. Coarse – large and uneven holes are a result of too much of the raising agent or too little liquid. This is not a good texture to have in food; in fact, it is something to be avoided. Such cakes and other products are sunken at the centre.

7. Tough – too much liquid, over mixing, incorrect mixing, too little fat and long cooking time could result in toughness in food. Mostly, like the coarse texture, this also is to be avoided.

8. Hard – another texture which should be avoided as far as possible. In fact, it is considered to be a fault in the product. Too much pressure while mixing, excessive liquid in the product and incorrect quantity of fat result in this texture. Air that is incorporated gets removed out of the mixture, making the final product hard.

4.3 Various consistencies:

Like different textures found in solid foods (which are mentioned above), different 'consistencies' are found in liquid foods.

Some substances flow readily, others resist flow and some require force or weight application to start flow. The concept of consistency is closely related to viscosity.

Factors affecting consistency of liquid are

- Concentration (of thickening agent)
- Temperature
- Degree of dispersion
- Mechanical treatment
- Time (how long is it after preparing)

Generally speaking, the following consistencies could be found in liquid foods –

A. Pouring – like water and milk. These do not show any resistance and flow easily / readily. Stocks and some thin soups like consommé are examples of 'cooked' liquids having pouring consistency.

B. Coating – when a starchy thickening agent is mixed with a liquid, and the mixture is heated, the starch gelatinizes. In case of a protein as a thickening agent, it coagulates when exposed to heat. In both these cases, the liquid starts to thicken. If a spoon is dipped in this mixture, it starts coating the spoon. A thin film of the mixture could be seen in the beginning. Later on it goes on becoming visibly thicker. Depending upon one / more factors listed before, the thickening will take place up to

a certain point. While making basic custard, this will be understood better. Here, liquid is milk and thickening is egg yolk. Similar coating consistency could be observed in kadhi where liquid is buttermilk and thickening is gram flour (besan). The liquid is proportionately more than the flour or thickening agent.

C. Dropping – when a liquid is added to dry flour, it forms lumps as only some flour (granules) gets combined with liquid. Later, when added more liquid, it converts into dough and with some more liquid, it turns into ‘batter’. Here, the amount of solid (flour) is more than the liquid. For example, a cake mixture of fat, sugar, egg and flour is moistened with water or milk. Only that much liquid is required which will make the mixture fall out in a big moist smooth lump. The liquid should be dispersed well to get a smooth mixture.

Methods & techniques

When raw materials are ready to be cooked, they are sent to the preparation area or hot section of the kitchen where it gets exposed to heat. Following are some of the techniques in preparation. List may be enriched as and when you start actual cooking.

- **Stirring** – this mixes two or more ingredients as they get cooked. Wooden / stainless steel flat spoons, round spoons, perforated spoons etc. of various sizes could be used. Liquids as well as solid and semi-solid ingredients need stirring. Generally it helps in even dispersion of heat leading to even cooking.
- **Masking** – to prevent food from getting burnt in case of baking / roasting, it needs to be masked with some other food material. It can also be done to get a desired colour and appearance.
- **Coating or dipping in batter** – as mentioned earlier, batter is a mixture of flour and liquid (mostly equal quantities). Certain foods are dipped in batter and deep fried. The most apt example would be potato vadas. The batter should coat the stuffing fully and not expose any stuffing. This needs skill, because food should be dropped in hot oil immediately after dipping in batter. So, in a split of a second, the process has to be completed. Thus, the consistency of the batter plays a very important role.
- **Basting** – this is a technique which goes hand in hand with roasting. This means to apply fat / butter on the food while being roasted. It helps by protecting the surface from going dry and also by giving a pleasant brown colour to the roasted food.
- **Tadka / baghar** – these terms and technique are used in Indian cuisine. Oil is heated to the required temperature and certain spice ingredients are added to it (which should crackle,) then the food (like cooked dal or chopped vegetables) are combined with this. It develops additional taste and flavour to the dish. A peculiar flavour which is the characteristic of the dish can be added through the ingredients in the tempering. Sometimes, continental dishes, especially rich soups and sauces are also ‘tempered’; but the technique is applied for a different purpose and using different ingredients. A mixture of egg yolk and cream (liaison) is added to a dish to enrich it, to give it a glaze and to make it smooth. A little of the hot soup / sauce is first mixed with the liaison, and then it is slowly stirred into the larger quantity of soup / sauce.

- **Seasoning** – seasonings bring about the natural taste and flavours of the ingredients. No dish can be complete without seasonings.
- **Flavouring** – these are those ingredients which impart additional flavours in the dishes. Nutmeg powder in creamed potatoes, cardamom powder in Indian sweets like kheers, vanilla essence in vanilla buns are some of the examples. Flavourings could be added in various forms – powders, drops or whole spices (which are removed before serving the dish to guest).

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STOCKS

5.1 DEFINATION OF STOCK

A stock may be defined as a nutritious, flavorful clear thin liquid that is obtained (extracted) by careful simmering of meat, poultry, fish and their bones and vegetables, seasonings and flavourings for a pre-determined period of time. along with herbs in water, to extract flavour. Stock is flavoured liquid which forms the base for many dishes particularly soups & sauces

5.2 TYPES OF STOCKS

WHITE STOCK: (FONDS BLANC)

White stocks are made from the bones of veal, beef, poultry, some types of game, and fish. The bones are washed to remove the impurities that might cloud or discolor the finished stock. Eg; Fonds blanc de Veau,(veal stock) Fonds Blanc de Mouton.(mutton stock)

BROWN STOCK (FONDS BRUN)

Brown stocks are prepared by first roasting the meat bones to deep brown colour, as well as mirepoix before they are simmered. An acid product such as tomato puree may also be added. This changes both the flavor and colour of the finished stock. Brown sauces are especially valuable in making brown sauce, jus lie, demi-glace and pan gravies. Eg: Fonds Brun de Veau(Brown veal stock), Fonds Brun de Gibier.(Brown game stock)

ESTOUFFADE, is a brown beef stock.

FISH STOCK (FUMET)

Fumet is prepared by sweating fish bones along with vegetables such as leeks, mushrooms, and celery and simmering these ingredients in water with the addition of a dry white wine. The end result is generally not as clear as a stock, but it is highly flavoured. Fumet, highly flavoured infusion is used to introduce flavoured to other preparations such as consommés or broths and a variety of small sauces.

VEGETABLE STOCK

Different kinds of vegetables are simmered together and the liquid is strained and used to improve the taste and nutrient quality of vegetarian dishes.

REMOUILLAGE

Remouillage is a stock made from bones that have already been used once to make stock. The literal meaning of the French term is “rewetting”. because not all possible flavour and gelatin is extracted from bones when

making a stock, making a remouillage allows the chef to extract a little more value from the bones. The resulting liquid will not be as clear or flavourful as the original stock, but does have some uses. Bones used to prepare a “primary stock” are reserved after the first stock is strained away from the bones. The bones are covered with fresh cold water and fresh mirepoix and sachet are added to the bones and simmered for about 4 hours to prepare the “secondary stock”. Drain and cool as for regular stock. The stock may not be of best quality, but it can be used as the basis for braises and stews. The food being cooked will provide the majority of the flavor in the finished sauce, and the first rate stock can be reserved for use in dishes where its role is more significant, like in the preparation of consommés etc.

COURT BOUILLON

A “short broth” is often prepared as the cooking liquid for fish or vegetables. The basic components of court bouillon include, aromatic vegetables and herbs, vinegar, wine, or lemon juice and water. A court bouillon may be prepared as part of the cooking process, or it may be prepared in large batches and used as required, in the same way as stocks.

POT LIQUOR

Pot liquor is the water in which meat, poultry, fish, vegetables, pasta etc. have been boiled for the table where the purpose is retain as much nutrients and flavor in the solids as possible. This liquid can be used as a substitute for stock if it is not readily available.

EMERGENCY STOCKS / CONVENIENCE BASES

When there is a temporary shortage of stocks, convenience products such as stock cubes and proprietary essences are useful. But in general these are not suitable for large scale use since they can produce a stock which, is already seasoned.

5.3 Preparation (Recipe),

Basic beef/veal/mutton stock (fond blanc de bœuf/veau/mutton) (1 litre)

Beef bones 500g
Carrots 25g
Onions 50g
Celery 25g
Parsley stalk 6g
Bay leaf ½
Thyme 1 spring
Water 2 litres

Method:

Cut the bones and remove the marrow, if any. Wash and place into stock pot and add cold water. Bring to the boil and skim off the scum, add cold water and wipe the side of the stock pot clean with a clean damp cloth. Add vegetables whole and the bouquet garni.

Allow the stock to simmer gently for 6hrs constantly skimming the fat that will rise to the surface. (the vegetables should be removed from stock after 3 hrs.) pass through a muslin,

N.B: 6-8hrs is the maximum time required for extracting full flavor; if cooked too long, the flavor will suffer. Bones from which the flavor has been extracted may be re-simmered for 6 hrs to produce jelly.

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Veal stock is made the same way of beef stock using veal bones instead of beef bones.

Gelatin is released from veal bones more quickly than from beef bones. A good veal stock will gel when cold.

Mutton stock is made the same way as beef stock.

Method is the same as for beef stock with the difference that the quantity of water is less and cooking time is 2hrs. White chicken or meat stocks are used for the preparation of white soups, sauces, stews, braises, court bouillon (cooking liquor)

WHITE FISH STOCK (fond de poisson blanc)

Butter 15gm

Sliced onion 50gms

Bay leaf ½

Peppercorns 2

Parsley 4gms

Fish bones and trimmings 400gms

White Mushrooms 3gms

Juice of lemon 1/4th lime

Cold water 1 1/2 lit.

Method:

1. Place the aromatics at the bottom of a buttered sauce pan on top of the blanched shredded onions
2. Add the cleaned and cut fish bones and and trimmings
3. Add lemon juice and sweat the bones ,place a cartouche(grease proof paper).
4. Moisten with water, bring to a boil, skim, allow to simmer for 20mins.
5. Strain through a muslin , reboil and cook as required.

Brown stock (brown beef/ veal /mutton) estouffade or fond brun

Beef/veal/mutton bones 500g

Carrots 25g

Onions 50g

Celery 12g

Bay leaf ½

Thyme 1/2spring

Fat A little to brown the bones

Water 1 ½ litres

Method:

Cut the bones and place it with fat in a roasting tray. Roast the bones or trimming in a hot oven till they are rich brown. Remove bones from the oven and place them in a stock pot. Cover with water, bring to boil and skim. Add fried carrots and onions, the bouquet garni let the stock simmer for 6 hrs skimming from time to time. Strain, re-simmer and

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use as reqd.

N.B: brown stock is used for soups, braises, gravies, curries, stews and sauces.

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Culinary Terms

- 1) **Roux:** - Equal quantities of fat & flour, cooked together.
- 2) **Beurre Manie:** - Equal quantities of fat & flour mixed together, uncooked.
- 3) **Clarified Butter:** - Butter melted on a low flame to separate solids and then strained to get a clear butter.
- 4) **Au Jus:** - meaning "with juice" describes the serving of meat, most often beef, with the natural juices that were produced while the meat was being cooked.
- 5) **Jus:** - Also known a demi-glaze. It is reduced equal parts of brown sauce & brown stock till it is thick and glossy.

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Methods Of Cooking

Cooking means exposing food materials to heat. The medium of transfer of heat from its source could be water, air or oil. This will be dealt with in detail at a later stage.

First let us understand why we need to 'cook'

TRANSPERANCE OF HEAT TO FOOD

All methods of cooking depend on one or more of the following principles.

RADIATION

Heat passes from its source in direct rays until it falls on an object in its path such as in grilling.

CONDUCTION

This is the transferring of heat through a solid object by contact. Some materials for example metal used for pans, transfer heat more quickly than wood used for wooden spoon. Conduction is the principle involved in the solid electric ranges.

CONVECTION

This is the movement of heated particles of gases or liquid. On heating, the particles expand, become less dense and rise. The colder particles sink to take their place, thus causing convection currents which distribute heat, this principle is used in heating a gas oven and in the heating of the liquids.

THE EFFECT OF HEAT ON FOOD

PROTEIN

It coagulates in heating. Overheating makes it tough, unpalatable and shrunken. For example, when heat is applied to egg white, it thickens, becomes opaque and then firm. This characteristic coagulation of protein when heated is employed in its use as a coating for deep and shallow fried foods and in the development of crust in bread formed by the protein gluten in wheat.

CARBOHYDRATES

MOIST HEAT: - on starch causes the starch grains to soften and swell. Near boiling point the cellulose framework bursts, releasing the starch which thickens the liquid.

DRY HEAT: - causes the starch to change color from creamy white to brown and after prolonged heat will carbonize and burn. Water is given off during heating and the starch on the surface is changed to dextrin, a form of sugar, as in toast.

MOIST HEAT: - causes sugar to dissolve in water-more rapidly in hot water than in cold. On heating it becomes syrup; on further heating it colours, than caramelizes and will eventually turn to carbon and ash.

DRY HEAT causes sugar to caramelize quickly and burn.

FATS

They melt to oils when heated. Water is given off with a bubbling noise as heating continues when all the water has been driven off a faint blue haze appears; further heating will result in smoking and burning. The unpleasant smell of burning fat is caused by the presence of fatty acids.

VITAMINS

VITAMIN A:- and CAROTENE are insoluble in water so they are not lost by moist methods of cooking, such as boiling and steaming, or by soaking. Therefore boiled vegetables contain same amount of carotene as raw vegetables.

VITAMIN D:- is not destroyed by heat or lost by solubility.

THIAMINE (VITAMIN B1):- is very soluble in water and about 50% will dissolve in the cooking liquid. High temperatures e.g. pressure cooking, destroy VITAMIN B1 and alkali (Baking powder) will cause some destruction.

RIBOFLAVIN (VITAMIN B2):- is soluble in water and will dissolve out in the cooking liquid; some is lost in normal cooking but more losses occur in pressure cooking.

NICOTINIC ACID (NIACIN):- is soluble in water and dissolves to some extent in the cooking liquid. It is stable in the presence of heat but is easily oxidized, which means that the chemical process of the products is adversely affected by taking in oxygen.

VITAMIN C:- is lost or destroyed very easily in cooking. It is soluble in water. Vitamin C oxidizes to form a substance which is useless to the body; to minimize oxidation cook with a lid on. Food containing Vitamin C should be cooked for short periods and must be used as fresh as possible.

Moist (Medium of liquids)

1. BOILING

DEFINITION

It is the cooking of prepared foods in a liquid at boiling point. This could be water, court- bouillon, milk or stock.

PURPOSE

The purpose of boiling is to cook food so that it is:

- Pleasant to eat with as agreeable flavour.
- Of a suitable texture, tender or slightly firm according to the food.
- Easy to digest and safe to eat.

EFFECTS OF BOILING

Gentle boiling helps to break down the tough fibrous structure of certain foods which would be less tender if cooked by other methods. Cooking must be slow in order to give time for the connective tissue in tough meat to be changed into soluble gelatine, so releasing the fibres and making the meat tender. Gentle heat will ensure coagulation of the protein without hardening.

ADVANTAGES OF BOILING

- Older, tougher, cheaper joints of meat and poultry can be made palatable and digestible.
- It is appropriate for large scale cookery and is economic on fuel.
- Nutritious, well- flavoured stock can be produced.
- Labour saving, as boiling needs little attention.

a) The advantages of food started slowly in cold liquid brought to the boil and allowed to boil gently:

- Helps to tenderize the fibrous structure (meat), extracts starch (vegetable soups) and flavour from certain foods (stocks)
- Can avoid damage to foods which would lose their shape if added to boiling liquid e.g. whole fish.

b) Adding food to boiling liquid:

- Seals in the natural juices as with meat.

2. POACHING

METHODS

There are two ways of poaching: shallow and deep.

- Shallow poaching. Foods to be cooked by this method, such as cuts of fish and chicken, are cooked in the minimum of the liquid, that is, water, stock milk or wine. To prevent the liquid boiling, bring to the boil on top of the stove and complete the cooking in a moderate hot oven, approximately
- Deep poaching: Eggs are cooked in approximately 8cm of gently simmering water. Whole fish, e.g. salmon: slices of fish on the bone e.g. turbot, grilled cod, salmon and whole chicken may be deep poached.

EFFECTS OF POACHING

Poaching helps to tenderize the fibrous structure of food, and the raw texture of the food

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becomes edible by chemical action.

TEMPERATURE AND TIME CONTROL

Shallow poaching is just below simmering point (and may be carried out in an oven);

Deep poaching is just below gentle simmering.

3. STEWING

PURPOSE

Because stewing is both economical and nutritional, cheaper cuts of meat and poultry, which would be unsuitable for roasting and grilling, can be made tender and palatable.

Stewing also produces an acceptable flavour, texture and eating quality.

EFFECTS OF STEWING

In the slow process of cooking in gentle heat the, the connective tissue in meat and poultry is converted into a gelatinous substance so that the fibres fall apart easily and become digestible. The protein is coagulated without being toughened unlike boiling, less liquid is used and the cooking temperature is approximately 5 degree Celsius lower.

TEMPERATURE AND TIME CONTROL

The ideal cooking temperature for stewing on top of the stove is approximately 82 degree Celsius.

4. STEAMING

METHODS OF STEAMING

Atmospheric and low pressure steaming

- Direct: in a steamer or in a pan boiling water (steak and kidney pudding);
- Indirect: between two plates over a pan of boiling water

High pressure steaming

Equipment, which doesn't allow the steam to escape, therefore enabling steam pressure to build up, thus increasing the temperature and reducing cooking time.

Vacuum cooking in pouch: this is known as sous-vide, a method of cooking in which food contained in vacuum sealed plastic pouches is cooked by steam.

ADVANTAGES OF STEAMING

These include:

- High-pressure steaming enables food to be cooked or reheated quickly because steamed is forced through the food, thus cooking it rapidly;
- Labour saving and suitable for large scale cookery.
- High speed steamers used for batch cooking enable the frequent cooking of small quantities of vegetables throughout the service, keeping vegetables freshly cooked retaining colour, flavour and nutritive value;
- With steamed fish, the natural juices can be retained by serving with fish making the accompanying sauce;

- Steaming is economical on fuel as a low heat is needed and multitiered steamer can be used.

TIME AND TEMPERATURE CONTROL

For high pressure steaming, foods should be placed in the steamer when the pressure gauge indicates the required degree of pressure. This will ensure that the necessary cooking temperature has been reached.

Cooking times will vary according to the equipment used and the type, size and quality of food to be steamed. Manufacturers' instructions are an essential guide to successful steaming.

5. BRAISING

A method of cooking food in a closed vessel with very little liquid at a low temperature and for a long time. Braising is used mostly for tougher cuts of meat, certain vegetables (cabbage, chicory (endive), artichoke and lettuce) and large poultry.

Braising is also a method of cooking certain firm fleshed fish (monkfish, carp, and salmon): the fish is poached in the oven, in a small amount of liquid containing herbs, and basted during cooking.

When cooking was carried out directly on the hearth, braising meant cooking slowly in hot embers. The cooking container had a lid with the rim on which embers. The cooking container had a lid with a rim on which embers could be placed, so that heat came from both above and below.

Frying

There are three basic methods of frying food:

- Deep-frying: Cooked in a deep fat fryer fully covered by very hot oil.
- Stir frying: small pieces of meat, fish, etc. cooked quickly (not more than a few minutes) in a wok or deep sided pan with a small amount of oil.
- Shallow frying: cooked in a frying pan usually with a small amount of fat or oil.

Fried foods are best served immediately. You should not keep the foods standing while you prepare the salad garnish or look for the accompanying sauces.

Shake off extra ice crystals before frying chips as water and oil get along badly and the oil will froth dangerously. Excess moisture shortens the deep frying life of oil. Do make sure that the food is dry before frying. Other enemies of oil are:

- Salt and sugar – season foods after frying, not before and so do well away from the oil.
- Small bits of food and coating which fall into the oil during cooking – always shake off excess breadcrumbs and drain battered food carefully before frying.

Frying foods: While **deep frying** always check that you are using the right temperature for the food you are frying. Do not place too much of food in the oil at one time as it will cause

the temperature of the oil to drop, which means that the food will absorb more oil, spoiling its eating quality. The correct ratio is one part of food to six parts of oil. While **stir frying** keep the food moving around the pan while it is cooking. All food should be tiny pieces. Never attempt to fry large pieces of food, which are still frozen. The food will end up overcooked on the outside, but undercooked inside. This will lead to customer complaints and is dangerous from hygiene point of view (harmful bacteria will survive). While **shallow frying** use as little oil as possible and a type which is high in polyunsaturates, and will not smoke at normal frying temperatures. Let the oil heat up and when you fry the food you should hear a gentle sizzle. If there is no sound or sign of activity the oil is too cold. Fierce sizzling and smoke mean the fat is too hot. Recognize the dangers of oil overheating. An unpleasant smoke that irritates the eyes, ears, nose and throat. If heating continues the oil will burst into flames – “ the flashpoint ”.

Baking

Success in baking requires accurate measurement of ingredients, and careful control of cooking temperatures and times. Some baked products must stand before cooking so that the yeast can do its work, or the pastry can rest. Others have to go in the oven at once so that they will rise properly.

Points to look out for include:

- Whether to defrost frozen products
- Whether to remove the lid/pierce the covering
- What quantities to use
- What temperature added ingredients should be at
- What further preparation steps are required
- How long and in what conditions, the food needs to be kept before cooking
- What preparation of the baking container is required

Ovens need time to reach the right temperature, but turning them on too soon is wasteful. Products baked very fast do not usually need temperature adjustments. With longer cooking times, look to see how the food is cooking and turn the heat up or down a little, as necessary.

Be careful when opening the oven to check cooking. Many breads and cakes are fragile until cooking is almost complete. The quality will suffer if the door is open too widely (letting cool air in). Rough handling of cooking containers can also cause harm.

Test the food before you remove it from the oven:

- Tapped on the base bread should make a hollow sound.
- Cakes should be firm and springy when the center of the top crust is lightly pressed.
- A skewer pushed into the center of a cake should be clean when drawn out- if any mixture sticks to it, the cake needs further cooking.
- Made – up dishes should be tested with a temperature probe, to ensure that the center has reached 70C or higher.

Always remove items carefully from the oven – fully loaded trays can be very heavy. Handle baked items especially when hot, with great care. Cakes can be easily damaged. Bread can dent and distort.

If the baked food is to be eaten hot, transfer it carefully to a warm serving dish and serve immediately. If it is served cold, requires decoration or is forming part of another dish, allow it to cool in a suitable area of the kitchen:

- Transfer to a cooling rack (tray made from a wire mesh), so that air can circulate round the base
- Remove any lining paper
- Leave delicate cakes to cool in the cooking container for about 15 minutes before turning out.

Grilling

Grilling is one of the quickest and most straightforward ways of cooking. It produces an attractive brown color and crisp texture. Little or no additional fat is required and many foods lose fat during cooking.

Grilling is best for foods, which are tender, and has reasonable moisture content. The pieces of food should not be too large or too thick; otherwise it is difficult to control the cooking evenly. The risk is that the outside burns or dries out before the center is cooked.

The main points you should check for before grilling pre-prepared or convenience foods are:

- What seasoning to use and when
- any final preparation to be done
- whether the food needs brushing with oil or butter or a coating of flour
- what garnishes and sauces will be accompanying the dish

The grill should always be switched on a little before service to get hot. As grills use a lot of energy it is wasteful to leave them on unnecessarily. You should also check that the service dishes are in a hot cupboard to keep warm, ready to take the food. Before use, brush the grill bars lightly with oil. This will prevent the food from sticking. Halfway through the grilling, turn the food over carefully with grilling tongs. Piercing it with a fork is not recommended, as this lets the juices escape.

Testing when the food is cooked normally comes with experience. Points to check includes:

- *Appearance* – some browning is a good sign, but too much is a warning the food is overcooking.
- *Feel* – pressed with grilling tongs, a steak changes from feeling flabby when rare to quite firm when well done. A tomato feels soft when cooked, fish is firm.
- *Color of juices* – pressed with grilling tongs, the juices will be red for a rare steak, have traces of blood for a medium, and be clear for well done.

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Hierarchy & Kitchen Staffing

Hierarchy refers to the flow of authority from top to bottom in an organization and with respect to the kitchen. It refers to the flow of authority commencing from executive chef and goes to the bottom i.e. Kitchen helpers. Kitchen staffing refers to not only assigning the positions but also filling them with the suitable manpower. Staffing is the actual strength of the employees working at different levels, which depends upon the various factors

8.1 CLASSICAL KITCHEN BRIDAGE

The classical kitchen brigade system established by Escoffier was designed for large operations using complex menus. The classical brigade included a Chef who was directly in charge of production. In the kitchen was divided into stations which were overseen by the following *Chef de Partie*:

Saucier

Responsible for sauces, stews, stocks, hot hors d'oeuvres and sautés.

Potager

Responsible for soups, stocks for soups and chowders.

Poissoner

Responsible for fish dishes.

Entremetier

Responsible for vegetables, starches and eggs.

Rotisserie

Responsible for roasted and braised meats and meat gravies.

Grillardin

Responsible broiled items and possibly deep-fried meats and fish.

Garde Manger

Responsible for cold foods including salads, dressing, pates, cold hors d'oeuvres and buffet items.

Patisserie

Responsible for prepared pastries and desserts with a baker responsible for breads and rolls.

Tournant

Swing or relief cook.

Each **Chef de Partie** was assigned a *Commis* – a helper. Standard were the *Premier Commis* (COMMIE-1) or Station Cook, *Deuxieme Commis* (COMMIE-2) or Cook's helper and *Troisieme Commis* (COMMIE-3) or Cook's helper assistant.

8.2 MODERN STAFFING IN VARIOUS CATEGORY HOTELS

Large modern kitchens still use a version of the classical brigade organization. The major changes are collapsed positions and different titles, such as the following:

Executive Chef

Responsible for overall kitchen organization.

Sous Chef

One for each shift the kitchen is open and for semi-independent operations within a hotel property.

Garde Manger Chef

The pantry supervisor.

Short Order Cook/Broiler Cook

Responsible for preparation of items to order and working the line (*The final plating area in the kitchen*); normally has minimal involvement in preparation of more complex items.

Pastry Chef

Plans dessert menu and prepares pies, cakes and other desserts.

Baker

Responsible for breads and rolls.

Cook's Helper

Assigned to the various stations, training positions.

Medium size modern kitchens use an abbreviated form of the brigade. In small restaurants, the lead position is typically the working Chef, who works directly with the Short Order Cook and Pantry Cook. The cook's helper may be the pot and dish washer.

The complexity of the staffing will be in proportion to the complexity of the property itself. The number of staff members doesn't necessarily reflect the quality of the food served by the establishment. The one constant from the classical brigade to the more modern version is the importance of the Chef, whether an Executive or Working Chef.

8.3 DUTIES & RESPONSIBILITIES OF VARIOUS CHEF

- **SOUS CHEF:** He is the right hand of the executive chef and is generally responsible for the day to day functioning of the kitchen. His duties are almost same as that of the executive chef. He supervises the practical activities of the kitchen. He is answerable to the executive chef regarding the daily activities. In the large organization the no. Of sous chef can vary depending upon separate kitchen for separate restaurant.
- **CHEF DE PARTIE (CDP):** For different section in the kitchen, there are different

CDP's who generally work with the help of the different apprentices and commis. Various cap's and their duties are as follows:

- **SAUCE COOK / CHEF SAUCIER:** He prepare the “entrée” i.e. To see all the meat, poultry, and game birds (like turkey, pigeon etc.) Especially those which are not roasted or grilled. He prepares his own mise-en-place (putting everything on place) i.e. Preparing for something in advance like cutting, chopping and collecting the necessary ingredients for many items. He can receive the prepared cuts of meat from the larder department.
- **ROAST COOK / CHEF RÔTISSEUR:** He is responsible for the preparation of all the roast and grill items. This section also contains the deep frying section and also prepares accompaniments, sauces and garnishes for roast and grills.
- **FISH COOK / CHEF POISSONNIER:** Except for the deep fried and grilled fish all the fish preparation are prepared here along with the accompaniments, sauces and garnishes. So a thorough knowledge of various recipes and their accompaniments is a must in this department.
- **GRILL COOK / CHEF GRILLARDIN:** He is the in-charge of grilling of various dishes. Sometimes these chefs work under roast section.
- **VEGETABLE COOK / CHEF ENTREMETTIER:** All the vegetable and potato other than deep fried prepared here under this section
- **SOUP COOK / CHEF POTAGE:** These sections prepare all the soups and their accompaniments and the garnishes are also prepared by this chef. Great care should be taken because it gives the impression about the meals which are to be followed.
- **LARDER COOK / CHEF GARDE MANGER:** It is the cold section of the kitchen which is generally concerned with the pre-preparation of the food which is cooked by other department. This includes the preparation of game, poultry, and fish. Cleaning and portioning of meat is also done in this section. Also, this department is responsible for the preparation of hors de oeuvres, salads, canapés, sandwiches and butchery section etc. So, the work of this department is unending and continuous throughout the operations.
- **INDIAN SECTION COOK:** This department is responsible for the preparation of all Indian dishes given in menu, which include tandoor, halwai, curry, rice, vegetables etc.
- **PASTRY COOK /CHEF PATISSEUR:** His work is specialised and all the continental sweets, pastries and bakery product prepared by the pastry section.
- **RELIEF COOK / CHEF TOURANT:** He is a relief cook takes over a section when a particular cdp goes on leave or has an off day. He is generally a senior chef

who is all rounder. He has got knowledge of all the departments

- **BREAKFAST COOK / CHEF DE PETIT DE JEUNER:** His duty starts very early. He is responsible for complete breakfast service after his work, he prepare mise-en-place with the next cook.
- **STAFFS COOK:** He generally prepare for the staff.
- **COMMIS:** This people help in doing mise-en-place.

8.4 DUTIES & ROLE OF EXECUTIVE CHEF

Planning menu: he has to take into consideration all the factors which influence the planning of menus and the chef has to take a critical note of all the activities which are important in the menu planning. Care should be taken of various things such as eating trends, raw materials availability and variety of the meals.

2) Forecasting: before indenting and buying, the chef must be able to produce the accurate estimates of the volume of production. He must consider the following points:

- a) Previous year's sales during the same time period.
- b) Sales forecast from f & b service departments.
- c) Volumes of daily enquiries for the parties.
- d) Chef's own experience.

3) Purchase: the food cost will go up if the purchasing is not done in an optimum manner. Excessive raw materials results in pilferages whereas shortage of raw materials results in the loss of business and decreases the no. Of clientele.

4) Planning work schedule: it is the duty of the executive chef to ensure that the schedule of work is planned in such a way that enough work forces are available all the time. So, the work schedule should be properly planned in order to ensure man power availability during the peak season and festival time.

5) Staff hiring: although the final decision rests with the personnel manager but the details of the staff hiring are given by the executive chef because he is the one who is actually taking part in the day-to-day operation.

6) Training: the chef will give the demonstration of the new dishes which he wants to introduce in the menu. So, its duty to plan the training program's not only for the new comers but also for the existing staff.

7) Supervision of the staff: it is the duty of the chef to delegate the authority amongst the various chefs working under him to ensure that the staff is performing duties as

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per his expectation.

- 8) He is responsible for the overall working of the kitchen.
- 9) He is one who is responsible for maintaining close liaison with the other departments to ensure the balance in the operations.
- 10) He represents his team to the management. So, it is his duty to convey the feelings of the staff members under him to the top management and hence ensure a good employer-employee relationship.
- 11) He presides over the departmental meetings from the kitchen side.
- 12) He is responsible for the aesthetic upkeep of the kitchen department.
- 13) He is responsible for organizing festivals in the organization.
- 14) He is responsible for ensuring a proper pest control procedure to be followed during a given time period.
- 15) He is responsible for maintain the discipline and decorum in the kitchen.
- 16) Ha has to have a real commitment in terms of efforts and willingness to learn the skills involved.
- 17) He is familiar with the safe preparatory techniques for handling food and equipment.
- 18) He is responsible for ensuring the high standards of personal hygiene and hygiene of food and equipment.
- 19) He is very creative, innovative and dedicated in his work.
- 20) He is very cooperative, courteous and honest when it comes to work.

8.5 INTER-DEPARTMENTAL CO-OPERATION & CO-ORDINATION

Cooperation with Front office

- Front office will communicate arrival and departure list which will help to forecast about the quantities to cook.
- With the association assistance of front office kitchen people promote sales by

explaining the guest as to what is available and where it is available.

- Front office gives the list of V.I.P. arrivals in order to increase the reputation of the establishment.

Cooperation with House-keeping

It is mainly for the supply of linen i.e. Aprons, kitchen towels, dusters etc and to keep the kitchen clean.

Cooperation with F & B service

There should be a close liaison b/w f & b service and the kitchen staff because f & b personal are involved in the selling of the products made by the kitchen department. It is the duty of the f & b personal to give the intimation about the various parties to be hosted in future and in turn it is the duty of the kitchen people to provide food at right time in hygiene condition. Also f & b personal must be aware as to how much time does a dish require to get ready because they are the ones who are directly associated with the guests.

Cooperation with Maintenance

Maintenance will keep the equipment in working condition. Further this department maintains all the electrical fittings. Also they introduce as well instruct about the use of new equipment.

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EGG

9.1 SELECTION OF EGG

Check for cracks in the shell which could let bacteria in and contaminate the eggs.

Freshness of egg can be check by following method:

How to test the freshness of an egg

I. Water test: put the egg in water

Bad egg : it will float.

Good egg : it will sink in bottom.

II. Spread test or egg break test: just break the egg

Bad egg : egg white will be thin & spread greatly and yolk is flat & broad.

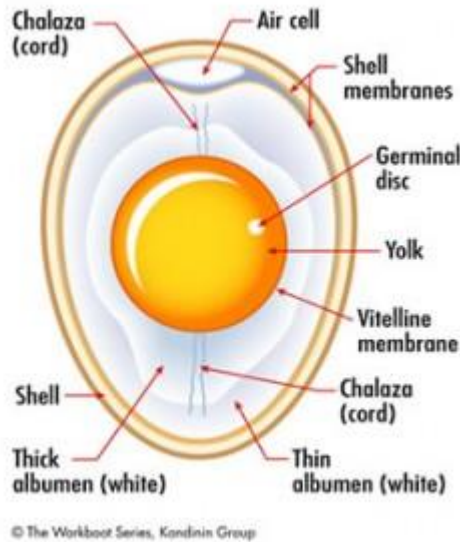
Good egg: egg will be a thick and yolk will be on the centre, round & high.

III. Candle test: check against the flame of candle

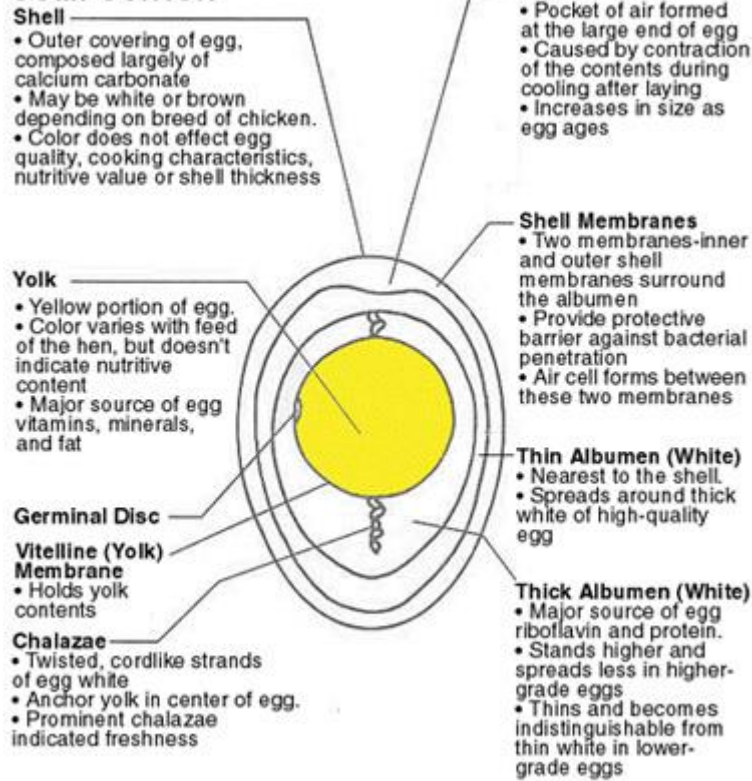
Bad egg : it will be almost transparent.

Good egg : it will be opaque.

1.1 STRUCTURE OF EGG



COMPOSITION



9.3 USES OF EGGS

- 1) **Binding agent:** eggs are used as binding agents for example croquettes.
- 2) **Leavening agent:** this property is exhibited by the eggs when we whip the egg white, the air gets entrapped inside the egg white & hence the egg acts as leavening agent for example sponge.
- 3) **Coating agent:** egg acts as coating agent in various dishes such as cutlets, poulet maryland etc.
- 4) **Emulsifying agent:** eggs act as emulsifying agents in case of emulsion such as mayonnaise (oil & water).
- 5) **Thickening agent:** eggs act as a thickening agent in gravies, sauces, soups etc.
- 6) **Clarifying agent:** in case of consommé, the egg acts as clarifying agent, where it clarifies the soup by entrapping impurities present in the soup.

6.4 NUTRITIVE VALUE OF EGGS

Eggs are important for nutrition. They contain vitamin A,D,E,K and B complex. They are high in iron and one egg equal to 28g lean meat, Fish or poultry. One large egg provide 15% of the recommended daily allowance for protein. Egg are low in saturated fat and one egg gives approximate 70 calories.

Chicken eggs are the most commonly eaten eggs. They supply all essential amino acids for humans, and provide several vitamins and minerals, including (vitamin A), (vitamin B2), Folic acid ,iron, calcium, , phosphorus and potassium All of the egg's vitamin A, D and E are in the egg yolk. The egg is one of the few foods to naturally contain vitamin D. The major concern with egg is cholesterol. One large egg gives average 213 mg of cholesterol. To reduce the cholesterol content use egg white instead of whole egg.

Cooked eggs are easier to digest, as well as having a lower risk of contamination.

Semester - I : Unit 2:Ch.No 10**VEGETABLE & FRUITS****10.1 CLASSIFICATION OF VEGETABLES**

Vegetable: Vegetables refers to all plants or parts of plants which can be eaten raw, cooked or preserved in some form. Vegetable are of great importance in our diet and especially with regard to the present trend when the people are shifting towards the vegetarian side. These play a very important role in our diet properly choose, properly cooked or raw. They make an invaluable contribution towards the supply of vitamins and minerals. Whenever possible, we should serve two vegetable in our diet also salads should be given the importance and hence must be made in both the meals. Generally vegetables have high water content, which ranges from 70-90%.

A useful way of classifying vegetables is to think in terms of what part of the plant is eaten:

- Roots- carrots, turnips, etc
- Tubers- potatoes
- Bulbs-onions
- Leaves- cabbage, spinach, lettuce, etc
- Fungi - mushroom
- Legumes – beans, peas
- Marrows- pumpkins, gourds
- Stems- celery, fennel, asparagus,
- Vegetable fruits- tomatoes, peppers

In general fresh vegetables should be:

- Clean, no soil- some soil may be acceptable on new potatoes and on organic produce
- Compact & crisp
- Of good color, shape and appearance
- Free from damage- no bruising or cuts
- Free from disease or pest damage

Bacteria of the type that can cause food poisoning find their way into the kitchen via the soil on vegetables. Slugs, ants and similar creatures can work their way right into the center of vegetables. Through washing removes both sorts of problem. When storing and handling vegetables, which might carry bacteria and soil, keep them away from other foods.

Storage: Bruising can occur and disease is quickly passed on if vegetables are left tightly packed in bags, sacks or boxes. For fresh vegetables:

- Remove from polybags or punch holes for ventilation.
- Store in a cool dry place, preferably on racks so that air can circulate freely around each vegetable
- Some vegetables are best stored in a refrigerator, preferably one reserved solely for vegetables or in salad drawers in a general-purpose refrigerator.
- Always separate blemished from perfect produce

Root vegetables should stay fresh for 5 to 6 days. Green vegetables should be supplied fresh daily if possible or at most every 2 to 3 days.

Preparation methods: There are some general rules, which help keep the high nutrition value of vegetables:

- Prepare and cook vegetables as close to service as possible
- Use sharp knives
- Only peel vegetables when necessary and then the minimum amount- most of the nutritional content lies close to the skin.
- Don't soak vegetables in cold water after you have prepared them (except for potatoes)- the vitamins dissolve out of the vegetable, into the water.

Washing is done to remove any remnants of soil from the vegetable. Even if there is no dirt visible washing is recommended. This is because you do not know what the vegetable has been exposed to, during its growth harvesting and the various stages before it reaches your workplace.

Peeling is done to remove the outer skin of certain vegetables- because it is inedible (onion skin) or because it is not required for the dish (roast potatoes).

Trimming gets rid of small blemishes, outer leaves and inedible parts of the vegetable. It is also a way of giving vegetables a more uniform shape.

Slicing and chopping are two similar ways of preparing vegetables. Which is used depends on what the vegetable is required for and to some extent on its shape.

10.2 COLOUR PIGMENTS IN VEGETABLES & EFFECTS OF HEAT ,ACID & ALKALION EACH OF THEM

Name of pigment	Color	Solubility in water	Effect of acid	Effect of alkali	Effect of prolonged ions	Effect of metals
Chlorophyll	Green	Slightly soluble	Changes To olive green	Intensifies green	Olive green	Changes to olive green in iron
Carotenoid	Yellow Orange	Slightly soluble	Less Intense colour	Little Effect	Colour may be Less intense	None
Anthocynins	Red / purple Blue	Very soluble	Red	Purple Blue	Little effect	Violet blue with iron/ tin
Betalains	Purplish Red yellow	Very Soluble	Little Effect	Little effect	Pale	None
Anthoxanthin	White colour	Very soluble	White	Yellow	darkness	Dark with iron Bright yellow With aluminum
Flavones	white	-----	More white	Turns yellow		

Effect of heat on vegetables: Cooking is the application of heat to food in order to make it safer to eat, digest and more palatable. Cooking also changes the appearance of food. Heat breaks down the cellulose and the starch present changes and blends the flavors within the food and also destroys the bacteria. Vegetables and other foods are composed of proteins, fats, carbohydrates, water and also small amounts of minerals, vitamins, pigments and flavor elements.

Carbohydrates: Both sugar and starch is carbohydrates. Heat plays a very important role when applied to vegetables in terms of caramelization and gelatinization. Caramelization is browning of sugar. The browning of sautéed vegetables is a form of caramelization. When starch absorbs water and swells, the process is known as gelatinization.

Vegetable Fibres: Fibres are a group of complex substances that gives structure and firmness to plants. They cannot be digested. Heat helps in breaking down the fibres. Alkalis make the fibres softer. Hence

vegetables should never be cooked with alkalis as this would make them mushy and lose essential vitamins.

Minerals, Vitamins, Pigments, Flavour components: Minerals and vitamins are important for the nutritional value of food. They can be destroyed by prolonged cooking or leaching out.

Proteins: They are present in a small extent. When heat is applied with increase in temperature they become firm and start shrinking.

Fibre: It includes cellulose and pectin and gives shape and firmness to the vegetables. Acids make the fibre firmer and increase the cooking time. Sugar strengthens the cell structure and makes the fibre firm. Fibre is softened by heat.

Starch: It affects the texture of a vegetable. Vegetables have enough moisture of their own but need to be cooked until the starch granules absorb moisture and soften.

10.3 CUTS OF VEGETABLES

- 1) Brunoise: vegetables are cut into fine dices.
- 2) Macedoine: vegetables are cut into ½ cm dices.
- 3) Julienne: vegetables are cut into very thin strips (1 ½ " long).
- 4) Jardinière: vegetables are cut into baton shape (1" x ¼" x ¼").
- 5) Paysanne: vegetables are cut into small triangles, circles and squares- uniform shape.
- 6) Wedges: tomato or lemon cut into four or six pieces.
- 7) Mirepoix: vegetables mixed (onions, carrots, celery, leeks) cut into rough dices.
- 8) Chiffonade: Shredded leafy vegetables.
- 9) Matignon: Evenly cut root vegetables.
- 10) Chateau: Turning of vegetables into barrel shape.

10.4 CLASSIFICATION OF FRUITS

FRUITS

Fruits are pulpy in character, often juicy & generally developed from flowers of plants & consist of a ripened seed or seeds with some edible tissues attached.

Types of fruits

Type of fruit Main characteristics E.g. Uses

Stoned fruits These have got a single prominent seed present in the middle. Apricots, cherries, peaches, plums. Used in jams, pies, puddings and sweet dishes.

Hard fruits These have got hard layer of fibers & generally firm when touched.

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Apple, pears etc. Used in pastries, apples are used for garnishing meat dishes, salads, sauces etc., Waldorf salad, apple sauce serve with roast meat etc.

Soft fruits These have got soft layer of fibers and should be handled very carefully.

Black & red currants, berries etc. Generally stewed and are used in pies and puddings. Also used for jams and as flavouring

Citrus fruits These are the fruits which have got acids present in them. Lemons, limes, oranges etc. They are not cooked usually but are generally used for flavouring and garnishing purposes. They are used to prepare fruit salad.

Tropical fruits These generally grow in the hot region where the temperatures might soar upto 50°C Guavas, bananas, dates, figs, mango, papaya, pineapple, litchis etc.

They are used to prepare fruit salad, flavouring and garnishing. Mango used for jams

Other fruits These are the fruits which do not fall into any category given above. Cranberries, melons, grapes etc. They are used to prepare fruit salad, flavouring and garnishing.

In general fruit should be:

- Good size and shape - no variation in size and shape in any one box.
- Good color with no signs of bruising.
- Fresh appearance with no sign of wilting, aging or insect damage.
- Clean, although with freshly picked local farm produce or organically grown items the presence of a little soil is acceptable.

Storage: Remove any fruit that is bruised, damaged or overripe. Depending on variety, it may be possible to trim off the damaged parts, and use the remainder sliced or chopped in a fruit salad or pureed for a fruit sauce.

No fruit should be stored packed tightly together, or in multiple layers. With strawberries, raspberries and other soft fruits, remove any plastic wrapping, and keep the fruit in the refrigerator.

Apples are usually kept chilled to retain their crispness. Pears are ripened in a warm place. Once ripe they should be used within a day. Oranges, lemons, grapefruit, and other citrus fruit should be kept cool. Never put bananas in the fridge – they go black rapidly and lose flavor.

Preparation methods:

Washing should be done just before the fruit is required, and carefully to avoid damage to the fruit.

Peeling to remove the outer skin of the fruit is necessary when the skin tastes unpleasant, or it is rather coarse for the intended use.

Trimming may be needed to remove remaining pieces of pith, small areas of damage, or pips.

Slicing or Chopping is done when small pieces of the fruit are needed in a salad, to make a sauce or to garnish a meat or fish dish.

10.5 USES OF FRUITS

10.6 SALADS 7 SALAD DRESSING

A salad is derived from the Italian word “insalata”. Insalata means a dish steeped in salt or brine solution. Salads are made up of meat, poultry, fish, game, shellfish, eggs, vegetables, fruit and milk products and normally serve cold. They can be made out of single ingredients or a combination of ingredients. Salads are generally served as an accompaniment to a dish but can be served as a course itself, an appetizer, sweet course (fruit salad).

THE SALAD COMPRISES OF FOUR PARTS

1. **The under liner or base:** these are generally greens either shredded or in large pieces. The greens must be crisp and chilled. This can be done by storing them in refrigerator. E.g. Lettuce leaves, cabbage leaves, watercress leaves etc. The main purpose is to keep the plate or bowl from looking bare and to provide contrast colour to the other parts of the salad.
2. **The body or heart of the salad:** this is the major component and can be made of one ingredient or a combination of ingredients. Ingredient should be fresh. Body constituents are the major portion of the salad. The salad gets its name from the ingredients that are used for the body.
3. **Garnish:** the purpose of garnish is to give eye appeal to the salad, though it often adds to the flavour as well. It should not be elaborate or dominate the salad. Garnish should harmonize with the rest of the salad ingredients and, be edible. Any of the fruit and vegetable, cut into simple, appropriate shapes, may be used as garnish.
4. **Dressings:** these make the salad more appetizing, although diet conscious people today eat salad without dressing. Various kinds of dressing are used in the preparation of salad depending upon the kind of salad to be made. It adds flavour, provides food value, helps in digestion and improves palatability and appearance. A dressing is in a liquid or semi liquid form.

SALAD DRESSINGS

- A. Vinaigrette can be made by three ways:-
- I. French: 3 parts oil 1 part vinegar, french mustard and seasoning.
 - II. English: 1 part oil 2 parts vinegar, mustard and seasoning.
 - III. American: equal quantities of vinegar and oil, seasoning and sugar.
- B. Lemon dressing: same as vinaigrette dressing using lemon juice instead of vinegar.
- C. Acidulated cream: 3 parts cream 1 part vinegar and seasoning.
- D. Mayonnaise
- E. Thousand island dressing: mayonnaise, hard boiled eggs, tomato ketchup, chopped gherkins, chopped onions, pimentos, olives and paprika powder.
- F. Russian dressing: mayonnaise, chilly sauce, horseradish, minced onion.
- G. Roquefort dressing: French dressing with cheese.
- H. Piquant dressing: French dressing, dry mustard, chopped onion and paprika powder.
- I. Anchovy dressing: french dressing with chopped anchovies.

J. Honey lemon dressing: honey with lemon juice.

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BAKERY & PASTERY

SUGAR

11.1 IMPORTANCE OF SUGAR

Introduction and definition

Sugar has been defined as “a sweet crystallize substance, colorless or white when pure occurring in plant juices and forming an important article of food. The word sugar however in the chemical sense to the family of carbohydrates is known as “saccharides”.

The chief source of sugar is sugarcane or sugar beet. The granulated sugar is 99.94% pure. The sugarcane first originated near the Ganges basin in India. It is believed that the term sugar was derived from the Sanskrit word “sakara”. It was later grown in West Indies and America.

The sugarcane is a grass like plant which is grown extensively in tropical and sub-tropical places. India produces large quantities of sugar but there is no export. The important countries that produce sugar for export are Cuba, Puerto Rico and Dominican Republic all of which are in the West Indies. Sugar is also exported from Mauritius. South Africa produces sugar in the world famous Demerara valley.

11.2 TYPES OF SUGAR

From the baker’s point of view, sugar is classified into 2 types

I) Single/simple sugar or monosaccharides (C₆ H₁₂ O₆)

These are sugars which do not have to be converted by yeast enzymes before they can serve as food for the yeast. In other words, they are directly fermentable by yeast. The

sugars in this group are glucose (dextrose) and laevulose. They vary considerably in their degree of sweetness and other physical characteristics.

Laevulose is also known as “fructose” or fruit sugar. It is present in molasses and is a principle sugar in honey. Fondant is a simple sugar in a finer crystal form also used for decorative work.

II) Double sugars or disaccharides (C₁₂ H₂₂ O₁₁)

These are sugars that have to be broken down by the yeast enzymes into simple sugars before they can serve as food for yeast or in other words they are not directly fermentable by yeast. The sugar is technically known as “sucrose”. It is nearly 100% pure.

Maltose or malt sugar is the chief constituent of malt syrup (malt is a process in which the starch present in barley is changed to sugar.)

Lactose is a natural sugar of milk. It is of a very low sweetening value but has a good food value and contributes to the crust colour. It is often termed as milk sugar.

SUGARS GRADING

Sugars may be graded into 2 groups.

SOLID SUGARS	SEMI-SOLID SUGARS
1) Granulated sugar	1) Glucose
2) Castor Sugar	2) Golden Syrup
3) Icing Sugar	3) Honey
4) Demerara/ Brown sugar	4) Treacle
5) Cube sugar	5) Molasses
6) Sugar Nibs	6) Invert Sugar
	7) Malt Syrup

I) SOLID SUGARS

i) **Granulated sugar** :- It is a part of the art of refining to induce sugar to crystallize or grow into the required crystal size. The granulated sugar is obtained from the other refined liquor which is cast onto the vacuum pans in which the moisture content is removed to produce crystals of different shapes.

Granulated sugar is of 3 types-

- a) Coarse
- b) Medium
- c) Fine

Coarse sugar is mainly used for sugar boiling.

The medium sugar is used for macaroons and whisking method cakes.

The fine granulated sugar is used for sponges and sometimes biscuits.

**Refined sugar gives 375cal/ 100 gms.

ii) **Castor Sugar** :- It is produced by grinding the crystals through rollers and then sieving it through various silk cloth sieves. Fine castor sugar is useful for making shortbreads, short crust pastry, creaming methods, sponges and biscuits.

iii) **Icing Sugar** :- This is produced by grinding the crystals of castor sugar and putting through sieves. The baker has a choice of 3 grades of icing sugar, namely

1) Bridal Icing Sugar

2) Plain Icing Sugar

3) **Pulverized Icing Sugar**

Bridal icing sugar is put through a silk cloth having an extremely fine mesh and is mainly used for making wedding cakes, Christmas cakes and special occasion cakes. It is used where delicate piping is required.

The plain icing sugar is used for marzipans, various icings, creams and for dusting purposes.

Pulverized icing sugar is mainly used for biscuit making. All icing sugars contain 3% - 5% cornflour, to prevent sugar from lumping.

**Classification of coarseness of icing sugar

1) 10X – Finest of all icing sugars – used for icings.

2) 6X – Standard confectioner's sugar for icing, toppings and cream fillings.

3) XXXX & XX – They are the coarse types mainly used for dusting.

iv) **Cube sugar or Lump sugar** :- It is made from the first refined syrup which is of the highest grade and is crystallized in the form of large slabs. After the slabs are dried, they are put onto cutting machines and cut into cubes. The debris are graded into fine, medium and coarse sugar nibs.

v) **Demerara sugar or Brown sugar** :- This is prepared in the same way as icing sugar. Sulphur dioxide is used in the juice pressed from the sugarcane. This is then treated with sulphuric acid. During boiling, the colour changes to a light yellow. The crystals are then passed through centrifugal machines but are not washed. In this way, the crystals are covered with a thin film of syrup which imparts the flavor desired in this type of sugar. When the sugar is crushed fine, it is known as 'muscavado sugar'. It is sometimes spoken of as soft sugar because of its 'Soft feel' characteristic. This sugar has a tendency to cake on storage. This sugar is mainly used in the making of wedding cakes or Dundee cakes.

**This sugar contains 85% - 92% sucrose.

II) SEMI SOLID SUGARS

i) **Glucose** :- This is known as glucose or corn syrup or dextrose and is produced commercially from cornstarch. For the manufacturing of glucose, starch is boiled with water to bring about gelatinization. A weak acid is then added in order to change the starch into sugar after which the acid is neutralized. This syrup is then reduced to the required consistency. It is mainly used to make fondant icing. It aids in the promotion of a glossy surface to the icing and prevents crystallization. It is also used in the manufacture of jams.

ii) **Golden Syrup** :- This can be termed as a bi-product of the sugar refining process. Its amber in colour and has 15% - 18% water and the remaining is a mixture of

sucrose, dextrose and levulose. When the syrup, after many boilings, no longer yields crystals, the syrup is then filtered and then concentrated. This sugar is used for bakery products for making ginger goods and biscuits and also for pineapple upside down cakes and butterscotch ginger buns.

iii) Honey :- It is one of the first sugars known to man. It is a syrup which is obtained from the nectar of the flowers through an agency of the honeybees. Honey contains 38% levulose, 35% dextrose and the remaining is water, ash and gum. Several grades of honey are sold commercially.

1) **Virgin/ Super refine honey** is of the best quality and is extracted from the combs by exposure to sun or gentle heat.

2) **Yellow honey** which is extracted by greater heat.

3) **Brown honey** which is extracted by pressure under heat.

Honey is very rich and a concentrated food. The quality, consistency, aroma and flavor of honey varies according to the type of flower. The highly reputed honey is that of Hymetus in Greece and in France of Narbonne Savoy and champagne districts. Spring honey is superior to autumn honey. Honey is mainly used for making honey cakes, nougats and chocolate centres. It is also used as an enriching factor in whole meal bread.

iv) Treacle :-It is a syrup which is much darker in colour and a much more pronounced flavour. It is made by filtering dilute molasses, after which it is concentrated. The good quality treacle is used for ginger goods. The darker variety is known as black treacle. Treacle is used mainly to give colour to wedding and Christmas cakes.

v) Molasses :- The best grade of molasses used by the baker is a thick sugary liquid. It is obtained by concentrating the juice of sugarcane which has been previously treated in order to prevent crystallization. The brown colour and characteristic flavour are due to the caramel present in the molasses.

vi) Invert Sugar :- It is manufactured from ordinary sugar and not starch, like other sugars. Sugar is boiled with water and an adequate amount of dilute hydrochloric acid is added to invert the disaccharide to monosaccharide. The acid is neutralized sodium bi carbonate which leaves a residue –NaCl.

Invert is thick in consistency and a colourless syrup used in cakes, biscuits and serves as food for the yeast.

vii) Malt Syrup :-Malt extracts used in yeast breads is extracted from barley. There are 2 types of malt syrups –

a) **Non-diastatic**-Processed at high temperatures which destroys the enzyme and gives a syrup darker and stronger ion flavour. It is used as it contains fermentable sugar and contributes to the crust colour, flavour and keeping quality of the bread.

b) **Diastatic** :-this syrup contains an enzyme called diastase, which breaks down the starch into sugars that can be acted on by yeast. Thus when added to a bread dough, is a powerful yeast. It is used when fermentation process is short. It cannot be used when fermentation is long as it breaks down the high amount of starch to a great extent resulting in a sticky crumb. Diastatic malt is produced with high, medium or low diastase content.

11.3 COOKING STAGES & TEMPRATURE OF VARIOUS STAGES

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1)	Thread Stage	106C – 112C
2)	Soft Ball Stage	112C – 116C
3)	Hard Ball Stage	121C – 130C
4)	Soft Crack Stage	130C – 137C
5)	Hard Crack Stage	137C – 145C
6)	Caramel	160C – 170C
7)	Black Jack	170C – 177C

11.4 USES OF SUGAR

- 1) It gives the necessary sweetness to cakes and other bakery products.
- 2) It serves as food for yeast in the fermentation process.
- 3) It helps in the creaming and whisking process of cake making.
- 4) It is used in the preparation of various icings and fillings.
- 5) It creates a softening or spreading action of the batter.
- 6) It provides a good grain/cell structure and texture to the product.
- 7) It imparts a good crust colour when sugar caramelizes.
- 8) It enhances the retention of moisture hence prolonging the shelf life of the product.
- 9) It adds to the nutritional value of the product.
- 10) All alcohols use sugar.

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SAUCES

12.1 Classification of Sauces/ Composition

The term “*sauce*” covers an infinite variety of culinary tricks for enhancing basic foods. Often a sauce will not only improve the flavour of a dish but make it more digestible, too.

The word is an Old French one originally deriving from the Latin “*salsus*” which means “salted”. This came about from the old habit of preserving meat in salt ; the meat would give off a salty liquid which was then mixed with wine , vinegar, honey or sugar and lots of herbs or spices to make a sauce to disguise the flavour of meat that was , to put it politely, no longer at its freshest.

Now a day in fact, many Chefs feel that good sauces are the pinnacle of all cooking, both in the skill they require and in the interest and excitement they can give to food. Very often, the most memorable part of a really fine meal is the sauce that enhances the meat or fish.

A sauce works like a seasoning. It enhances and accents the flavour of the food; it should not dominate or hide the food.

A “*sauce*” may be defined as a flavourful liquid, usually thickened, which is used to season flavour, enhance other foods.

12.2 Mother Sauces & its recipes

These are the main basic sauces from which all the other sauces are derived.

- **Béchamel (classic white sauce) :** Sauce consist of milk and thickened with white roux. Béchamel sauce is named after “ Marquis Louis de Béchamel”
- **Espagnole (brown sauce):** Espagnole meaning “Spanish” in French was the original brown sauce and still is one the glories of the French kitchen.
- **Velouté(white stock sauce):** It literally means velvet. It is a very light blond coloured sauce, made from chicken, fish, or veal stock , thickened with a blond roux.
- **Tomato (classic tomato sauce):** The traditional French tomato sauce is thickened with a roux.
- **Hollandaise (butter sauce):** A warm emulsified sauce is based on egg yolk and clarified butter. Hollandaise is French word meaning “ Dutch Style”. This sauce is a versatile sauce and is served as a topping on a dish and gratinated to give colour.

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- **Mayonnaise (cold sauce):** It is a cold emulsified sauce based on egg yolk. If it is not handled carefully it will separate giving a curdled appearance.

2. PROPRIETARY SAUCE

These sauces are industry made.

- Soya sauce
- Worcestershire sauce
- H.P. Sauce
- Barbeque Sauce
- Ketchup

3. CONTEMPORARY SAUCE

These sauces are simple, less rich and easy to prepare. These are more likely to be specifically tailored to be given food or techniques.

- Beurre Blanc
- Pesto Sauce
- Compound Butter

12.3 Derivatives**MOTHER SAUCES AND THEIR DERIVATIVES****Mother Sauces**

**Comprises of Onion, Bay leaf Pepper corn, Cloves, Mace and Thyme.*

Derivatives of Béchamel Sauce

<i>Mornay Sauce</i>	Béchamel + Grated Parmesan and Grated Gruyere cheese.
<i>Cream sauce</i>	Béchamel + heavy cream.
<i>Mustard sauce</i>	Béchamel +prepared mustard.
<i>Soubise sauce</i>	Béchamel + Sautéed diced onions.
<i>Nantua sauce</i>	Béchamel + Cray fish tails +Cray fish butter + cream.
<i>Scotch egg sauce</i>	Béchamel +Hard boiled eggs (dices of egg whites and sieved yolks).
<i>Lobster sauce</i>	Béchamel +anchovy essence + diced cooked lobster flesh +a little cayenne pepper.
<i>Cardinal Sauce</i>	Béchamel + a reduction of fish stock and truffle essence + very red Lobster butter+ cayenne pepper.
<i>Horseradish sauce</i>	Béchamel + little beef stock + grated horseradish + vinegar + cayenne pepper.
<i>Avignon</i>	Cream sauce flavoured with garlic + Grated Parmesan +Egg

<i>(avignonnaise)</i>	yolks +chopped parsley.
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Derivatives of Veloute Sauce

<i>Supreme Sauce</i>	Veloute +Cream.
<i>Allemande Sauce</i>	Veloute +Mushroom liquor + egg yolks +grated nutmeg+ lemon juice. (<i>This sauce is also known as Sauce Parisienne a name which is more logical and proper than Sauce Allemande</i>).
<i>Normande Sauce</i>	Fish Veloute +mushroom liquor +Mussels liquor +fish stock + liaison (egg yolks + cream) + lemon juice.
<i>Mushroom Sauce</i>	Sauce Allemande+ mushrooms (to serve with poultry. To serve with fish – Fish Veloute + mushrooms + liaison is used instead of sauce allemande.
<i>Sauce Albufera</i>	Sauce supreme + meat glaze + pimento butter.
<i>Sauce Aurore</i>	Veloute + tomato puree + butter.
<i>Sauce Bercy</i>	Fish Veloute+ chopped shallots sweated in butter + white wine + chopped parsley (<i>special for fish</i>).
<i>Sauce Bonnefoy</i> (<i>White Bordelaise Sauce</i>)	Make a white wine reduction with chopped shallots, ground pepper, bay leaf and thyme to this add ordinary Veloute and finish the sauce with a little chopped tarragon.
<i>Oyster Sauce</i> (<i>Sauce Huitres</i>)	Normande sauce + poached oysters.
<i>Sauce Hongroise</i>	Veloute + sautéed onions + paprika + butter.
<i>Sauce Indienne</i> (<i>Curry Sauce</i>)	Veloute+ Curry powder + Coconut milk + cream+ lemon juice.
<i>Sauce Ivorie</i>	Sauce Supreme + Meat glaze.
<i>Sauce Joinville</i>	Sauce Normande finished with Cray fish and Shrimp butter instead cream and butter.
<i>Sauce Diplomate</i>	Sauce Normande + Lobster butter + dices of cooked lobster+ dices of truffle.
<i>Sauce Saint-Malo</i>	Reduction of white wine + chopped shallots + anchovy essence + mustard.

<i>Sauce Riche</i>	Sauce Diplomate + Truffle cut into small dices + truffle essence.
<i>Sauce Chivry</i>	Reduction of white wine with Chervil, parsley, tarragon, chopped shallots and chives + Veloute + butter.
<i>Sauce Regence for Fish</i>	Sauce Normande + Reduction of Rhine wine with mushroom and truffle trimmings+ truffle essence.
<i>Sauce Regence for Poultry</i>	Same reduction as above + Sauce Allemande + truffle essence.
<i>Sauce Villeroy</i>	Sauce Allemande + Ham + Truffle essence. This sauce is used to coat certain food items and then they are Egg and Bread crumbed and deep fried.

Derivatives of Espagnole Sauce

Estouffade means brown stock

Espagnole means brown sauce.

Concentrated brown stock is called Meat glaze.

Equal quantities of Estouffade and Espagnole reduced to half is called Demi-glace.

<i>Sauce Bigarade</i>	(For Braised duck) Espagnole + D.G. (Demi glace) + orange juice + Orange zest + Lemon juice + Lemon zest.
<i>Sauce Bordelaise</i>	Reduction of (red wine + shallots + peppercorns + bay leaf+ thyme) + Espagnole + Meat glaze (M.G.) + Lemon + dices of poached bone marrow (served with grilled red meat).
<i>Sauce Bourguignonne</i>	Reduction of (red wine + shallots + parsley + bay leaf+ thyme + mushroom) + Butter (Beurre Manie) + Cayenne Pepper (served with Eggs and dishes a la Bourguignonne).
<i>Sauce Robert</i>	Reduction of finely chopped sautéed onions + white wine + Demi Glace + Sugar + English Mustard (served with grilled pork).
<i>Sauce Charcutiere</i>	Sauce Robert + Juliennes of Gherkins. Served with grilled pork chops and any grilled meats.
<i>Sauce Chasseur</i>	Reduction of (white wine + slices of mushroom + finely chopped shallots) + D.G. + Tomato sauce +Butter+ Chopped Tarragon and Chervil.

<i>Sauce Chasseur</i> (<i>Escoffier's method</i>)	Meat Glaze + Demi Glace + (White wine + Brandy + Mushrooms + Shallots) reduction + Tomato sauce + Parsley.
<i>Sauce Colbert</i>	Sauce Colbert is actually Colbert Butter which is Maitre d'Hotel butter with the addition of meat glaze. I.e. Butter + Chopped Parsley + Lemon juice + salt.
<i>Sauce Diable</i> (<i>Devilled Sauce</i>)	Reduction of white wine and chopped shallots + Demi Glace + strongly seasoned with Cayenne pepper. Served with grilled drilled chicken and pigeons.
<i>Escoffier's Devilled sauce</i>	It is commercially obtainable add equal amount of softened butter to the sauce before use. Serve with grilled or poached fish and for all grilled foods.
<i>Sauce Poivrade</i>	Espagnole + freshly crushed peppercorns + butter. This sauce is served with butcher's meat.
<i>Sauce Diane</i>	Sauce Poivrade + whipped cream + crescent shaped pieces of truffle and hard boiled whites of eggs.
<i>Sauce Italienne</i>	Demi Glace + mushrooms + shallots + ham + chopped tarragon + chervil + parsley. Used in the preparation of many small entrées.
<i>Sauce Lyonnaise</i>	Reduction of chopped golden brown onions in white wine and vinegar + demiglace.
<i>Sauce Madere</i> (<i>Madeira Sauce</i>)	Reduction of Demi Glace until slightly thickened + Madeira wine to correct consistency.
<i>Sauce Perigueux</i>	Demi Glace + Truffle essence + Chopped Truffle.
<i>Sauce Piquante</i>	Reduction of (white wine + vinegar + shallots) + Espagnole + chopped Gherkins + tarragon + chervil + parsley. Usually served with grilled, roast or boiled pork or even with boiled beef.
<i>Sauce Zingara</i>	Demi Glace + reduction of white wine and mushroom liquor + mushrooms+ Cayenne pepper + julienne of cooked ham + salted ox tongue + truffle.
<i>Africaine</i>	Demi glace + Cayenne pepper + Madeira garnished with onion rings + diced truffles.
<i>Sauce Bercy</i>	Meat glaze + butter + reduction of shallots and peppercorns in white wine garnished with dices of marrow + chopped parsley

	(served with grilled meats).
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Derivatives of Tomato Sauce

<i>Sauce Portugaise</i>	Tomato sauce + meat glaze + chopped onions + concassed tomatoes + garlic + salt + sugar + chopped parsley.
<i>Sauce Creole</i>	Tomato Sauce + reduction of (white wine + garlic + onion) + Cayenne pepper + strip of red peppers.
<i>Sauce Provencale</i>	Dices tomatoes sautéed in oil chopped parsley + garlic + salt + pepper + sugar.
<i>Sauce Navarraise</i>	Tomato Sauce + flavoured with garlic + garnished with chopped herbs.
<i>Sauce Milanaise</i>	Tomato puree + M.G. + D.G. + garlic + mushroom juliennes sautéed in butter.
<i>Algerian</i>	Tomato sauce garnished with strips of green or red pepper.

Derivatives of Hollandaise Sauce (Isigny Sauce or Dutch Sauce)

It is made with a reduction of crushed peppercorns in vinegar.

<i>Sauce Maltaise</i>	Hollandaise sauce + juice of two Blood Oranges + Grated zest of the same oranges. Served with asparagus.
<i>Sauce Mousseline (also called Sauce Chantilly)</i>	2/3 H. sauce + 1/3 Whipped Cream. Served with boiled fish and vegetables like asparagus celery, etc.
<i>Sauce Aegir</i>	Hollandaise Sauce+ Mustard powder.
<i>Sauce Ancienne</i>	Dutch sauce garnished with chopped Gherkins, mushrooms and truffles.
<i>Sauce Bavaroise</i>	Hollandaise Sauce + Cray fish butter + dices of Cray fish tails. Served with fish.
<i>Sauce Noisette</i>	Hollandaise Sauce + Hazelnut butter (Beurre de Noisette). Served with poached salmon and trout.
<i>Sauce Rubens</i>	Reduction of white wine, fish stock and fine mirepoix. Strain, add Egg yolks and finish with crayfish butter in the same way as with Hollandaise and anchovy sauce.

Derivatives of Mayonnaise Sauce

<i>Sauce Alexandra (cold)</i>	Mayonnaise prepared with sieved yolks of hard boiled eggs + English Mustard + chopped chervil.
<i>Sauce American</i>	Mayonnaise Sauce+ lobster puree + mustard.
<i>Sauce Andalouse</i>	Mayonnaise Sauce + tomato puree garnished with dices of sweet peppers.
<i>Sauce Gribiche</i>	Mayonnaise Sauce made with cooked sieved hard- boiled eggs + chopped capers + gherkins + parsley + tarragon + chervil + white of hard boiled eggs cut into juliennes. Served with cold fish.
<i>Sauce Italienne</i>	Mayonnaise Sauce + poached sieved calf's brain + lemon + salt + pepper + chopped parsley. Served with cold meats.
<i>Sauce Remoulade</i>	Mayonnaise Sauce + Mustard + chopped gherkins + capers + chopped parsley + tarragon + chervil + anchovy essence. Served with various cold items/food.
<i>Sauce Tartare</i>	Mayonnaise Sauce with hard boiled eggs garnished with finely chopped onions and chives.
<i>Sauce Chantilly</i>	2 parts of mayonnaise sauce + 1 part of whipped cream + lime juice
<i>Gloucester Sauce</i>	Mayonnaise Sauce + Derby Sauce + sour cream + lemon juice + chopped fennel. This sauce is mainly served with cold meat.

Mayonnaise sauce is widely used as a salad dressing. In salads, mayonnaise sauce is mixed with various other ingredients and seasonings to prepare dressings like thousand island, cocktail, blue cheese, etc.

Miscellaneous Sauces

<i>Albert Sauce</i>	Butter sauce + simmered grated horseradish + cream + bread crumbs + egg yolks+ salt + pepper + mustard + vinegar. This sauce is suitable for joints of braised beef especially the fillet.
<i>Apple Sauce</i>	Cooked and well mashed apples + cinnamon + sugar. Served Luke warm, serve with roast duck, goose and pork.
<i>Aromatic Sauce</i>	White Bouillon made with thyme, basil, savory, marjoram, sage, chives, shallots, nutmeg and peppercorns thickened with blond

	roux + lime juice garnished with chopped and blanched tarragon and chervil. This sauce is suitable for serving with relevés of boiled or poached large fish or joints of butcher's meats.
<i>Bread Sauce</i>	Infused milk + Fresh white bread crumbs + salt + butter + cream. Served with roast poultry and roast game birds.
<i>Caper sauce</i>	Butter sauce + capers. Served with boiled fish and is an indispensable accompaniment for boiled leg of mutton.
<i>Celery Sauce</i>	Cream sauce + celery puree. Served with roast turkey.
<i>Cranberry Sauce</i>	Stewed cranberries puree + sugar. Served with roast turkey.
<i>Fennel Sauce</i>	Butter sauce flavoured with blanched fennel. This sauce is served with grilled or boiled mackerel.
<i>Parsley Sauce</i>	Butter sauce + chopped and blanched parsley. This sauce is served with calf's head, feet and brains, etc.
<i>Cambridge Sauce</i>	Mayonnaise made with hard boiled eggs, fillets of anchovy, capers, tarragon, chervil, and chives + mustard + Cayenne pepper + vinegar + chopped parsley. Served with any kind of cold meat.
<i>Cumberland Sauce</i>	Red currant jelly + Port wine + Chopped shallots + orange and lemon juices and zests + mustard + Cayenne pepper + ground ginger. Mix all the ingredients together well. This sauce is served with cold venison.
<i>Horseradish Sauce</i>	Grated horseradish + mustard + castor sugar + sugar + cream + vinegar + soaked and squeezed bread crumbs. Served with roast and boiled beef.
<i>Mint Sauce</i>	Mint leaves chopped + castor sugar + vinegar + salt + pepper + water. Mix all the ingredients together. This sauce is served with hot or cold roast lamb.

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BAKERY & PASTRY**13.1 BREAD MAKING****PRINCIPLES OF BREAD MAKING**

There is a sense of mystery in watching basic ingredients like flour, water, sugar and salt respond to the power of yeast. The gluten stretches and expands as air pockets form. The sugar colours with the heat and become golden. What was simply a spongy mass miraculously becoming a veritable work of art, a very edible work of art.

Components and their Contribution to Bread Making Bread is composed of various ingredients, each playing a particular role and contributing to the flavour and texture of the finished product. To be familiar and understand these ingredients is the first step in good bread making. 1) Yeast It is a tiny living fungus that thrives on sweetness, warmth and moisture. Through the process of fermentation yeast acts on carbohydrates and turns them into carbon dioxide and alcohol. This carbon dioxide causes the rise in baked products. Alcohol evaporates during baking yet helps in development of flavour in the bread.

2) Flour The main ingredient in any bread is flour, which gives it its structure. Wheat flour, with its rich protein called gluten, gives doughs their strength and elasticity. Gluten is capable of expanding greatly; thus creating a network of little pockets that trap the gasses produced by yeast that would otherwise escape. As discussed earlier, whole-wheat flour contains all of the wheat grain; i.e. bran, germ and endosperm. All-purpose flour contains only the endosperm, which yields the highest percentage of gluten. Bread recipes that use yeast must contain at least some white or whole-wheat flour to provide gluten.

3) Liquid It is the liquid in the dough that turns into steam during baking. This steam helps create texture in the bread. Water, milk or even beer can be used in bread making. The difference in breads will steam form the components within the liquid. Milk will produce richer bread with a tender crust and a less grainy taste. The proportion of liquids to flour will vary from formula to formula and is caused by the composition of the flour used and the liquid.

4) Salt It has three primary functions in bread dough, the first being improvement of the bread's flavour and enhancement of the flavours of other ingredients. The second function is that it has an inhibiting effect on yeast fermentation. Salt reduces the gassing power of yeast, allowing the development of a uniform rise in the product. The third function is the strengthening and tightening of gluten in the dough. Thus salt, when used, should be in balance with the flour or results could be disastrous.

5) Sugar This makes the dough rise quickly as well as helps brown the crust. Sugar should be used sparingly as too much will inhibit the action of yeast. Always follow the formula carefully. Granulated sugar is most commonly used, though other sweeteners like honey, molasses, corn syrup or brown sugar as well as raisins and dates can be used. They all add a different variety of flavour, texture and colour to the bread.

6) Shortening It is often added to enrich bread, however it is not essential to any bread formula. Shortening gives flavour to the bread and makes it tender. Breads also keep longer and better. Shortening also must be used in limit as too much could inhibit the growth of yeast. In olden days hog lard was used in bread making, but today the preferred fats are vegetable shortening and butter.

7) Eggs too are an optional ingredient in bread making. They provide richness, flavour and improve texture. Breads also have a longer shelf life if eggs are added to the dough. Eggs are best used in the production of sweet enriched dough.

8) Other Ingredients Spices, dry fruits, nuts and various seeds and cereals are also used in bread dough. They contribute to flavour, texture and nutritional value of the bread.

Lean Dough and Rich Dough There are many formulae for bread doughs. Some of these contain few or more enriching ingredients. Those that are low in fat and sugar are termed as lean doughs. They include hard crusted breads like French bread, Kaiser Rolls, and pizza bases. Dinner rolls and white bread are slightly enriched because they have a certain amount of sugar, milk and eggs added to the dough. These breads have a softer crust. Whole wheat and rye breads are made from lean doughs. Dough that has a high percentage of enriching ingredients such as eggs, butter, sugar, fat and cream are termed as rich doughs. These include rich dinner rolls, brioche, sweet rolls, coffeecakes, Danish pastry, croissants and many tea rolls. They are usually made with a sweet filling or topping.

Methods of Bread Making

1) Straight Dough Method In this method, yeast is dissolved with a portion of the liquid. The rest of the ingredients, except flour, are combined with the remainder of the water and mixed. The flour and yeast solution is added and the dough kneaded until it is smooth. Shortening is kneaded in last. Fermentation is longer in this type of dough as yeast is less.

2) No-time Dough Method In this method, all the ingredients are mixed in a once and the dough is used immediately. Yeast is more and the fermentation period is eliminated.

3) Sponge Dough Method Here a ferment is made with yeast, part of the liquid, sugar and salt. It is kept to ferment and only then is the rest of the flour and liquid added.

4) Ferment Dough Method Similar to sponge dough method, only fat and sugar content is higher.

5) Salt Delayed Method This is a variation of the straight dough method. Salt is added only after 2/3 of the fermentation time is over. Yeast multiplies at a faster before being inhibited by salt. Therefore, fermentation is faster.

6) Sour Dough Method Left over dough is kept until it over-ferments and turns sour. This is added to the new dough and acts as a partial substitute for yeast. It provides a distinct flavour to the bread.

7) Hot Dough Method The temperature of the dough is maintained at 88°F by using lukewarm water. This is done when there is shortage of time and fermentation has to be done faster. The quality of the bread made by this method is not so good.

8) Continuous Bread Making Method This is a machine method of making bread. A liquid broth of yeast, water, sugar, milk solids, salt and yeast food is prepared in steel tanks by mechanical agitators. The temperature of the broth is maintained at 86°F. After the broth is fermented, it is pumped into an incorporator where flour and fat are roughly mixed in. It then moves on to the developers where gluten is developed by high speed mixing. It then goes on to dividers where the dough is measured, cut out and moulded. It is then placed on greased trays ready to proof and bake.

Steps in Bread making

1: Scaling

All ingredients are measured. We would like to recommend two things for this step:

1. Measure all wet and dry ingredients by weight.
2. Use a formula that is expressed in "baker's math" or "baker's percentages."

(more about this in a future post)

This step concludes when all ingredients are accurately measured and lined up in order of use, as well as all tools and equipment are ready for the second step in the bread-making process.

Step 2: Mixing

Ingredients are combined into a smooth, uniform dough; the yeast and other ingredients are evenly distributed through the dough, the gluten is developed, and fermentation is initiated.

Step 3: Bulk or Primary Fermentation

The dough is allowed to ferment. Fermentation is the process by which the yeast acts on the sugar and starches and produces carbon dioxide and alcohol.

Step 4: Folding

The purpose of this step is to degas the dough, and we do that for four reasons: to expel some of the carbon dioxide, and avoid by that choking the yeast; to allow the gluten to relax a bit; equalize the temperature of the dough; and to redistribute the nutrients necessary for the yeast's continued growth.

Step 5: Dividing or Scaling

The dough is divided or scaled into the desired individual portions.

Step 6: Pre-shaping or Rounding

The portioned dough is loosely shaped into smooth, round balls. This organizes the dough into consistent pieces and makes the final shaping easier and more efficient. It also stretches the gluten on the outside of the dough and forms a skin that helps it retain the gases produced by the yeast.

Step 7: Resting

The benching or resting lasts approximately 20 to 30 minutes and relaxes the gluten, making the final shaping of the dough easier.

Step 8: Shaping and Panning

The dough is formed into its final shape and placed in the pan or mold that it will be baked in. Hearth breads that will be baked directly on the oven deck are placed in bannetons or between the folds of baker's linen.

Step 9: Proofing or Final Fermentation

The dough goes through one final fermentation. The dough should be placed in a temperature and humidity controlled environment to allow the bread to rise to the desired volume before baking. Optimum rise for this stage is 80 to 85 percent of the dough's overall volume.

Step 10: Baking temperatures & its importance

The dough is baked. The dough is often scored with a sharp knife prior to baking. This allows the bread to expand without bursting.

Some of the important changes that occur during the baking process are:

- *Ovenspring:* The initial, rapid expansion of loaf volume that is caused when the trapped gasses in the dough expand as a result of the high heat of the oven. The yeast remains active in this final fermentation process until it is killed at a temperature of about 145°F (63°C).
- *Coagulation of proteins and gelatinization of starches:* This contributes to the formation of the crumb and sets the structure of the loaf. This begins at approximately 140°F (60°C) and continues until the temperature reaches between 180°F and 194°F (82°C and 90°C).
- *Formation and browning of the crust:* This begins when the surface of the dough reaches 212°F (100°C) It occurs in baked goods in the presence of heat, moisture, proteins, and sugars and continues until the surface temperature reaches 350°F (175°C). Further crust color and flavor develop with caramelization that occurs between temperatures of 300°F and 400°F (149°C and 204°C). When the bread reaches a maximum internal temperature of 210°F (99°C) the bread should be properly baked. Other signs that mark the completion of the baking process are a golden brown crust and a hollow sound emitted when the baked loaf is thumped. The baking process is now complete and the bread is ready to be cooled and stored.

Step 11: Cooling

The loaves are cooled on racks that allow the air to circulate around them and prevent the crusts from becoming soggy. The bread should be cooled at least two hours to allow the crumb structure to stabilize and develop full flavour.

Step 12: Storage

Baked breads will stale most quickly at temperatures between 32°F and 50°F (0°C and 10°C) and therefore should never be placed in the refrigerator.

13.2 COOKIES

TYPES OF COOKIES

Cookie is a small, flat, baked treat, usually containing fat, flour, eggs and sugar. In most English-speaking countries outside North America, including the United Kingdom, the most common word for a small, flat, baked treat, usually containing fat, flour, eggs and sugar is biscuit and the term cookie is often used to describe drop cookies exclusively. The word cookie means small cake. In fact, some cookies are made from cake batter for some products such as certain kinds of brownies it's difficult to know whether to classify them as cakes or cookies. Most cookie formulas however call for less liquid than cake formulas do. Cookie dough ranges from soft to very stiff, unlike the thinner batters for cakes. This difference in moisture content means some differences in mixing methods, though the basic procedure are much like those for cakes. The most apparent differences between cakes and cookies are in makeup. Since most cookies are individually formed or shaped, there is a great deal of hand labour involved. Learning the correct methods and then practicing diligently are essential for efficiency.

13.2 COOKIES (METHODS OF PREPARATION) & TYPES**MIXING METHODS**

Cookie mixing methods are very much like cake mixing methods. The major difference is that less liquid is usually incorporated, so that mixing is somewhat easier. Less liquid means that the mixing will less develop gluten. Also it is a little easier to get a smooth uniform mix. There are basic three cookie mixing methods: One - stage Creaming Sponge These methods are subject to many variations due to differences in formulas. The general procedures are as follows, but always are sure to follow the exact instructions with each formula. One - stage method: This method is the counter part of the two-stage cake mixing method. There is more liquid in cake batters so it must be added in two or more stages in order to blend uniformly. Low moisture cookies on the other hand can be mixed all in one stage. Because all the ingredients are mixed at once, the baker has less control over the mixing with this method than with the other methods. Therefore, this method is not frequently used. When over mixing is not a great problem, as with some chewy cookies, it can be used. Procedure for one state method

1. Scale ingredients accurately. Have all ingredients at room temperature.
2. Place all ingredients in mixer. With the paddle attachment, mix these ingredients at low speed until uniformly blended. Scrape down the sides of the bowl as necessary. Creaming method This is nearly identical to the creaming method for cakes. Since cookies require less liquid, it is not necessary to add the liquid alternately with the flour. It can be added all at once. Note the importance of step two, the creaming stage. The amount of creaming affects the texture of the cookie, the leavening and the spread. Only a small amount of creaming is desired when the cookie must retain its shape and not spread too much Also if the cookie is very short (high in fat and low in gluten development) or if it is thin and delicate too much creaming will make the cookie too crumbly.

Procedure for creaming method:

1. Scale ingredients accurately. Have all ingredients at room temperature
2. Place the fat, sugar, salt and spices in the mixing bowl. With paddle attachment, cream these ingredients at a low speed. For light cookies cream until the mix is light and fluffy, in order to incorporate more air for leavening. For denser cookies, blend to a smooth paste, but do not cream until light.
3. Add eggs, liquid and blend in at low speed.
4. Sift in the flour and leavening. Mix until just combined. Do not over mix, or gluten will develop?

Sponge method

This method is similar to the egg foam methods for cakes. The procedure varies considerably depending on the ingredients. Batches should be kept small because the batter is delicate.

Procedure for sponge method

1. Scale all ingredients accurately. Have all ingredients at room temperature, or warm the eggs slightly for greater volume, as for sponge cakes.
2. Following the procedure given in the formula used, whip the eggs (whole, yolks or whites) and the sugar to the proper stage soft peaks for whites, thick and light for whole eggs or yolks.
3. Fold in the remaining ingredients as specified in the recipe. Be careful not to over mix or to deflate the eggs.

TYPES AND MAKEUP METHODS

We can classify cookie type by their makeup methods. Grouping them by the makeup method is perhaps more useful from the point of view of production, because their mixing methods are relatively simple, while their makeup procedures vary considerably. Bagged, Dropped, Rolled, Moulded, Icebox, Bar, Sheet.

No matter what makeup method you use follow one important rule, make all the cookies of uniform size and thickness. This is essential for even baking since baking time are so short, small cookies may burn before large ones are done. If the tops of the cookies are to be garnished with fruits, nuts, or other items, place the garnishes on the cookies as soon as they are panned press them on gently. If you wait until the surface of the dough begin to dry, the garnish may not stick and will fall off after baking.

BAGGED Cookies

Bagged or pressed cookies are made from soft dough's. The dough must be soft enough to be forced through a pastry bag, but stiff enough to hold its shape.

1. Fit a pastry bag with a tip of the desired size and shape. Fill the bag with the cookie dough.
 2. Press out cookies of the desired shape and size directly onto prepared cookie sheet.
- Eg:- Vanilla swirls

DROPPED Cookies

Like bagged cookies Dropped cookies are made from soft dough. Actually, this method can consider the same as the bagged method, and many bakers use the term "Drop" for both bagging cookies and for depositing dough with a spoon or scoop. Usually a pastry bag is faster, and it gives better control over the shape and size of the cookies. However, in the following situations, using a scoop to drop cookies may be preferred. E.g.: - Chocolate chip cookies When the dough contains pieces of fruits, nuts or chocolate that would clog the pasty tube. When you want the cookies to have a rough homemade look.

1. Select the proper size scoop for accurate portioning.
2. Drop the cookies onto prepared baking sheets. Allow enough space between cookies for spreading.
3. Rich cookies will spread by themselves. But if the formula requires it, flatten the mounds of batter slightly with a weight dipped in sugar.

ROLLED Cookie

Cookie rolled and cut from stiff dough are not made as often in bakeshops and food service operations as they are made in homes because they require excessive labour. Also there are always scraps left over after cutting. When rerolled, these scraps make inferior, tough cookies. The advantage of this method is that it allows you to make cookies in a great variety of shapes for different occasions.

1. Chilled dough thoroughly.
2. Roll dough out 1/8 inch (3mm) thick on a floured canvas. Use as little flour as possible for dusting, since this flour can toughen the cookies.
3. Cut out cookies with cookie cutters. Place cookies on prepared baking sheets. Cut as close together as possible to reduce the quantity of scraps. Roll scraps into fresh dough to minimize toughness
4. Baked cut-out cookies are often decorated with coloured icing (royal icing or fondant) for holidays or special occasions. E.g.: - Crispy cheese biscuit

MOLDED Cookies

The first part of this procedure (step I & 2) is simply a first and fairly accurate way of dividing the dough into equal portions. Each piece is they moulded into the desired shape. This usually consists of simply flattening the pieces out with a weight. For some traditional cookies, special moulds are used to flatten the dough and at the same time stamp a design into the cookie. The pieces may also be shaped by hand into crescents, fingers or other shapes.

1. Refrigerate the dough if it is too soft to handle. Roll it out into long cylinders about one-inch-thick, or whatever the size is required.

2. With a knife or bench scraper, cut the roll into ½ ounce (15gm) pieces, or whatever size is required.
3. Place the pieces on a prepared baking sheet, leaving 2 inches space between each.
4. Flatten the cookie with a weight, such as a can, dipped in granulated sugar before pressing each cookie. A fork is sometimes used for flattening the dough for peanut butter cookies.
5. Alternative method: After step 2 shape the dough by hand into desired shapes.
Eg:- Nankhatai

ICEBOX Cookies

The icebox or refrigerator method is ideal for operations that wish to have freshly baked cookies on hand at all times. The rolls of dough must be made in advance and stored. Cookies can easily be cut and baked as needed. This method is also used to make multicolored cookies in various designs, such as checkerboard and pinwheel cookies.

1. Scale the dough into pieces of uniform size from 1 ½ lb (700gm) if you are making small cookies to 3lb (1400gm) for large cookies.'
2. . Form the dough into cylinders from 1 -2 inches in diameter, depending on the size. For accurate portioning, it is important to make all the cylinders of dough the same thickness and length.
3. Wrap the cylinders in parchment or wax papers, place them on sheet pans, and refrigerate overnight.
4. Unwrap the dough and cut into slices of uniform thickness. The exact thickness required depends upon the size of the cookie and how much the dough spread during baking. The usual range is from 3 - 6 mm. A slice machine is recommended for ensuring even thickness. Dough's containing nuts or fruits however should be sliced by hand with a knife.
5. Place the slice on prepared baking sheet, allowing 5cm between cookies. E.g.: -
Date pinwheel cookies

BAR Cookies

This procedure is called the Bar method because the dough is baked on long, narrow strips, which are then cut crosswise into bars. It should not be confused with sheet cookies, which are sometimes called bars by home cooks.

1. Scale the dough into 800gms units, 450 Gms units may be used for smaller cookies.

2. Shape the pieces of dough into cylinders the length of the sheet pails. Place three strips on each greased pan, spacing them well apart.
3. Flatten the dough with the fingers into strips about 3 - 4 inches wide and about ¼ inch thick.
4. If required brush with egg wash.
5. Bake as directed in the formula.
6. After baking while cookies are still warm cut each strip into bars about 4 ½ cm wide.

SHEET Cookies

Sheet cookies vary so much that it is nearly impossible to give a single procedure for all of them. Some of them are also like sheet cakes; only denser and richer they may even be iced like sheet cakes. Other consists of two or three layers added and baked in separate stages. The following procedure is only a general guide:

1. Spread cookie mixture into prepared sheets pans. Make sure the thickness is even.
2. If required add topping or brush with an egg wash.
3. Bake as directed. Cool
4. Cut into individual squares or rectangles. E.g.: - Hermit spiced cookies Various cookies can be sandwiched with an array of fillings like jam, butter icings, marshmallow etc. PANNING, BAKING &

COOLING

Preparing the pans

1. Use clean, unwrapped pans.
2. Lining the sheet with parchment or silicone paper is fast, and it eliminates the necessity of greasing the pans.
3. A heavy greased pan increases the spread of the cookie. A greased and floured pan decreases spread.
4. Some high fat cookies can be baked on ungreased pans.

13.3 FLOUR – STRUCTURE OF WHEAT

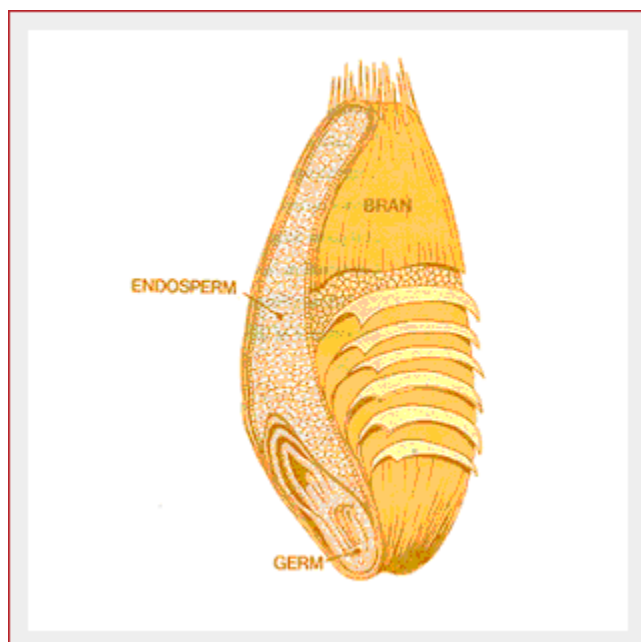
Flour is the principal raw material used in the manufacture of bread, cakes, cookies & pastries. It provides bulk & structure to these products. Flour indicates any foodstuff which is finely powdered e.g. rice flour, soya flour; corn flour etc. when there is no specific indication of the type of flour then it refers to refined wheat flour.

Wheat grows in almost every part of the world, except in extreme climatic conditions. However, wheat flourishes best in temperate regions & the best quality comes from the American & Canadian borders under the names Manitoba, Minnesota hard winter etc. The other countries producing wheat are China, India, Australia, Iran, Turkey, U.K etc.

The commercially grown species of wheat are:

1. **Triticum Vulgare-Suitable for cake-making.**
2. **Triticum Durum-Suitable for spaghetti pasta, macaroni etc.**
3. **Triticum compactum -Suitable for bread.**

The wheat berry is made up of three parts- Bran, Germ & Endosperm.



TYPES OF FLOUR OBTAINED FROM WHEAT

1) WHOLE WHEAT FLOUR	Also called Atta in India, it is the whole milled wheat kernel. The flour is cream to brown in colour as it has the bran ground with it.
2) BROWN FLOUR	It is almost 85% of the grained millet, where some amount of bran has been extracted. It is nutritious as it has high percentage of germ.
3) STRONG FLOUR	It is a high-protein flour. The strong flour absorbs more water

	than weak flours, as gluten can absorb twice their own weight of water
4) WEAK FLOUR	Weak flour is also known as cake flour. As the name suggests, this flour has less gluten and hence, it is used for products that need a softer texture such as cookies, cakes and sponges.
5) ALL-PURPOSE FLOUR	The all-purpose flour is a blend of flours and has medium strength.

Types of (Wheat flour): -

1. **Whole wheat flour:** - has a dark colour, it consists of all parts of the grain i.e. bran, germ & endosperm. This flour has a characteristic flavour. As this flour contains the germ (oil) it will have a storage life of only 6-8 weeks.
2. **Straight flour:** - is flour from the entire endosperm. Because it contains the part nearer the bran as well as the whiter interior, the colour of straight flour is darker in colour than patent.
3. **Patent flour:** - is milled from the inner part of the endosperm. Patent flour made from hard wheat is a **strong flour** of excellent quality & light cream color. Patent flour has 11% - 13% protein content.
4. **Clear flour:** - the portion of the endosperm from the outer part of the endosperm nearer the bran thus is darker in color.
5. **Cake flour:** - is **weak or low gluten flour** made from soft wheat it has a very soft, smooth texture and pure white color. Cake flour is used for cakes & other delicate baked goods that require low gluten content.
6. **Pastry flour** – is also weak or low gluten flour, but is slightly stronger than cake flour. It has a creamy white color. Pastry flour is used for pie-dough, cookies, and muffins.
7. **All- purpose flour:** - medium quality flour which can be used for any type of baked items.
8. **Self- rising flour:** - is white flour to which baking powder (2%) & salt has been added.

- 9. High-ratio flour:** - this is highly bleached, finely milled flour, made from wheat having good quality proteins. The fine milling increases the absorption properties of flour while chlorination increases the acidity & renders the starch more soluble making it possible to have a faster set in the oven & thus minimizing the possibility of escape of leavening gas. Mostly used in cake-making.

Other flours:

TYPES OF FLOURS:

Flours are not only derived from wheat but also from other grains and seeds, it is very important for chefs to have knowledge of such flours so they can make different products with the range of flours which are healthier.

TYPES OF FLOURS OBTAINED FROM VARIOUS GRAINS

1) RYE FLOUR	Rye flour does not have much gluten content as in popular flour and hence, it is sometimes mixed in proportions with flour for the production of breads. Breads which use only rye flour are more dense and chewy.
2) SPELT FLOUR	It is quiet popular in European countries such as Germany, France and Swiss. It is a good source of vitamin B.
3) RICE FLOUR	It is finely ground polished rice with a similar texture of corn starch, usually used as a thickening agent.
4) MAIZE FLOUR	Popular in Mexico, this flour is made from cooked maize corn and then ground. It is also known as ' <i>masa harina</i> '.
5) CORN FLOUR	It is made by grinding the white heart or the germ of the corn kernel; one of the widely used thickening agents in Chinese cooking.
6) ARROW ROOT	This flour is finely milled from the arrowroot plant.
7) BARLEY FLOUR	Made from the pearl barley, it has low gluten content with mild flour.

Composition of flour

Composition of flour will vary depending upon the types of wheat used in the grist.

Starch - 71.5-74.5%,

Moisture - 13.5-14.5%,

Protein insoluble - 7-10%,

Protein soluble - 1%,

Sugar - 2.5%,

Fat - 1%, Ash - 5%

Starch:

Starch is not soluble in water but absorbs moisture through its cells, therefore it is necessary to protect flour from too humid atmosphere.

When starch is heated to about 60°C with about 6 times its weight of water, starch cells swell and the cell wall bursts. Starch becomes soluble in water and in concentrated form will form a gel. This process is known as **GELATINIZATION**. In case of bread, the water available to starch is less and the inner temperature of bread does not reach gelatinization point until the last stage of baking when it is time to take out the bread from the oven. Due to this reason the starch is partially gelatinized in bread.

Moisture –

The next important constituent of flour is moisture. If moisture in flour is higher than 13-14%, the baker will be getting less of solid material and more of water for his money. If moisture content is high then it will reduce the water absorption power (WAP) of flour, resulting in less yield.

Protein –

Flour contains soluble and insoluble proteins. Soluble proteins are useful in providing nourishment to yeast for its growth and reproduction during fermentation process. Two insoluble proteins **glutenin and gliadin form gluten when hydrated**. Glutenin gives strength to the dough in order to enable it to hold gases during baking operation and gliadin gives elasticity or stretch ability.

Sugar –

Sugars in flour consist of maltose, sucrose and dextrose.

Ash-

Ash content of flour is indicative of the degree of its purity with respect to bran fragments. Higher ash content means that flour contains too much bran fragments. Apart from darkening the colour of flour, the bran fragments have a cutting action on gluten strands which in turn will affect the volume of bread.

13.4 Raising Agent**RAISING AGENTS**

Raising agents are also known as leavening agents. Leavening is the production or incorporation of gases in a baked product to increase volume and to produce taste and texture as well as shape. These gases must be retained in the product until the structure is set enough by the coagulation of gluten and /or egg protein to hold its shape. Exact measurement of leavening agents is important, because small changes can produce major defects in baked products.

TYPES OF RAISING/LEAVENING AGENTS

Biological: Yeast

Chemical: Baking powder, Baking soda, Baking ammonia

Mechanical: Air, Steam

YEAST

Fermentation is the process by which yeast acts on carbohydrates and changes them into carbon dioxide and alcohol. This release of gas produces the leavening action in yeast products. The alcohol evaporates completely during and immediately after baking. The process of fermentation is brought about by an enzyme called zymase.

Yeast is a microscopic plant. As a living organism, it is sensitive to temperatures.

45°F (7°C)	Inactive; storage temperature
60-70°F (15-20°C)	Slow action
70-90°F (20-32°C)	Best growth, proofing temperature for dough
Above 100°F (38°C)	Reaction slows
140°F (60°C)	Yeast is killed

Yeast will contribute to flavour in addition to leavening action. There are various market forms of yeast, which are available.

Dried Yeast: is a mixture of yeast and cornflour or cornmeal, which are pressed into cakes and dried. The yeast continues to live, but in an inactive state. When furnished with warmth and moisture, it begins to develop and multiply, but this process is slow. Dried yeast has to be soaked in lukewarm water and mixed with very soft dough for a preliminary period before the other ingredients are added.

Activated Dried Yeast: This develops more rapidly than dried yeast and is the type that is most commonly used these days. It can be added straight into the flour. It is also less perishable than compressed yeast (see below). The shelf life of both dry and activated dry yeast is longer when stored in the refrigerator.

Compressed Yeast: This is a moist mixture of yeast plants and starch. The yeast remains active and will grow and multiply rapidly when added to dough. It has to be kept refrigerated and will keep well only for a few days. If held in the freezer, it retains its activity for a longer period.

CHEMICAL LEAVENERS

Chemical leaveners are those that release gases produced by chemical reactions.

Baking Soda: is the chemical sodium bicarbonate. If moisture and acid are present, soda releases carbon dioxide gas, which will leaven the product. Heat is not necessary for the reaction, although the gas will be released at a faster rate if the temperature is increased. For this reason, products leavened with soda must be baked immediately otherwise the gases will escape and the leavening power will be reduced. Acids that react with soda in a batter or dough would include honey, molasses, buttermilk, fruits, cocoa and chocolate. Sometimes, acids, such as cream of tartar are added to induce the production of carbon dioxide.

Baking Powder: is a mixture of baking soda and an acid such as cream of tartar and diluted with cornflour to give a product of the desired strength. The cornflour also serves to separate the acid and the base, thereby increasing the stability of the mixture. General proportions used are 1 to 2 tsps /500 GMS of the flour or foundation ingredients. Baking powders are more versatile since they do not depend on acids for their leavening power. Do not include more baking powder in a recipe, as it will create an undesirable flavor.

Baking Ammonia: is the chemical ammonium carbonate. It decomposes during baking to form carbon dioxide gas and ammonia gas. Only heat and moisture are required for it to work. No acid is required for reaction to take place. Baking ammonia releases gases very quickly and can only be used in small products like cookies or in products like choux pastry where rapid leavening is desired. Because it decomposes quickly, it leaves no residue, which could affect the flavor.

MECHANICAL AGENTS

Air: is incorporated in a batter primarily by two methods. This air expands during baking and will leaven the product.

1. Creaming – is the process of beating fat and sugar together. Besides breaking up the fat into minute particles, it also incorporates air into the mixture. It is an important technique in cake making and in cookie making as well. Some pound cakes and cookies are aerated entirely by this method.

2. Foaming – is the process of beating eggs, with or without sugar, to incorporate air. Foams made with whole eggs are used for sponge cakes, while meringues, angel food cakes and soufflés are aerated with only egg whites.

Steam: When water turns to steam, it expands to 1600 times its original volume. Because all baked products contain some moisture, steam is an important leavening agent. Bakery products such as eclairs and cream puffs rely on steam for aerating. If the starting temperature for the baking of these products is high steam will be produced and rapidly aerate the product.