BREADS & BREAD ROLLS

6.1 INTRODUCTION

Think of eating and you think of bread. It can be in the form of a loaf baked in a bread form or a family moulded bread baked open on a baking tray. Bread includes rolls, buns and bread sticks. The ready and mouth watering aroma of a well baked bread is a very appetising sight. No continental meal is really complete without bread as an accompaniment . Bread, as we already know, is a dough of wheat flour and water, seasoned with a little salt, raised by the action of yeast and then baked in an oven. But there can be many variations to this basic bread. We can use different types of flours, e.g. whole meal flour, barley flour etc. We can also make spiced or sweetened, flavoured or enriched breads. In this chapter we are going to discuss different types of loaves and rolls.

6.2 OBJECTIVES

After reading this lesson, you will be able to :

- explain the theory related to bread making process;
- list the various raw materials used;
- explain their suitability and the purpose they perform in bread making;
- understand the common terms used in bread making process;
- describe variations like hamburger roll and fruit bun;
- describe the method for preparing plain basic bread;
- derive variatrons like milk bread, brown bread;
- identify common faults likely to occur in bread products, their causes and suggest remedies for the same.

6.3 BASICS OF BREAD MAKING PROCESS

Before you learn to make bread you must know the actual activity that happens in the dough. The four essential ingredients in bread are :

— flour
— yeast
— water
— salt.

Sugar, fat and eggs are often added for nutritional value, better flavour, colour and texture.

Breads are made by a fermentation process in which yeast, a one-cell plant, feeds on sugar and converts it into carbon dioxide gas, water and alcohol.

Yeast
↓
Sugar (*from flour*) → Carbon-di-oxide (*gas*) + Water + alcohol

The sugar required for the action of yeast comes from flour itself which contains 1% sugar, and any sugar added during preparation . The fermentation process requires sugar and proper conditions of temperature and humidity. It then results in gradual expansion of dough and finally its doubling in volume.

In addition to yeast multiplication and activity, the gluten of flour must be developed. It is the gluten which gives dough elasticity or stretch-ability which is necessary for its rising in volume. Gluten is formed from the proteins present in flour, on addition of water and salt. The process of kneading (discussed in detail later) is accomplished by considerable manipulation by hand or by machine. As bread rises during the fermentation process, the gluten stretches to form the cellular structure of the dough which should be light and porous.

Let us now discuss the **raw materials** used in bread making and their role in the whole process.

Although **Whole wheat flour** contains protein, certain qualities of wheat have higher percentage of protein. This type of wheat flour is more suitable for bread making as it develops stronger gluten.

Both **fresh compressed yeast** and **dry yeast** can be used for bread making but fresh yeast gives better results. Dry yeast, if used, should be used in 50-70% quantity of the fresh one as it is more concentrated. Also activate the dry yeast before using.

To activate yeast : Add measured quantity of yeast to little lukewarm water and dissolve properly. From the weighed quantity of flour add some to the dissolved yeast so that you get a thin paste consistency. Keep this in a warm place for 10-15 minutes. If air bubbles start coming out, yeast is ready for use. If after half an hour also, no bubbles are visible the yeast is dead and inactive and should not be used.

While sugar aids in rising of the dough, salt retards or controls gas formation. What will happen there is too little or no salt in the dough?

The dough would rises very quickly and bread will not be of good quality.

The **liquid** used for breads and rolls may be milk or water. The liquid dissolves salt, sugar and yeast and hydrates the flour. Milk is more often used in powder form as quality can be regulated better and storage is easier.

Eggs add colour and flavour, emulsify fats and produce a bread or roll of higher protein content.

Solid **shortenings** (**fats**) in the form of butter, marganine or hydrogerated fats (vanaspati ghee) act as tenderizers.

Other ingredients like cheese, onions, garlic, raisins, currants, candied fruits and peels are often added to produce different types of bakery products.

All ingredients should be weighed in correct proportions before starting. Bakery is more of a science as it is based on scieitific principles, so exact proportions and right procedures must always be followed to produce good baked products. Right temperature for the dough is 27°C or 80°F. Depending upon the atmospheric temperature you have to regulate the dough temperature by using cold water in very hot weather, tap water in normal conditions and lukewarm water in cold seasons.

Bigger professional ovens have prooving chambers attached to them, where the conditions of temperature and humidity are controlled as per the requirement of yeast. The temperature in these chambers is controlled by production of steam which also keeps the crust from drying out. If proovers are not available rolls may be prooved successfully by placing the dough on racks, near an oven, but away from air drafts.

INTEXT QUESTIONS 6.1

1. Fill in the blanks :
   a) The four essential ingredients required for bread making are ....., ..., ... and .....
   b) A living organism used in bread making process is .....
   c) Gluten is formed from ..... present in flour.
   d) The process of ..... helps in gluten development.
   e) The liquid used for bread making can be ..... or .....

f) Fat acts as a ..... in bread.

g) Fermentation is a process in which ..... acts upon ..... to form ....., water and .....

2. Tick mark (√) the right answer :

a) Fresh compressed yeast/dry yeast gives better bread products.

b) Exact/Approximate weights of raw materials should be used for making bread rolls.

c) Salt/sugar helps in increasing the yeast activity.

d) Wheat containing a high/low percentage of protein is suitable for bread making.

6.4 TERMS USED IN BREAD MAKING

There are certain terms which are used very frequently in describing the process of bread making. All those terms are explained below so that you can be familiar with these words and can also understand fully what they really mean.

1) **Dough** : A mixture of flour and liquid made into a stiff paste.

2) **Mixing** : Add the liquid to the dry ingredients slowly and mix with a wooden spoon or with one hand until a dough is formed. If using a machine mixer, mix on the slowest speed until the mixture forms a dough.

3) **Kneading** : To knead, turn the dough on to a clear work surface. Fold the dough in half towards you, then push down with the palms and heels of your hands and away from you. Give the dough a quarter turn and repeat the folding and pushing across, developing a rocking rhythm. This action develops the gluten in the dough to give a high volume loaf. At first the dough will be soft and sticky, but as the gluten develops, the dough will become smooth, elastic and no longer stickey. There is a temptation initially to add more flour to the sticky dough, but avoid this as it will make the finished loaf hard and tough. Kneading by hand is hard work and it takes about 10 minutes for a brown or whole meal bread.

   For an electric mixer with a dough hook, increase the speed a little after the dough is formed, kneading will take about half the time of hand kneading.

4. **Fermentation** : After the dough has been kneaded properly, it is kept for fermentation. Fermentation is a process whereby yeast feeds on sugar and produces carbon dioxide gas and alcohol. Carbon dioxide raises the volume of the dough and alcohol imparts a peculiar flavour. The ideal temperature for fermentation of the dough should be 78° to 80° F (25-30° C).
5. **Rising** : Rising takes place during fermentation. The dough when kept at a suitable temperature will rise to double its original volume. Place the dough in lightly oiled bowl to avoid sticking and cover with a moist duster. Duster should not be too wet. It should be squeezed well before using for covering the dough.
6. **Knocking back** : Punch the risen dough to deflate it, then knead until firm. This distributes the air bubbles in the dough to ensure a more even texture. Large bubbles of gas would make large holes in the finished bread if knocking back is not done.
7. **Prooving** : After shaping, the dough is left to rise again until double in size, light and puffy. It must be covered as for the first rising.
8. **Glazing** : After final fermentation is complete and the rolls or buns are ready to be baked they are coated with different finishes to improve their appearance. This is called glazing. The glaze is applied on the products with the help of a pastry brush.
   a) Milk : gives a slightly crusty, shiny finish.
   b) Egg : slightly beaten egg is used. It gives a golden, soft finish. One table spoon water can also be added to egg while beating.
   c) Flour : gives a soft finish. Lightly brush shaped dough with dry flour.

6.5 DIFFERENT TYPES OF BREAD AND BREAD PRODUCTS

There are many variations possible to a simple basic dough. Variations can be in the form of shapes or by addition or alteration of certain ingredients. By dividing dough into small and easily manipulated pieces, you can get a wide range of bread rolls or buns. Similarly, you can take the bread in a closed tin, open tin or on a tray to change its shape. By adding certain sweet or savoury ingredients you can radically alter the bread's taste and texture.

The breads and rolls we are going to discuss in this chapter are :

1. Bread rolls
2. Hamburger rolls
3. Fruit buns
4. Basic Bread
5. Milk Bread
6. Brown Bread

1. BREAD ROLLS

These are generally eaten with continental meals to provide the required cereal.

Ingredients needed

Flour	—	225 g
Milk powder	—	5 g
Salt	—	2.5 g
Sugar	—	10 g
Fresh yeast	—	10 g
Butter or Margarine	—	10 g
Egg	—	1 (for eggwash)

Method

1. Sieve flour and milk powder together on to a marble table top. Make a bay in the centre of the sieved flour.
2. Dissolve yeast in a little (about 40 ml) water in a mug.
3. Dissolve salt and sugar separately in another mug using about 40 ml water.
4. **Mixing the dough** : Pour yeast solution in the centre of the flour and mix with one hand. After the whole liquid has been mixed with flour add sugar and salt solution mixing in the same manner.
5. **Adjusting the consistency** : Add more water if required so that a soft shaggy mass is formed. The dough at this stage should neither be soft nor too hard. If it feels very dry and striff, mix in a little more water; if it is too loose and wet, work in some more flour.
6. **Kneading** : Once the consistency of the dough has been corrected, you have to knead it. The process of kneading has already been explained earlier.
7. **Addition of fat** : Cream butter or margarine on table top, using the heel of your hand. Mix the fat into the dough and knead again for about 5 minutes to mix fat properly.
8. **First fermentation** : Place the dough in a greased bowl and cover with a moist duster and keep the bowl in a warm place,

until the dough has doubled in bulk. The time required will vary from 45 minutes to 1½ hours.

To test that the dough has risen enough, press a finger into it. If the depression remains, filling in only very slowly, the dough is ready.

9. **Knock-back** : Turn the risen dough out on the work surface and punch it to reduce the volume. Then knead it until firm. This distributes the air bubbles in the dough and gives better texture to the finished products.

10. **Second fermentation** : Keep the dough again in the bowl, covered with a moist duster till the volume of the dough is doubled again. This time it will take 35-50 minutes.

11. **Second knock-back** : Knock-back as explained at point No. 8.

12. **Dividing the dough** : Shape the dough into a long cylinder and divide to get eight equal portions. The best method is to divide the cylinder into two and then further keep making halves till you get eight equal balls.

13. **Intermediate prooving** : Shape each dough piece into a ball using a light, even pressure with the heel of your hand and turning it in a clockwise direction, pleats, if any should be towards the bottom. Keep the balls covered with a moist duster for five minutes for intermediate prooving.

14. **Readying the baking tray** : Take a clean baking tray and grease it lightly with oil. Remove any extra oil by rubbing with paper.

15. **Shaping the balls** : Take the ball you had made first and give it a desired shape. Keep on the greased baking tray. Shape all balls and keep in rows on the baking tray with a gap of 2" on all sides. The gap between various rolls is important as they will be increasing in size and will stick to each other if enough space is not provided. This will spoil the appearance.

16. **Final Proving** : Cover the trays with duster, keep in a warm place till the rolls are doubled in volume.

17. **Egg wash** : Beat one egg slightly and using a pastry brush lightly coat the rolls.

18. **Bake** : Bake is an oven preheated to 200° C for about 20-25 minutes or till golden brown in colour.

19. **Cool** : Keep on a cooling rack for cooling and brush a little butter on top.

Round, knotted or coiled?

Bread rolls can be shaped variously and you can develop as many as your imagination permits. A few shapes are discussed here.

(i) **A simple round** : Bread rolls can be shaped as rounds which are simple and quite acceptable. You can also make a criss-cross pattern by drawing deep lines using a sharp knife before egg wash.

(ii) **Single knot** : Exerting an even pressure with both hands, role each portion if dough backwards and forwards until it is about 9" in length. Tie the strip of dough into a loose single knot.

(iii) **Double knot** : Roll the dough with both hands till 12" in length. Bring both ends towards the centre and the two adjacent single knots.

(iv) **Clover leaf rolls** : Divide one ball of dough into 3 equal parts. Make 3 rounds and place on greased tray to form a clover leaf pattern.

(v) **Coilng a turban** : Roll out a cylinder of 12" length and coil into a spiral.

(vi) **Plait** : Divide the dough into 3 equal parts and roll each one to 5-6" length. Using the three strands, tie a plait. At the beginning all 3 stands should be joind neatly and the same should be done at the end.

INTEXT QUESTIONS 6.2

1. Explain in brief
   a) Why do we knead the dough?
   b) What is fermentation?
   c) Why is knocking back important?
2. a) Why are glazes or whashed applied on bread products?
   b) Explain the commonly used glazes.

2. Hamburger Roll

These rolls are used for making hamburgers and vegetable burgers.

Ingredients needed:

Flour	—	1 kg
Salt	—	20 g
Sugar	—	50 g
Fresh yeast	—	20 g
Egg	—	1 + 1 (for egg wash)
Butter/Margarine	—	50 g

Method :

1. Dissolve yeast in a little water in a mug.
2. Dissolve salt and sugar separately in water in another mug.
3. Add one slightly beaten egg to yeast solution and mix well.
4. Sieve flour on tabletop and make a bay in centre.
5. Add salt and sugar solution and yeast & egg solution in bay of flour, mixing all the fine. Make a soft, smooth dough. Use more water if required.
6. Knead for 10-15 minutes as explained for Bread Rolls.
7. Keep in a greased bowl covered with a moist duster. Leave this in a warm place for fermentation till double in volume (about 45 minute to 1 hour).
8. Knock back and keep again in the same manner for second fermentation. Again the dough should double in volume. It will take 30 minutes approximately.
9. Knock back again and shape into a cylinder.
10. Divide into 16 equal portions. Make balls and keep on table top covered with moist duster for 5 minutes.
11. Reshape the balls into rounds and keep on greased tray at a distance of 2" from each other.
12. Covered in a warm place, keep till double in volume (approx. 25 minutes).
13. Eggwash and sprinkle seasame seeds on top.
14. Bake at 200° C for about 20-25 minutes till golden brown in colour.
15. Cool on a rack and apply a little butter on top to avoid drying.

3. FRUIT BUNS

There are generally eaten as a tea time snack.

Ingredients needed :

Flour	—	225 g
Salt	—	a pinch
Sugar	—	25 g
Milk	—	100 ml
Yeast	—	15 g
Egg	—	1 + 1 (for egg wash)
Lemon colour	—	a few drops
Lemon essence	—	1/4 tea spoon
Glazed cherries	—	20 g
Orange peel	—	20 g

Method :

1. Sieve flour and salt together.
2. Mix fat in the flour and rub in with finger tips till you get bread crumb consistently.
3. Dissolve sugar in 30 ml milk.
4. Dissolve yeast in 30 ml milk and mix egg into the same.
5. Add colour and essence to sugar solution.
6. Mix flour, sugar solution to get a soft dough.
7. Knead well till the dough becomes smooth and elastic.
8. Keep aside for first fermentation.
9. Wash, dry and chop the orange peel and glazed cherries and keep aside.
10. Knock back the dough when double in volume and mix choped peel and cherries.
11. Keep aside for second fermentation.
12. Knock back again when doubled.
13. Divide into 8 equal parts.
14. Make balls and keep for intermediate prooving for 5 minutes.
15. Shape the balls again and keep on greased tray.
16. Leave for final prooving till double.
17. Apply the egg wash.

18. Back 200°c for 15-20 minutes.
19. Cool on a cooling rack.

4. BREAD LOAF

Ingredients needed :

Flour	—	1½ Kg
Salt	—	15 g
Sugar	—	30 g
Milk powder (optional)	—	1 tea spoon
Fat	—	30 g

Method :

1. Sieve the flour and milk powder together.
2. Dissolve salt and sugar in a little water.
3. Dissolve yeast seperately in water.
4. Mix flour, salt and sugar solution, yeast solution and extra water to get a soft dough.
5. Knead till the dough becomes soft, smooth and elastic.
6. Add fat and knead again.
7. Keep for first fermentation till double in volume, approximately 50 minutes to 1½ hours.
8. Knock back.
9. Keep for second fermentation.
10. When double in volume (approximately 40 mts.) give second knock back.
11. For making a small bread weigh and separate 450 g pieces of dough. For bigger bread 900 g pieces are made.
12. Shape each piece into a ball & keep for 5-10 mts. for intermediate prooving.
13. Clean and grease the bread tin or mould. Do not forget to grease the lid. The lid should always be tight fitting to avoid overflowing of mixture in the oven.
14. **Moulding of dough**
    a) Flatten the round of dough by pressing with crossed hands.
    b) Roll the dough starting at the far edge of the flattened round of dough, using the thumbs to maintain an even shape.

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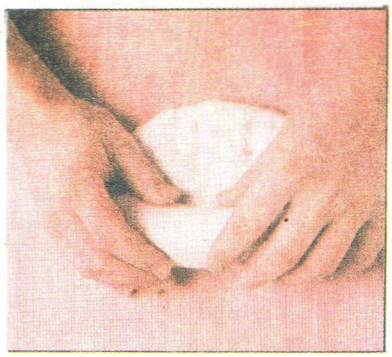

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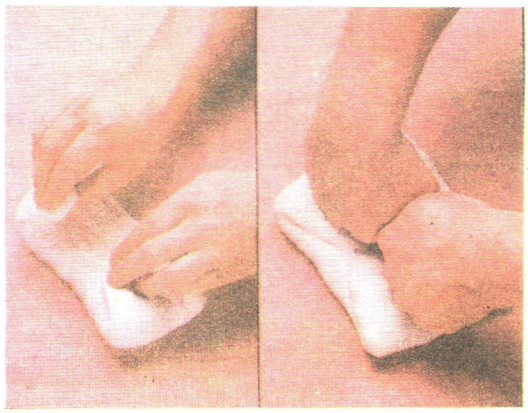

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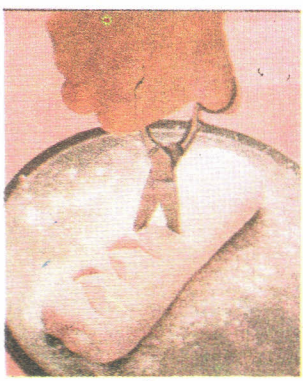

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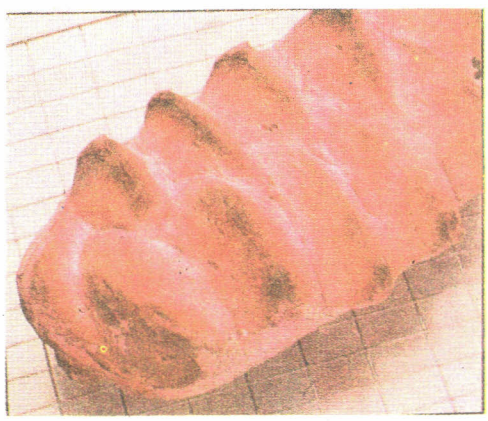

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c) Flatten the rolled dough again with palms pressing on it. Repeat while exerting an even pressure on the whole of cylinder.

d) Stretch the dough from both ends using hands and pulling slightly. Continue till almost double of original length.

e) Fold by bringing elongated ends to the centre of the cylinder.

f) With knuckles of hands press the dough firmly and spread into a rectangle.

g) Roll up the cylinder to produce a compact cylinder. The length of this cylinder should be equal to that of the bread tin.

15. Place the moulded dough in a greased mould and put the lid loosely.
16. Keep for final prooving till it is almost ready to touch the lid.
17. Cover the bread mould by fitting the lid, place on a baking tray.
18. Bake at 210° C for about 25-30 minutes.
19. The bread once fully baked, springs back on pressing by hand.
20. Unmould bread on a cooling rack and leave overnight before cutting.

5. MILK BREAD

Milk bread can be made using both milk powder and liquid milk. We are using the recipe with milk powder as that is more standard whereas milk can be of varying fat contents. Milk Bread is denser in consistency with lesser holes than plain bread but it remains softer for a longer time as it retains moisture for a longer period.

Ingredients needed :

Flour	—	300 g
Milk powder (optional)	—	24 g
Yeast	—	9 g
Salt	—	6 g
Sugar	—	12 g
Fat	—	12 g

Method :

1. Sieve flour and milk powder.

2. Dissolve yeast in little water.
3. Dissolve salt and sugar in another mug using little water.
4. Mix flour, salt and sugar solution and yeast solution to get a soft dough.
5. Knead for 10 minutes till it becomes smooth and nonstricky.
6. Mash and add fat and knead again.
7. Keep for first fermentation till double in volume about 1-1½ hour.
8. Knock back.
10. Keep for second fermentation till double in volume about 30-40 minutes.
10. Knock back again.
11. Make a ball and keep for intermediate prooving for 5 to 10 minutes.
12. Mould and put in greased bread tin.
13. Keep for final prooving for about 25-30 minutes.
14. Cover the bread mould and keep on a baking tray.
15. Bake at 200° C for about 25-30 minutes.
16. Cool on cooling rack.

6. BROWN BREAD

This is made by using both white flour and whole meal flour in equal quantities. It is very popular in western countries as it is considered nutritionally superior. Whole meal flour is richer in B-complex vitamins and certain minerals and contributes these to the brown bread. The crumb of this bread is light brown in colour and has a delicious flavour.

Ingredients needed :

Flour	—	500 g
Whole meal flour	—	500 g
Yeast	—	20 g
Salt	—	10 g
Sugar	—	20 g
Caramel	—	10 table spoon

Method :

1. Sieve flour & whole meal flour together to mix evenly.

2. Dissolve yeast in little water.
3. Dissolve salt and sugar in another mug. Add caramel. You have already learnt how to make caramel. Do you remember?
4. Mix flour, yeast solution and salt and sugar solution to get a soft dough.
5. Knead till smooth (10-15 mts).
6. Add fat and knead again.
7. Keep for first fermentation till double in volume (about 50 minutes to 1¼ hour).
8. Knock back.
9. Keep second fermentation for about 30 minutes.
10. Give second knock back.
11. Divide into 450 g balls after weighing and keep for intermediate prooving.
12. Mould and put on greased bread tin.
13. Keep for final prooving for about 30-40 minutes.
14. Cover with lid and keep on a baking tray and bake at 200 °C for 30-35 minutes.
15. Cool on a rack before slicing.

6.6 HOW TO JUDGE THE QUALITY OF BREAD

Most of the commercial bread produced in our country is the sandwich type (i.e. made in bread tin so it has a fixed shape). But for judging of quality, open loaves are better as some of the finer points may not be observed in sandwich bread.

To make a complete assessment of the qualities of bread, it should be examined both for external as well as internal characteristics.

External Characteristics :

1. Volume
2. Symmetry of shape
3. Bloom and crust colour
4. Evenness of bake
5. Oven Break

Internal Characteristics :

1. Colour
2. Structure
3. Flavour and aroma
4. Moistness

External Characteristics

1. **Volume** : The first thing to catch the eye when we see a bread, is its volume. The volume of bread should always be considered in conjunction with its weight and for a particular weight of bread, the volume should be neither too big nor too small. To much volume for the weight of bread indicates too open a texture which entails crumbiliness and early stalling. On the other hand, a small volume indicates too closed texture.
2. **Symmetry of shape** : For all open loaf symmetry of shape is very important as it makes the bread pleasant in appearance and better suited for further use. For French loaves, garlic bread, bread rolls etc., it is important to have a balance in the various parts of the baked product.
3. **Bloom and crust colour** : It requires a very fine judgement to check this characteristic. Just as a healthy plant or a healthy human beings has a different appearance from unhealthy ones, so is the natural bloom of bread different from artificially acquired shine. Bloom is the natural flush on a well baked product which is achieved by the use of good raw materials and proper processing at each stage.

   Crust colour should be a pleasant, even golden brown colour which is obtained by caramelization of sugar. Thus right amount of sugar should be available in bread after fermentation to get good crust colour.
4. **Evenness of Bake** : A good, well-baked bread should have even crust colour. The bread may not have even crust colour if the bread moulds are set too close to each other in the oven or if the oven has hot and cold spots. So keep a distance of atleast half an inch between moulds and rotate the tray or mould if required.
5. **Oven spring** : This is the expansion or rising that takes place in bread volume after it is put inside the oven for baking. It happens because in an open loaf till the crust forms there can be expansion due to expanding of gases on heating. This

ensures better volume and texture. Proper fermentation, correct moulding adequate prooving and sufficient humidity in prooving chamber are required to ensure proper oven spring.

Internal Characteristics

1. **Internal colour** : It is influenced by the type and quality of flour. But different breads made from some flour may have different internal colours as the visual effect of whiteness of bread crumb is decided by the amount of light reflected. If more light is reflected bread appears whiter whereas more absorption of light makes the bread crumb appear darker in colour. A proper crumb structure with small evenly distributed holes in required for properly reflection of light.
2. **Structure** : If you observe the crumb structure of different kinds of bread products closely, you will find that shape and size of gas cells varies considerably e.g. plain white bread has oblong small gas cells which are evenly distributed throughout the crumb, while a French loaf will have round cells of uneven size. Structure of different kinds of bread products varies due to difference in formulation and processing. The internal structure of bread, should be as per its formula and should have right sized holes.
3. **Flavour and aroma** : You would fully enjoy a bakery product only when it has matching aroma. No cake, cookie or bread can be enjoyed thoroughly if suitable flavour is not present. An underfermented bread lacks aroma whereas over fermented one will have strong, sourish flavour.
4. **Moistness** : Quality of freshness of bread is judged by the degree of its moistness. Moistness is influenced by the condition of gluten and starch in the bread and not by the amount of total moisture presence in the bread. Some of the bread making ingredients e.g. salt, sugar, fat etc. help in retaining moisture in the bread. Improperly prooved or stale bread is dry in texture. Right amount of moisture provides required elasticity to to bread and that helps in proper and neat slicing of bread.

6.7 BREAD FAULTS AND THEIR REMEDIES

A thorough knowledge of raw materials and the functions they perform and the bas bread making procedure is a must to be able to bake a good brea or roll. It is necessary to control the temperature, humidity and timing at different stages of bread making. A

skilled baker should examine the bread carefully and by reasoning and then experimentation, he should be able to detect the cause of fault and subsequently find the solution.

Here, we are going to discuss the common faults and remedies so that you can examine your products and improve upon them.

i) **Too small a volume** : This means bread or bread roll has not risen enough. it could happen due to any of the following causes:
   a) Too tight a dough or less water
   b) Too little yeast
   c) Less fermentation time given to the dough
   d) Too cold a dough
   e) Excess salt
   f) Oven temperature too high

2. **Excessive volume in bread** : It is the exact opposite of first point, i.e. the roll or bread has risen too much
   a) Too slack a dough or to much water
   b) Lack of proper temperature in the oven
   c) Lack of salt in the recipe
   d) Excess of yeast
   e) Too much time given for prooving
   f) Loose moulding.

3. **Crust colour not right** : Crust colour should be golden brown. It is controlled by the amount of sugar present in the dough at the time of baking and temperature of the oven.
   i) Pale brown colour could be due to :
      a) Excessive fermentation time
      b) Lack of salt
      c) Too high dough temperature
      d) Excess yeast
   ii) Too dark reddish brown colour could result due to
      a) Too much salt
      b) Too cold dough or fermentation temperature too low.
      c) Too tight a dough

4. **Cracks or breaks in buns, rolls or bread**
   a) Under fermentation
   b) Under proofing

c) Oven temperature too high

5. **Over moist or stricky crumb** : In this case when you cut the bread, the interior will be too moist or sticky

   a) Proofing or baking in excessive humidity.
   b) Bread is under baked.

6. **Rapid drying or staling of bread** : This means that moisture retention is less and crumb will become dry very quickly.

   a) Baking in a cool oven for a longer time.

   b) Temperature of dough is too high.

   c) Too tight dough

6.8 BREAD DISEASES

The two diseases which affect bread are

(i) Rope

(ii) Mould.

These diseases are particularly prevalent in warm and humid weather i.e. April to August in most parts of our country.

(i) Rope

Rope is caused by a bacteria — *Bacillus mesentericus vulgatus* found in soil. It comes into the bread from improperly washed wheat or unhygienic conditions in bakery.

Bread develops a peculiar smell (sickening, sweet like rotten fruits), gets discoloured and may become a little sticky. Later on, smell and stickiness increases. When an infected slice is broken, it looks as if a number of threads are entwined in it. Very heavy infection may almost liquify the crumb.

Prevention : To prevent rope, an acidic medium is required. Acetic acid of 10% strength can be added at the rate of one percent based on flour.

Calcium propionate at the rate of 0.1% (based on flour) can also be used. It can be increased slightly but too high levels of Calcium propionate will elongate the prooving time of bread.

Utmost hygiene is important to prevent rope. There should be no accumulation of dı on equipment, utensils and the premises. Underbaked, overm. ist bread is also likely to get ropy faster. So proper prooving and baking and cooling of bread are important

before packaging. Ideal temperature and humidity for storage are 70-95°F and 65-75% respectively.

(ii) Mould

Spores of various kinds of moulds are always present in the atmosphere and they start growing on finding suitable conditions of temperature and moisture in the crumb of bread. Spores enter through the cracks on surface of bread. Normally three kinds of moulds are found in bread :

i) White — due to *Mucor mucedo*
ii) Greenish or bluish — due to *Penicillium*
iii) Black — due to *Aspergillus niger*

Prevention : Precautionary measures required against mould are the same as in the case of 'rope', i.e. general clealiness, good ventilation, avoidance of warm and humid conditions, thorough cooling of bread and increasing the acidity of dough.

Now that you know the faults that can arise in bread making, you will agree that it is, indeed, an art to bake a good bread or roll.

INTEXT QUESTIONS 6.3

1. What do you understand by the term 'moulding'?
2. What are the differences in plain white bread, milk bread and brown bread?
3. Give reasons for :
   i) Finding the crumb sticky and moist.
   ii) Too light colour of the crust of bread.
   iii) While baking cracks in the buns.
   iv) Too much rising in volume and hard texture of rolls.

ANSWERS TO INTEXT QUESTIONS

6.1 1. a) Flour, yeast, liquid, salt
b) Yeast c) Proteins d) Kneading e) Water, milk
f) Shortening g) Yeast, sugar, carbon dioxide, alcohol
2. a) Fresh compressed b) Exact c) Sugar d) High

6.2 1. and 2. Refer to the text please.

6.3 Please refer to the text.