
UNIT 8 QUANTITY FOOD PRODUCTION: KITCHEN PRODUCTION

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8.1 INTRODUCTION

In the last unit we learnt about the food production system management and control. The process of production planning, forecasting and scheduling was discussed and the role of standardized recipe as a production control tool was described. Cooking on a large scale, you would realize, is more or less similar to small-scale cookery, though it involves food on a large amount. In this unit we will learn about the general procedures and techniques used in institutional and commercial food production. Food production encompasses the preparation of large variety of items ranging from appetizer to curries, roast, sandwiches, snacks, salads, vegetables, and beverages. For each type of item, certain skills are needed and different methods of processing are required to produce different types of dishes. Along with processing techniques, different types of equipments are required for preparing the final product. In this unit we will focus on these aspects specific to quantity food production.

Objectives

After studying this unit, you will be able to:

- explain the general procedures used in institutional and commercial food production,
- describe various basic cookery process and their applications to quantity food production, and
- illustrate the type of equipments used for quantity food production.

8.2 GENERAL PROCEDURES USED IN INSTITUTIONAL AND COMMERCIAL FOOD PRODUCTION

Whenever cooking is done on large-scale considerable resources in the form of time, human and money are at stake to yield a good, acceptable end product. For this to happen, measures such as the use of standardized recipe, use of high-level mechanized items to lessen time consuming procedures for pre-preparation etc. are adopted. Often equipments like electronic ovens, microwaves, steam jacketed kettles etc. are used for mass cooking. Apart from this, once the food is prepared and cooked, care is taken to hold the dishes well before serving to prevent spoilage. These resources/measures are enumerated herewith.

Good Equipment

The use of proper equipment in top condition is of primary importance in the production of good food. Standardized measuring equipment's (cups/glasses/spoons etc.), a variety of knives, accurate scales and thermometer, and well insulated cooking range all contribute to good quality of food.

Standardized Recipes

The use of standard recipes is a prime factor in producing good products and obtaining similar results each time it is being prepared as already highlighted in Unit 7 earlier. They are particularly necessary to the person who is just beginning to develop skills in cookery.

Food Service

Not only must food be well prepared to be palatable, it must also be served with an eye to its colour and appearance. No matter how simple it is there should be something special about every food served. It is not only necessary to transfer the food from the baking or cooking dish to a platter or serving dish. Advance planning may suggest that the item should be cooked in a dish suitable for serving. A simple garnish can lift the dish out of the realm of the ordinary and make it a special creation.

Timings

To be most palatable and nutritious, food must be served as soon as possible after it has been prepared. Ideally, all food should be cooked in small quantities and for a relatively short period of time. Immediate service is frequently possible when food is prepared for an individual or for a small group but relatively difficult when it is prepared for large group. The successful handling of food in quantity is an area of food management that takes intensive study. Dishes that should be eaten cold are less than perfect if they are not served cold. Similarly, hot dishes, if they are served lukewarm and on cold plate do not present the food to full advantage.

In the discussion above, we have considered the measures basic to cooking on large-scale. Next, let us examine the process of food production itself and review the processes involved in this operation.

Before food is produced and doled out on a large scale it is essential to plan out a number of activities before final food item is laid on the table. The process of food production involves a number of interrelated activities, each dependent on the other, including collecting of ingredients, selection of foods, weighing and measuring them according to standard recipes, preliminary treatment of foods and cooking technique. These number of steps mentioned above and illustrated in Figure 8.1 describe a series of activities that each food service kitchen undergoes before production of the desired dish.

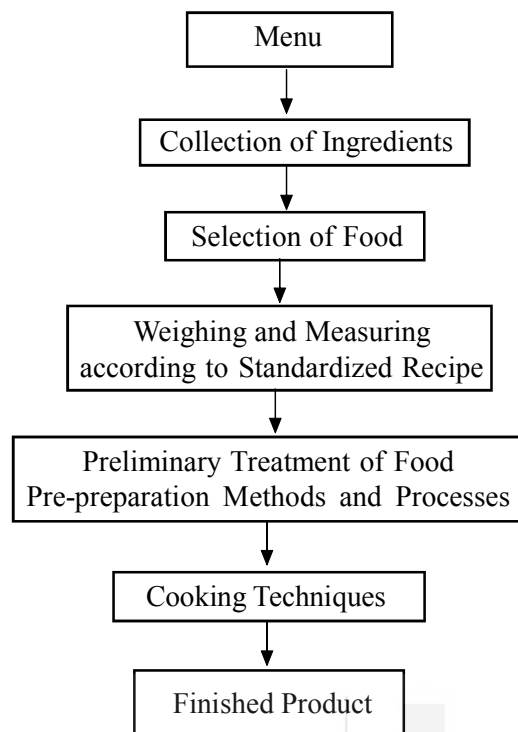


Figure 8.1: Flow chart of processes of food production

Let us get to know about these activities. We begin with the process of collecting ingredients.

8.2.1 Collecting Ingredients

In large quantity food production preparation, collection of ingredients is done on the day previous to preparation. This is because some items have to be collected from stores, while others are delivered directly to kitchen such as milk and milk products, fresh fruits and vegetable. Timely collection also enables early preparation next morning. This helps to start off the next day without wasting time, in addition to distributing work evenly throughout the day. Further, in the event of a cook or assistant being absent the next day, the work goes on as per plan making it easier for others to handle the jobs without panicking.

Next, let us review selection of food.

8.2.2 Selection of Food

The condition of food when it is brought into kitchen has a great deal to do with the results obtained. This does not mean that ingredients must be most expensive, but it does mean that all food should be fresh and at proper stage of maturity for cooking. Vegetables that have been kept for too long have deterioration and oils that are slightly rancid cannot be improved during the cooking process. Hence, selection of the right kind of food and of good quality is essential for food production.

Once the right kind of food is selected, it needs to be weighed and measured so that the right quantity is determined. This activity is described next.

8.2.3 Weighing and Measuring

In order to produce a popular dish each time it is ordered by a customer and to maintain standards of quality, it is important to weigh and measure ingredients accurately. In addition the method of combining these ingredient using the desired methods of cooking at the right temperature and suitable period of time, are essential for consistency. In other words, standard recipes are necessary for producing food in large quantity. We have already learnt about the use of standard recipes in the last unit. You might

need to adjust the recipe, particularly when we need to produce food in large quantity. The methods to use for adjustment have already been described earlier in Unit 7. Hence, according to the menu and the recipe the ingredients can be accurately weighed for the production operation to commence.

Once the ingredients have been obtained, to convert them into final products, these ingredients, food items may require preliminary treatment. Let us get to know about this activity next.

8.2.4 Preliminary Treatment of Food

Only clean food is palatable. Surface dirt is apparent and is easily removed by thorough cleaning. It is essential, however, to learn the unique characteristic of each food that is to be prepared, so that a thorough cleaning may be given. For example, a soft brush must be necessary to clean the spears of coriander leaves, which sometimes contain large amount of sand that ordinary washing will not remove. Foods that are not thoroughly cleaned fail to make their true mark on the dish later. In fact, strong food dislikes may develop because of a food that was not properly cleaned.

Another preliminary step in preparing the food that affects the finished product is mechanical treatment given to it. Refer to Figure 8.2, which highlights some of the pre-preparation methods/processes we carry out before cooking. Cutting, slicing, dicing, pounding, mashing, rolling and similar mechanical procedures must be planned systematically for the particular food item handled before cooking. Excessive chopping or mashing, for example may destroy the tenderness, texture and flavour. Unnecessary removal of beautifully coloured skins of fruits and cutting up of food into awkward sizes and shapes may have a fatal effect on finished product. Soaking may be necessary for some food such as dry fruit and dried legumes, but most dried foods are not improved by it. They become soft and lose flavour, as well as, nutritive value. In short, if care and planning go into the preliminary treatment of food, many food failures can be avoided. Poor preliminary treatment cannot be corrected later.

Seasoning also may make the food more appealing. Let us see how.

Seasoning

Some foods require little seasoning; others are improved by addition of small amounts of seasoning materials. The purpose in seasoning food is to make it more enticing. It is the utmost importance to taste food as it is being cooked. Each recipe, regardless of number of times it is prepared, will show small differences in flavour each time because the precise flavour of each ingredient making up the dish is never the same. Consequently, the food should be tasted at regular intervals so that the right amount of seasoning may be added.

Once the entire preliminary steps in preparing the food have been considered, the food is ready to be cooked. This is the final process in the food production operation.

8.2.5 Food Production to Achieve Customer Satisfaction

One of the keys to good cooking is to understand the composition and structure of the food and the chemical and physical changes that take place during cooking. Basic cooking principle must be observed for each group of food products, if good results are to be obtained. Techniques for cooking are the result of the application of cooking principle to the preparation of food. The objective of cooking food, as we all are aware, is not only to improve the digestibility of food, but also to develop and enhance the flavour and appearance of the food in terms of colour, form, texture. Cooking also helps to destroy harmful organisms and substances and at the same time conserve nutritive value. Cooking is accomplished by the transfer of heat from an energy source to and through the food. Various different cooking methods can be employed. A detail review of the different methods is presented next in section 8.3.



Figure 8.2: Pre-preparation methods and processes

But first let us take a break and recapitulate what we have learnt so far. Answer the questions given in check your progress exercise 1.

Check Your Progress Exercise 1

- 1) Process of food production involves a number of interrelated activities. Illustrate these activities in the form of a flow chart.

- 2) List the resources required for cooking at a large scale.

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- 3) Why is it essential to clean raw food items? List the pre-preparation methods/processes used in large-scale cooking.

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8.3 BASIC COOKERY PROCESS AND THEIR APPLICATION TO QUANTITY PRODUCTION

Once the food items have been pre-prepared they need to be put together to form a dish, which is attractive, aromatic, tasty and thus enjoyable to eat. Most food need to be subjected to some processing involving the application of heat, in order to make them tender, easy to digest, safe from microorganisms. The process of subjecting food to heat processing is termed as “*cooking*”. Some food need not be cooked if the desired effect required is crispness, as in salad making, or if they are used to be as accompaniments or garnishes for main dishes. The manner in which heat is applied to food during cooking determines the type of cooking methods used. The methods developed may be classified under three main heads – *moist cooking*, *dry heat cooking* and *combination methods* – as illustrated in Figure 8.3.

a) Moist Heat • Boiling • Simmering • Poaching • Stewing • Blanching • Steaming • Pressure cooking	b) Dry Heat • Roasting • Grilling & broiling • Toasting • Baking • Sautéing • Frying • Microwave cooking	c) Combination Methods • Braising
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Figure 8.3: Different cooking methods

The different methods of cooking classified under each of the three heads are described herewith. We shall begin our study of these methods starting with the moist heat methods.

The process of transferring heat from a source of food through the medium of water is called '*moist heating*'. Boiling, simmering, poaching, stewing, blanching, steaming are a few examples of moist heating as illustrated in Figure 8.3. Let us get to know these moist heat methods in detail.

- 1) *Boiling*: Boiling is cooking food by just immersing them in water at 100°C and maintaining the water at that temperature till the food is tender. Water is said to be boiled when large bubbles are seen rising constantly to the surface of liquid and then breaking rapidly. Food may be boiled in any liquid, which is bubbling at the surface such as stock, milk, juices, syrups, etc. Boiling is rarely used as the sole method of cooking. The few foods that are cooked by boiling and served as such are potatoes, eggs, sweet potatoes, rice and beetroot. Boiling of food may be done in one of the following two ways:
 - i) By bringing the water or liquid to bubbling point and then adding the food to be cooked, and allowing the liquid to bubble again till the food is done.
 - ii) By adding the food to water or liquid and heating them together to the boiling point and then maintaining the temperature till the food is tender.

Boiling as a method of cooking is generally used in combination with simmering and other methods in preparation of curries, soups, stews, sauces in food service establishments.

- 2) *Simmering*: When foods are cooked at temperature just below the boiling point of the liquid in which they are immersed, the process is known as "simmering". It is a useful method to use when food has to be cooked for long time to make it tender, as in case of cuts of meats, Indian puddings like kheer, custards etc. Using this method of cooking ensures that the food retains its shape better and the nutrient losses are minimum.
- 3) *Poaching*: This involves cooking in the minimum amount of liquid at a temperature just below the boiling point. Foods generally poached are eggs, fruits and fishes. For poaching eggs, the addition of little salt and vinegar to the cooking liquid lowers the temperature of coagulation, cooking eggs quickly and giving the poached egg a clean smooth edge.
- 4) *Stewing*: This is the gentle method of cooking in a pan with a tight fitting lid, using small quantities of liquid, to cover only half the food. The food above the liquid is thus cooked by steam generated within the pan. The liquid is brought to the boiling point and then the heat applied is reduced to maintain the cooking at simmering temperature, that is 98°C. Stewing is therefore a slow method taking 2 - 4 hours depending on the nature and volume of food being stewed. The method is generally used for cooking cheaper cuts of meat along with some root vegetable and legumes, all put in the same cooking pot and cooked to get a stock or water. The longer cooking time and lower temperature enables tougher meat fibers to become tender. The cooking of meat and vegetables together makes the dish attractive and nutritious since no liquid is discarded.
- 5) *Blanching*: In meal preparation it is sometimes necessary to peel off the skins of fruits, vegetables, nuts etc without making the food tender. This is achieved by dipping the food in boiling water for varying periods of time (5 seconds to 2 minutes) depending on the texture of food. Pouring enough boiling water on the food to immerse it for some time, or subjecting food to boiling temperature for short period of time and then immediately immersing in cold water kept ready for the purpose also does blanching. The process causes the skin to become loose and can be peeled off easily. The process helps to maintain a good texture, while improve the colour and flavour of the foods. In addition removing peel can improve digestibility, eliminates enzyme and microbial activity, and make it safe for consumption in salads, sandwiches, puddings etc.

- 6) *Steaming*: This method requires the food to be cooked in the steam generated from vigorously boiling water or liquid in a pan so that the food is completely surrounded by steam, and not in contact with the water or liquid. Steaming is generally done in special equipment designed for the purpose. Small establishments can use double boilers, while larger ones utilize pressure cookers designed to hold 16 - 20 liter of liquid, and provided with separators for steaming food. For very large establishments, steamers are available which may be simple or pressure steamers for quick cooking of large quantities of food. Food best suited is vegetables, fruits, fishes, custards, cereals and generally those, which get quickly tender. The method is ideal for making idlis, dhokla or other fermented products.

Steaming has certain definite advantage of making food more easily digestible, nutritious and full of flavour. This is because it is not necessary to add fat in this process and the food retains its nutrients better because heating temperature is constant, cooking time short and leaching minimum. Besides, it is consumed as soon as it is prepared, especially if the food is batch cooked, this prevents nutrient loss which would normally take place if the food is held for some time before being served.

- 7) *Pressure cooking*: This is a method of cooking developed on the principle that more heat is generated by steam under pressure than otherwise, and therefore cooking time is greatly reduced. Also since the steam is not allowed to escape, the volatile flavour compounds remains in the food and the shorter cooking time enhances nutrient retention and palatability. Pressure-cooking is best suited in cooking of foods, which require being moist such as curries, soups, broths, and stews. The equipment for pressure-cooking varies in its capacity to suit the needs of food services of different types and sizes, and can usually be adjusted for pressure of 5-10-15 lbs per square inch.

With a discussion of pressure cooking we end our study of the moist heat methods. Next, let us review the dry heat methods.

8.3.2 Dry Heat Method

The dry heat method involves the transfer of heat directly from the source to a food. Unlike the moist heat methods, water or moisture is not used in this method. However, fat may be used for cooking such food. Examples of dry heat methods include roasting, toasting, baking, sautéing, grilling etc. as illustrated in Figure 8.3. Let us get to know about these dry heat methods now.

- 1) *Roasting*: This is a method in which the food is brought in contact with direct heat. The food is periodically coated with fat and the pieces of food, generally meats are turned over the fire occasionally for even cooking. Roasting may be carried out using 3 types of equipment. When a 'split' containing live coal on which meat pieces are skewed together are placed and rotated at intervals using the wooden or heatproof handle on the skewer, the method of cooking is called as "*split roasting*". "Boti" kababs are placed in this manner, for split roasting, it is advisable to use small pieces of deboned pieces, and has an even brown colour with a characteristic flavour. It has high customer appeal because it is served straight from the fire and is fresh, hot and aromatic. The second type of roasting is done in an oven, either electric or an oven known as tandoor and the method is referred to as "*oven roasting*". In this the meat is placed on a mesh or slotted shelf inserted in a roasting tray, to allow the meat dripping to fall at the base. If drippings are allowed to touch the base of meat, charring or burning will take place, or part of meat will get flavour of fried meat. It is useful to moisten meat from time to time with oil.

In "oven roasting" usually large joints of full birds are cooked. The meat turns brown and crisp on the surface and moist and tender from inside. If the top is also required to be moist then the birds are best roasted with their skins. Good

roasting involves preheating the oven to 425°C first, placing the meat in it, and letting it brown for 5 - 10 minutes and reducing the temperature and allowing it to cook till tender. If only one temperature is used, then cooking at a moderate temperature of 350 - 375°C for longer cooking time gives a better product than a higher temperature for short time. This is because moderate temperature and longer cooking time ensures complete heat penetration through the food. Constant high temperature may even lead to over browning or charring and uneven cooking, with greater moisture loss resulting in a dry product. Over roasting joints after browning and then wrapping them in aluminum foil, this method retains moisture and flavour and leads to even heat penetration and cooking.

Roasting can also be done in heavy pan if small joints are to be cooked. This method is known as “pan or pot roasting”. The principle underlying the process of roasting involves sealing the meat surface through the coagulation of surface protein brought about by direct heat and high temperature. The sealing prevents further evaporation of moisture from middle of the meat, retaining its juices and natural flavour. Besides meat, root vegetables like potatoes may be roasted. In India, peanuts, popcorn, and Bengal gram are roasted in a “kadai” containing sand or salt, which are continuously heated over a source of heat.

- 2) *Grilling and broiling*: The term grilling and broiling are used synonymously for cooking by application of dry heat. The food is placed on a metal grid directly over the source of heat or on a tray placed on the source of heat. Some equipment is designed so that the food comes between electrically heated grill bars. Usually tender cuts of meat; poultry and fishes are prepared this way and browned under a grill. Cheese and preparations of cheese like pizza, cheese toast, chops, bacon, tomatoes, and capsicum are also grilled. In fact, this method of cooking has given the name to a dish known as “mixed grill” which consists of a variety of meat and vegetables. When food is cooked uncovered on heated metal or a frying pan, the method is often called as “pan broiling”.

Grilling has also been done with the use of infrared radiations reducing the cooking time. The equipment used is called the “infra-red grill”.

- 3) *Toasting*: The term toasting is used to describe the process in which the bread keeps under the grill or between two heated elements, to brown on both sides and become crisp slices. This does not imply cooking. Toasters are available which radiate heat from both the sides at the same time and can be adjusted to give the required degree of brownness through temperature control. Automatic model switch off when the present temperature and brownness is reached, and the toast pops out of the toaster automatically.
- 4) *Baking*: Food cooked by baking involves the use of an oven or tandoor-equipment in which hot air circulates around the food placed in it. While it is a dry heat method of cooking the action of dry heat is combined with that of steam, which is generated while the food is cooking. Foods baked are brown and crispy on top, and soft and porous in center. Some dishes baked are cakes, bread, puddings, vegetables, meat dishes in sauces etc.

The principle involved in baking is that the air inside the oven is heated by a source of heat, electricity, gas or wood, as in case of tandoor. The oven is insulated to prevent outside temperature from causing fluctuations in internal temperature of the equipment. In case of the traditional tandoor, the insulation is provided by a coating of mud given on the outside and inside of the galvanized iron or brick oven. The temperature of the traditional tandoor is tested, the indicator being the speed with which the water sprinkled on the inside evaporates. If this is too high sprinkling is done to reduce temperature just right for cooking of specific foods. Once the right temperature is attained, the foods are placed in hot air currents which pass over their heat to the food through the container, or directly as the case may be. The top of the food gets brown and crispy because of the direct heat on the surface of the food.

The method of heat transformation involved are radiations from the source of heat to the metal wall at the base of the oven, by conduction from the base to the other walls, and by convection through the heated air currents set up in the oven, to the food.

- 5) *Sautéing*: This method involves cooking in just enough fat or oil to cover the base of the pan. The food is tossed occasionally or turned over with a spatula to enable all the pieces to come in contact with the oil and get cooked evenly. Sautéing involves light tossing in the food in heated oil and then covering the pan with the lid, reducing the flame or the intensity of the heat applied to the pan, and allowing the food to be cooked till tender in its own steam. The product obtained in cooking is slightly moist, tender but without any liquid or gravy. Foods cooked by sautéing are generally vegetables, used as side dish in a menu. Sautéing can, however be well combined with other methods of cooking to produce variety of meals.
- 6) *Frying*: This is a method in which food to be cooked is immersed fully or partially in hot fat till it acquires a golden brown colour and a crisp feel. When foods are completely immersed in fat or oil, the method is known as 'deep frying', while the term 'shallow frying' is used when the food is only partially immersed or has only surface contact with oil or fat.

Foods are generally fried in kadai or in fryers designed for the purpose, and provided with wire nets for immersing the food in the hot fat and then draining out the excess oil from the food after the cooking is completed.

Some fried foods are fish and eggs, fried chops, cutlet, kebabs, samosas and so on. The list can be endless because fried foods are crisp, attractive, aromatic, quickly served and microbiologically safe due to high temperature at which the cooking is done.

Deep fried foods differ greatly in texture, flavour, appearance and taste. Since each food has specific quality characteristics, it is important to maintain them or enhance them in the process of frying. To do this, it is essential to know what deep-frying involves and quality can be affected for better or for worse. The factors involved are:

- i) *Selection of right frying medium*: Any fat or oil used for frying should be flavourless so that it does not mask the natural flavour of the food. The smoking point of the frying medium when fresh should not be less than 220°C and it must contain some antioxidants and stabilizers to prevent its deterioration during storage, and while in use.
- ii) *Knowledge of the right frying temperature*: Different foods require different frying temperature for best result. If higher temperatures are used more than necessary, the oil or fat breaks down and discolours the food, making it unacceptable and unpalatable.
- iii) *Use of proper frying techniques*: The proper method used in frying is vital to the quality of product obtained. If the food has been fried properly there will be minimum absorption of fat and oil by the food, making it look and taste crisp and fresh instead of stale and greasy. Foods, which look too greasy, indicate that they have been fried at too low temperature or re-fried to serve hot. Most foods require to be coated before frying in order to retain moisture and flavour, and seal in the nutrients.
- iv) *Proper care and selection of frying equipment*: Selection of the right size and design for the equipment to suit the needs of an establishment is important especially when a fryer has to be invested on. The size will be determined by the frequency with which fried foods appear on the menu and the volume of frying to be done in one lot.

- 7) *Microwave cooking*: This method involves the use of high frequency electromagnetic waves, which penetrate the food and produce frictional heat by setting up vibration within the food. Special ovens are designed for the purpose. They are fitted with a magnetron so placed as to focus the microwave on the food. The two greatest advantage of cooking by this method are quick cooking (within minutes), and the absence of heat in the oven. The later enables the dishes to remove from the oven by ease and safely without the use of clothes or gloves. The method is however only suitable for cooking or heating up small portion. It is an excellent method of reheating or finishing individual portions of food on demand, because the method does not brown the food each time it is heated, and hence retain its original colour of food. In some model of microwave oven a browning or roasting cycle has been introduced where required in finishing kitchens. In microwave cooking, it is important to keep in mind that metal reflects the microwave, while glass, plastic, paper or china transmits them to the food. It is therefore necessary to use the container that will transmit the microwave. The usefulness of microwave in self service cafeterias, kiosks, coffee shops and lunch rooms, where people eat at different times and in small groups, cannot be overemphasized. In industrial and hospital canteen where service needs to be provided for night staff, the microwave is an asset for heating up meals at odd hours, in required quantities and instantly.

Besides the dry and the moist heat methods discussed above, many a times a combination of methods are used in food production. These combination methods are reviewed next.

8.3.3 Combination Method

Combination method as the name suggests, involves the use of more than one method of cooking. The most commonly used combination method of cooking is braising which is described herewith.

Braising: This is a method in which roasting and stewing are combined for cooking. The foods are first browned or pan roasted in little oil or fat to seal off the surface, then half covered with liquid, the pan tightly closed, and the foods stewed till tender. Braising is a good method, especially for cooking meats, and lot of Indian curries is prepared in this way. Similarly, legumes and pulses can be stewed in little fat, and then pressure-cooked or steamed. Another method used of combination method of cooking is the preparation of meatball curry. In this meat is mixed with herbs, spices, onions, garlic, and Bengal gram dal, and pressure cooked till tender. The mixture is then ground to fine paste, bound together with eggs, made into balls and deep-fried. Curry is then prepared by browning onions, adding spices, tomato puree and water. The mixture is then brought to boil, and then balls are added to it. The temperature is then held just below the boiling point for minutes, and the mixture is simmered and held hot for service. It is thus seen that two or more methods may be used together in preparing a dish.

We have reviewed the different types of food preparation methods, which can be used in the food production operation. Next, we shall focus on the types of equipments commonly used in a food production operation.

8.4 TYPES OF EQUIPMENT

Equipment and utensils are absolutely essential for the efficient food production and running of any food service establishment commercial or small. Food service equipment, you may recall studying in Unit 3, sub-section 3.4.3, may include mechanical processing equipment, cooking equipment, non-mechanical equipment and/or service equipment. Determination of the needs is the first and the most important consideration for deciding the type of equipment required in any food service

establishment. The form in which the raw food material is obtained will also influence the choice of processing equipment. The number of employees and their capacity to do work will further determine the need for equipment. Decisions regarding equipment are also based on space available to accommodate them in the kitchen. We shall briefly review few common cooking, processing and non-cooking equipment required for an institution kitchen next. A detail review on equipment is presented later in Unit 16. Let us begin our review herewith the study of cooking equipment.

8.4.1 Cooking Equipment

Cooking equipment can be gas operated or electrical. Some may also be steam operated as double jacketed kettles and pots, pressure cooker etc. Some handy points to be considered while purchase of these equipment is highlighted herewith.

- 1) *Grill or griddle*: Griddle, you might be aware, is a flat metal surface, such as a pan, used for cooking by dry heat. Grill on the other hand, is a cooking surface of parallel metal bars. Points to be considered while purchasing these equipment include:
 - Size, according to the need
 - Sectional control of heat – different temperature at different part of grill at the same time.
 - Reliable thermostat controls
 - Uniform retention of heat
 - Speed of temperature recovery
 - Easy cleaning and mobility for ease of serving.
- 2) *Broiler*: Any equipment that broils is a broiler, especially a small oven or the part of the stove used for broiling. Different types of broilers are available. We may consider the following when purchasing:
 - Charcoal broilers (heat is below grids)
 - Flavour from smoke in product desirable
 - Skill required to control heat and broiling
 - Electric and gas broilers (above grids are heated)Other considerations, which are important, are as follows:
 - Select grids with adjustable height
 - Select size of slit needed
 - Height should be convenient to cooks
 - Grease trays easy to remove, baffles and fitters within easy reach for frequent and thorough cleaning
 - Proper ventilation for smoke and grease is necessary
 - “Free standing” are easier to clean and safer than those above or below range tops.
- 3) *Ovens*: An oven is a chamber or enclosed compartment for heating, baking, or roasting food, as in a stove, or for firing, baking, hardening, or drying objects, as in a kiln. The points to be considered while purchasing oven include:
 - Suitable range of temperature – 40°C to 260°C
 - Reliable temperature controls, good thermostat and insulation
 - Speed or temperature required
 - Level, easy to reach shelves
 - Each shelf should hold 45 by 65 cm bun pan
 - Appropriate capacity for work to be done
 - Easy to operation and cleaning.

- 4) *Microwave oven*: A microwave oven is an oven in which food is cooked, warmed, or thawed by the heat produced as microwaves. Microwaves passing into foods cause rapid vibration of water molecules, and food cooks and heats in a few seconds or minutes. Microwaves pass through china, plastic and paper with no effects. These materials are used to hold the food when cooking. Metals reflect microwave and should not be used in cooking in microwave ovens. The use of microwave ovens is indicated for:

- Defrosting frozen and reheating cooked foods in seconds
- Fast production of individual servings, large amounts take much longer.

Caution: - There are some dangers of radiation, especially in older models, which can be dangerous to cardiac patients with electronic pacemakers.

In this section we have reviewed some common cooking equipments needed in a food production operation. Next, we shall get to know about mechanical processing equipments.

8.4.2 Mechanical Processing Equipment

Mechanical processing equipments are basically the labour saving devices that are needed in large kitchens. Few common mechanical processing types of equipment are reviewed herewith.

Vegetable peeler: A vegetable peeler is an upright cylinder with rotating uneven disc on the bottom that throws vegetable against rough carborundum sides. Sizes may be for 4.5 - 30 kg or other round vegetable.

Revolving chopper: A revolving chopper is a round bowl with knives rapidly turning in circular motion, for chopping onions, meat, and other foods. Julienne and dicing equipment usually attaches to the above bowl-type cutter, to a mixer, or to a separate unit with various grid plates for strips of different thickness, and cross cutting blade for dicing.

Caution:-Keep hands away from bowl and the blades. Turn off before cleaning.

Vertical cutter/Mixer: A vertical cutter or mixer is large like 14 - 75 liter blender with water running through it as it operates. It chops vegetables, meats, cheese, breadcrumbs, and other foods.

Slicing Machines: Slicing machines control portion sizes, as for ham or roast beef, save labour, and provide attractive uniform slices.

Mixers: Mixers are labour savers in various areas for bakery, whipping potatoes, making mayonnaise etc. Number in kitchen varies from one in small kitchen to more than one in various areas. Size can vary in capacity from 4.75 - 135 liters.

Agitator mixers feature:

- Standard beater for mashing, creaming, blending
- Whip for egg white, whipped cream, frosting
- Dough hook for yeast breads
- Pastry knife for pastry
- Sweet dough arm for yeast mixtures with higher portion of fat and sugar.

A wide variety of processing equipments are available. Depending on the need these may be purchased for the production unit. Next, we shall review the non-cooking equipment, particularly the refrigeration equipment required in a food production unit.

8.4.3 Non-Cooking: Refrigeration Equipment

The amount of refrigerator and freezer equipment will depend on the menu and kind of fresh and frozen foods purchased. The use of refrigeration is indicated for holding or storing perishable foods, to prevent spoilage, for sanitation, and to chill foods for serving.

Design feature should include:

- Doors no bigger than necessary
- Removable and adjustable shelves for ease of cleaning and storage
- Cleaning and storage
- Self defroster
- Good insulation.

The issue of selection of equipment is so important since errors are costly and energy conservation is a prime consideration. The size or capacity of equipment to select for a given situation, as already mentioned, is determined largely by the type of menu and service offered and the quantities of different types of foods to be prepared at one time. Material for the various food service equipment should also be suitable for the purpose. The material used in the equipment will influence price, wearing quality, sanitation and suitability.

We have in this unit therefore reviewed the general procedures used in institutional and commercial food production and describe various basic cookery process and their applications to quantity food production. The types of equipments used for quantity food production have also been highlighted.

Check Your Progress Exercise 2

- 1) What are the different types of cooking methods used in quantity cooking?

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- 2) Differentiate between the dry heat and moist heat methods giving examples.

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- 3) Define the following:

a) Sauéting:

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b) Stewing:

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c) Braising:

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- 4) Name different types of equipments used in large-scale cooking and give one example of each.

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8.5 LET US SUM UP

Quantity cookery is more or less similar to small quantity food production, but the actual way of preparation may vary slightly due to large amount of food at stake when cooking on a large scale. In this unit we reviewed the various methods of cooking such as moist heat method, dry heat, method and combination method of cooking. We learnt that different types of food use various methods of cooking and food service units take special precautions to carry out all the methods of cooking at right temperatures.

With the advent of mass cooking, food industries have constantly aimed for better equipments for quick cooking, holding and service of food items. Thus, today we see a number of sophisticated mechanical instruments that aid in quantity cookery such as steam-jacketed kettle. With all these equipments, coupled with use for standardized recipes, have made quantity cooking at a mass level earlier and less time consuming.

8.6 GLOSSARY

Seasoning	:	the act or process by which something is seasoned. Seasoning may be something, such as a spice or herb, used to flavour food.
Standardized recipe	:	is a recipe which gives consistently the same result every time it is used. It gives the amount of ingredients to be used and the procedure to make the dish. It also specifies the yield, number of portions and the size of portion.

8.7 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

- 1) Refer to Figure 8.1 and present the flow chart of the processes involved in large-scale food production.
- 2) The resources required for cooking at a large scale include use of standardized recipe, use of high-level mechanized items to lessen time consuming procedures for pre-preparation etc. Apart from this, once the food is prepared and cooked, care is taken to hold the dishes well before serving to prevent spoilage.
- 3) It is essential to clean raw food items and surface dirt with the help of clean potable water to avoid contamination, spoilage and change in flavours at the time of preparation. Food not cleaned properly may have inherent smells that may raise objections in a food item.

Cutting, slicing, dicing, pounding, mashing, rolling and similar mechanical procedures are a few of the pre-preparation methods/processes used for the particular food item handled before cooking.

Check Your Progress Exercise 2

- 1) Dry heat method, the moist heat method and combination methods are commonly used in food production operation.
- 2) The dry heat method involves the transfer of heat directly from the source to a food. Examples of dry heat methods include roasting, toasting, baking, sautéing, grilling etc. The process of transferring heat from a source of food through the

medium of water is called '*moist heating*'. Boiling, simmering, poaching, stewing, blanching, steaming are a few examples of moist heating.

- 3)
 - a) Sautéing involves light tossing in the food in heated oil and then covering the pan with the lid, reducing the flame or the intensity of the heat applied to the pan, and allowing the food to be cooked till tender in its own steam.
 - b) Stewing is a moist heat method of cooking in a pan with a tight fitting lid, using small quantities of liquid, to cover only half the food. The food above the liquid is thus cooked by steam generated within the pan.
 - c) Braising is a method in which roasting and stewing are combined for cooking. The foods are first browned or pan roasted in little oil or fat to seal off the surface, then half covered with liquid, the pan tightly closed, and the foods stewed till tender.
- 4) Different types of equipments used in large-scale cooking include mechanical processing equipments (for example vegetable peelers, revolving choppers, vertical cutters, slicing machines etc.) cooking equipments (for example griddle, broilers, ovens, microwave ovens), non-cooking equipment (for example refrigerator, freezer etc.) and/or service equipments.



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