



Participant Handbook

Sector
Food Processing

Sub-Sector
Bread and Bakery

Occupation
Processing

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NSQF Level 4



Craft Baker

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L-29, 1st Floor, C/o. Awfis,
Outer Circle, Connaught Place (Above Haldiram's)
New Delhi - 110001
Email: admin@ficsi.in
Web: www.ficsi.in
Ph. no.: 011 65001273

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FOOD INDUSTRY CAPACITY AND SKILL INITIATIVE SECTOR SKILL COUNCIL

for

SKILLING CONTENT - PARTICIPANT HANDBOOK

Complying to National Occupational Standards of
Job Role/ Qualification Pack: '**Craft Baker**' QP No. '**FIC/ Q5002 NSQF Level 4**'

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About this Book

In India, the food sector has emerged as a high growth and high profit sector. Food and grocery account for about 31% of India's consumption basket. The Indian food and grocery market is the world's sixth largest. A craft baker has huge employment opportunities.

This Participant Handbook is designed to enable theoretical and practical training to become a Craft Baker. The qualification pack of a Craft Baker includes the following National Occupation Standards which have been all covered in this Participant Handbook

1. Prepare and maintain work area and machineries for producing baked products in artisan bakeries and patisseries
2. Prepare for food production of baked food products in artisan bakeries and patisseries
3. Produce baked products in artisan bakeries and patisseries
4. Documentation and recordkeeping
5. Food safety, hygiene and sanitation for processing food products

This Participant Handbook is designed considering the minimum education qualification of a Craft Baker is preferably 8th standard. The Key Learning Objectives and the skills gained by the participant are defined in their respective units. The participant will be able to produce baked products in artisan bakeries and patisseries. He will also be able to follow food safety practices, hygiene and sanitation for processing food products

We hope that this Participant Handbook will be able to provide a sound learning support to our young friends to aspire to build their career in the food processing sector.

Symbols Used



Key Learning Outcomes



Unit Objectives



Steps



Exercise



Summary

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3. Raw Materials

Unit 3.1 – Overview: Raw Materials and Ingredients

Unit 3.2 – Details of Raw Materials and Ingredients



Key Learning Outcomes

At the end of this module, you will be able to:

1. List preferred quality parameters for raw materials and ingredients
2. Identify raw materials and ingredients

UNIT 3.1 - Overview: Raw Materials and Ingredients

Unit Objectives

At the end of this unit, you will be able to:

1. Explain preferred quality parameters for raw materials and ingredients
2. Identify raw materials and ingredients

3.1.1 Basic Quality Parameters of Raw Materials and Ingredients

A craft baker bakes products such as, breads, puffs, cookies, cakes/ pastries, desserts, special baked products, etc. The quality of these products depends on the quality of the raw materials used. There is a wide variety of raw materials used to produce the aforementioned products. Hence, it is imperative for a craft baker to know the physical parameters of raw materials being used in the production process.

Basic quality parameters of raw materials

The table below shows most common physical parameters that can help a craft baker to choose the right kind of raw materials for the production process.

Physical parameters	Description
Appearance	
Colour	
Taste	
Odour	
Weight	

Adulterant	
Contaminants	

3.1.2 Raw Materials and Ingredients

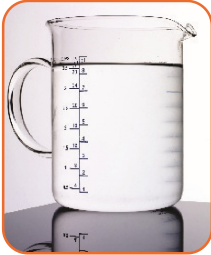



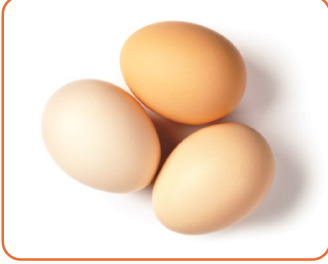
Some of the most common raw materials used by a craft baker are:

- Flour
- Yeast
- Water
- Salt
- Sugar
- Milk and milk products
- Eggs
- Baking powder

Flour		
Yeast		

Fig. 3.1 Flour

Fig. 3.2 Yeast

Water		 <p>Fig. 3.3 Water</p>
Salt		 <p>Fig. 3.4 Salt</p>
Sugar		 <p>Fig. 3.5 Sugar</p>
Milk and milk products		 <p>Fig. 3.6 Milk and milk products</p>
Eggs		 <p>Fig. 3.7 Egg</p>

UNIT 3.2 - Details of Raw Materials and Ingredients

Unit Objectives

At the end of this unit, you will be able to:

1. Explain the preferred quality parameters for raw materials and ingredients used
2. Identify raw materials and ingredients

3.2.1 Flour

Flour is the most common raw material used in the production of bakery items. There are various types of flour. Some of them are listed below:

- Bread flour
- Buckwheat flour
- Cake flour
- Coconut flour (gluten free)
- Corn flour (gluten free)
- Instant flour
- Millet flour (gluten free)
- Oat flour (gluten free)
- Organic flour
- Pastry flour
- Rice flour (gluten free)
- Almond flour
- Barley flour (low gluten)
- Sorghum flour (gluten free)
- Soy flour (gluten free)
- Whole-wheat flour (low gluten)



Fig. 3.8 Different types of flour

Gluten is one form of protein. It is found in grains such as, wheat, barley, rice, etc. Gluten gives consistency to the dough.

Gluten causes inflammation in the small intestine if an individual is suffering from celiac disease. It is the primary cause of celiac disease. It is recommended to avoid gluten if one is susceptible or suffering from related diseases.

Some common types of flour used in baking are:

All-purpose flour (Maida)

- Blend of soft and hard wheat.

- 8-11% of gluten is present in all-purpose flour.
- All-purpose flour is broadly classified as bleached and unbleached.
- Bleached all-purpose flour is used for the production of cookies, quick breads, waffles, etc.
- Unbleached flour is used to produce yeast breads, pastry, strudel, cream puffs, etc.

Self-rising flour

- White flour to which baking powder is already added.
- Sometimes, salt is also added to it.
- Baking powder is distributed uniformly in it.
- However, since different recipes require different amount of baking powder, one has to use it wisely and make adjustments as per the recipe.

Whole-wheat flour

- Usually made with grinding the entire wheat kernel (grain) including the bran and germ.
- This has higher fat content and therefore can spoil faster as the fat deteriorates and goes rancid.
- Bread made with whole-wheat flour is heavier than white bread. Sometimes, it is mixed with white flour.

Bran flour

- This is flour to which bran flakes have been added.
- The bran may be added for nutritive value to add fibre to the products or this may be to achieve the right product texture and look. It may also be used to balance a recipe.
- The bran may be fine or coarse depending up on the specification.



Fig. 3.9 Bran flour

Storage of flour

The following points must be kept in mind for storing flour:

- It must be stored in a cool and dry place.
- The flour should be stored in refrigerators during summer.
- Whole-wheat flour should be stored in the refrigerator round the year. Natural oils react with whole-wheat flour, making it unsuitable for use over the time.
- It is not advisable to mix old and new flour.
- Do not store flour near soap powder, onions or other food items and products with strong odours.

- If freezer space is available, flour can be repackaged in airtight, moisture-proof containers, labelled and placed in the freezer at 0 degrees F.
- Flour should never be stored for a long time.

3.2.2 Water

Water acts as a solvent in dough preparation. Measured volume of water should be added to get the right kind of dough. More or less water will definitely affect the quality of the dough.

Water is classified based on its characteristics, such as:

- Soft water
- Hard water
- Alkaline water
- Acidic water

Role of water in dough preparation

Water or a substitute liquid is usually an integral part of baked goods. The role of water in baked goods is as follows:

- Aids in the formation of gluten.
- Gluten controls consistency of dough.
- Acts as a solvent and dispersing agent (for salt, sugar, and yeast).
- It is necessary for yeast fermentation and reproduction. Softer doughs will ferment more quickly than dry doughs.
- The temperature of water can be varied in order to obtain dough of the correct temperature.

Various parameters of water and its impact on baked goods is listed below:

Hardness of water

- Hardness or softness of water represents the amount of calcium and magnesium ions in water, expressed in parts per million (ppm).
- Hard water has over 200 ppm of ions.
- Soft water has less than 50 ppm of ions.
- Water of medium hardness, with about 100 to 150 ppm of minerals, is best suited to bread baking.
- Minerals in water provide food for the yeast, and therefore can benefit fermentation.
- If water is excessively hard, there will be a tightening effect on the gluten, as well as a decrease in the fermentation rate (minerals make water absorption more difficult for the proteins in the flour).

- If water is excessively soft, lack of minerals will result in a dough that is sticky and slack.
- Most water is usually neither too hard or too soft, and if water is drinkable, it is considered suitable for bread baking.

Degree of acidity

The degree of acidity, expressed as pH (potential hydrogen), also has an effect on fermentation. In terms of alkaline or acidity, the pH is measured on a scale of 0 to 14. The lower the pH, the more acidic the solution. The higher the pH, the more alkaline (or base) the solution.

Pure water is neutral. When an acid is dissolved in water, the pH will be less than 7. When a base or alkaline is dissolved in water, the pH will be greater than 7.

- Hard water is more alkaline than soft water, and can decrease the activity of yeast.
- Water that is slightly acidic, (pH a little below 7) is preferred for bread baking.

3.2.3 Yeast

Yeast is the leavening agent. Leavening is the process of fermentation that causes the dough to expand or rise. Fermentation is the process by which yeast acts on sugars (added and already in the flour), and releases carbon dioxide gas and alcohol. The release of carbon dioxide produces leavening action in yeast products. The alcohol evaporates during and after baking. Yeast also adds flavour to the product.

Yeast is available in three forms:

1. **Fresh or compressed yeast**, usually available in cake form. It is moist and has a low shelf life. This is preferred by professional bakers.
2. **Instant yeast**, also called quick rise yeast, is dry and in the form of granules. This is used as it is in the product and has high absorption rate due to which it does not need to be dissolved in water before use as is done in the third form of yeast, active dry yeast.
3. **Active dry yeast** is also dry and in the form of granules. It must be dissolved in water before use. Usually this dissolved yeast and water are directly added to the product as indicated in the recipe. The water quantity in the recipe will have to be adjusted according to the water used along with the yeast to not overhydrate.



Fig. 3.10 Forms of yeast

Other leavening agents include baking soda or sodium bicarbonate, baking powder, air, steam, etc.

3.2.4 Salt

Salt is a very important ingredient in baked products. Apart from being a seasoning that impacts taste, it inhibits yeast growth, thereby preventing over fermentation of the dough. It also helps achieve the right texture as it strengthens the gluten structure and makes it more stretchable. It is important therefore not only to arrive at the right amount of salt to put in the dough, but also when it should be put into it.

3.2.5 Sugar

Sugar has the following impact on baked products:

1. Adds sweetness to the taste.
2. Provides food to the yeast causing fermentation to take place.
3. Impacts the colour through caramelization.
4. Weakens the gluten structure, therefore impacts texture of the product.
5. Sugar is hygroscopic i.e. it attracts and retains moisture. This helps in keeping a product fresh.
6. It also acts as a creaming or foaming agent to dissolve and support egg formations.

Sugar is commonly available and used in bakery products in different forms, such as:

1. Granulated sugar
2. Fine or very fine sugar
3. Powdered or icing sugar
4. Brown or demerara sugar



Fig. 3.11 Forms of sugar

Sugar may also be used as a syrup in some cases or caramelized. In some recipes, other syrups are used with or in place of sugar. These may be corn syrup, honey, malt syrup, glucose syrup, etc.

3.2.6 Milk and Milk Products

Milk is the other liquid used most commonly in a bakery. Milk not only contributes to the product texture, flavour and colour, but also to the nutritive value of the products.

Milk is available in different forms and with different fat specifications. This is important for a baker to know as this impacts and changes recipe composition.

Buffalo milk and cow milk are the most common. Buffalo milk is high on fat, almost twice as high as that of cow milk. It is higher in saturated fat and overall calories. Cow milk has 3.5-4% fat and buffalo milk up to 8%.

Milk is usually available with the following specifications:

1. **Full cream or whole milk:** Usually 3.5% fat and 8.5% non-fat milk solids and 88% water.
2. **Toned milk:** This refers to milk obtained by the addition of skim milk powder and water to whole milk. Under PFA (Prevention of Food adulteration) rules, toned milk should contain a minimum of 3.0% fat and 8.5% non-fat solids.
3. **Double toned milk:** This refers to milk obtained by the addition of skim milk powder and water to whole milk. Under PFA (Prevention of Food adulteration) rules, Double toned milk should contain a minimum of 1.5% fat and 9% non-fat solids.
4. **Skimmed milk:** This has almost all its fat content removed, usually 0.5% or less.
5. **Fortified milk:** Usually with vitamin D or other additions.
6. **Condensed milk:** This is sweetened, and has water evaporated.
7. **Dried milk:** This is available in powder form.

Other milk products used commonly in a bakery are cream, butter, butter milk, yoghurt or curd, cheese, etc.

Cream

Cream is a dairy product composed of higher-butterfat layer skimmed from the top of milk. Some of the types of cream used in bakeries include:

- Double cream is cream with a fat content of around 48%. This is used for pouring over fruit and puddings. Also used in cooking or whipped and incorporated into dishes or served separately.
- Whipped cream is made by whisking or mixing air into cream with more than 30% fat to turn the liquid cream into a soft solid.
- Sour cream, common in many countries including the U.S., Canada and Australia, is cream (12 to 16% or more milk fat) that has been subjected to a bacterial culture that sours and thickens it.
- Crème fraiche, contains 28% milk fat, is slightly soured with bacterial culture, but not as sour or thick as sour cream.

Butter

Butter is made by churning cream to separate the butterfat and buttermilk. This can be done by hand or by machine. Butter usually comes in the form of salted or unsalted, and may be pasteurized or unpasteurized. While using salted butter, one has to factor in the impact of salt as well. Butter is usually substituted for other shortening fats, which achieve the same objective.

Shortenings is a term given to any group of solid fats that are especially used for baking, generally including vegetable and animal fats. The main function of butter or shortenings is to:

- provide flavour
- moisten the product and give it a tender and soft texture
- improve quality
- provide flakiness through layering, for example, puff pastry
- serve as a creaming agent and support leavening

A common form of shortening is margarine, which is available for different purposes, such as baking cakes and pastries.

Buttermilk

This can be natural (by-product of making butter) or made by adding a bacterial culture to skimmed milk. This is used in products where there may be a need to add sour milk.



Fig. 3.12 Buttermilk

Yoghurt or Curd

These are made by adding bacterial culture to milk. These may have additions of milk solids and may be flavoured, salted or sweetened.

Cheese

Cheese is derived from milk, and is of a wide range of flavours, textures, and forms. Cheese may be classified based on type of milk, hardness, age, place of origin, etc. It is produced by coagulation of the milk protein casein. It comprises proteins and fat from milk, usually the milk of cow, buffalo, goat or sheep.

Various kinds of cheese include:

Milk based cheese

- Cow's milk cheese – Ricotta
- Goat's milk cheese – Boursault, Chevre
- Ewe's milk cheese – Feta
- Buffalo's milk – Mozzarella
- Raw milk cheese
- Skimmed milk cheese
- Pasteurised milk cheese



Fig. 3.13 Different types of cheese

Texture and hardness based cheese

- Soft cheese – Camembert and Brie
- Medium soft – Monterey Jack, Mozzarella, Gouda and Colby
- Medium hard – Cheddar, Edam, Emmenthal, Gruyere and Raclette
- Hard cheese – Parmesan, Pecorino and Romano
- Blue vein cheese – Gorgonzola, Stilton and Roquefort

Country wise cheese

- Netherlands or Holland – Edam and Gouda
- Italy – Ricotta, Parmesan, Gorgonzola, Mascarpone and Mozzarella
- England – Cheddar and Stilton
- France – Brie, Roquefort and Camembert
- Switzerland – Emmenthal, Gruyere and Raclette
- Greece – Feta
- American – Monterey Jack, Philly and Colby

Other categories

- Fresh cheese – Ricotta, Cottage Cheese, Paneer and Mascarpone
- Processed cheese – Plain or flavoured (herbs, pepper, etc.)
- Stretched cheese – Mozzarella

Commonly available brands are Amul, Britannia, Go, etc.

3.2.7 Eggs

Eggs usually used in bakeries are from chicken hens. A whole egg consists of a yolk, egg white, a membrane and a shell. Eggs are usually considered in recipes according to the the following specifications:



Fig. 3.14 Egg

Weight of whole egg	47 -50 gm
Egg yolk	28 gm
Egg white	19 gm

Various functions of eggs in various baked products apart from adding flavour and impacting taste include:

- Help in emulsification i.e. producing well-mixed and smooth batters and pastes for a good volume and a smooth, even texture.
- Act as leavening agents when beaten, trapping air.
- Egg protein when coagulates, toughens up to help give a stronger structure to the products.
- Provide moisture to baked products, which helps in keeping them fresh and improving quality.
- Give a lustrous look and colour when used in glazes, etc.
- Add to nutritional values of the products.

3.2.8 Baking Powder

Baking powder is a common leavening agent used in many bakery products. Baking powder usually includes baking soda, starch and an acid component. Baking powder are of different varieties - one where heat is required and the other where mere moisture is enough to release the gas. They go by the name of double acting and single acting baking powders respectively.



Fig. 3.15 Baking powder



Summary



A. Basic quality parameters of raw materials:

Physical parameters
Appearance
Colour
Taste
Odour
Weight
Adulterant
Contaminants

B. Common raw materials used by a craft baker:

Raw materials
Flour
Yeast
Water
Salt
Sugar
Milk and milk products
Eggs
Baking powder

C. Classification of water:

Soft water
Hard water
Alkaline water
Acidic water
Saline water

Summary



D. Types of flour:

Bread flour	Whole-wheat flour (low gluten)
Buckwheat flour	Soy flour (gluten free)
Cake flour	Sorghum flour (gluten free)
Coconut flour (gluten free)	Barley flour (low gluten)
Corn flour (gluten free)	Almond flour
Instant flour	Rice flour (gluten free)
Millet flour (gluten free)	Pastry flour
Oat flour (gluten free)	Organic flour

E. Various kinds of cheese:

Milk based cheese	Texture and hardness based cheese	Country wise cheese
Cow's milk cheese – Ricotta	Soft cheese – Camembert and Brie	Netherlands or Holland – Edam and Gouda
Goat's milk cheese – Boursault, Chevre	Medium soft – Monterey Jack, Mozzarella, Gouda and Colby	Italy – Ricotta, Parmesan, Gorgonzola, Mascarpone and Mozzarella
Buffalo's milk – Mozzarella	Hard cheese – Parmesan, Pecorino and Romano	France – Brie, Roquefort and Camembert
Raw milk cheese	Blue vein cheese – Gorgonzola, Stilton and Roquefort	Switzerland – Emmenthal, Gruyere and Raclette

Exercise



Q1. Match the following

1	Flour	Provide strength and flavour to any bakery product	<input type="checkbox"/>
2	Yeast	Main solvent that provides solubility, and impacts the consistency of the dough or batter	<input type="checkbox"/>
3	Water	Controls yeast fermentation and toughens the dough	<input type="checkbox"/>
4	Salt	Produces carbondioxide (Co ₂) to raise the dough	<input type="checkbox"/>
5	Sugar	Improves texture of bakery products	<input type="checkbox"/>
6	Milk and milk products	Major raw material required for any bakery product	<input type="checkbox"/>
7	Eggs	Provides golden brown appearance of any bakery product	<input type="checkbox"/>

Q2. Fill in the blanks.

- Appearance comprises physical parameters such as, _____, _____, _____ and _____.
- It is important to avoid raw materials with that smell _____
- _____ weight raw materials should be selected for baked products.
- Contaminants are defined as _____ substances.

Q3. Place the appropriate options in the correct category.

Used to produce yeast breads, pastry, strudel, cream puffs, etc. - - May be fine or coarse
 - - Baking powder is distributed uniformly in it - - Bread made with it is heavier than white bread - - Adds fibre to the products - - Blend of soft and hard wheat - - Salt is also added to it - - Has higher fat content

Exercise



All-purpose flour	Self-rising flour	Whole-wheat flour	Bran flour

Q4. Label the different types of yeast in the picture below.



Q5. List the specification of different types of milk .

Skimmed milk	
Condensed milk	
Double toned milk	

Exercise



Full cream or whole milk	
Fortified milk	
Dried milk	
Toned milk	

Q6. Match the following.

1	Netherlands or Holland	Brie, Roquefort and Camembert	<input type="checkbox"/>
2	Italy	Emmenthal, Gruyere and Raclette	<input type="checkbox"/>
3	England	Feta	<input type="checkbox"/>
4	France	Monterey Jack, Philly and Colby	<input type="checkbox"/>
5	Switzerland	Cheddar and Stilton	<input type="checkbox"/>
6	Greece	Ricotta, Parmesan, Gorgonzola, Mascarpone and Mozzarella	<input type="checkbox"/>
7	American	Edam and Gouda	<input type="checkbox"/>