

# THEORY OF FOOD

## BOOK 2

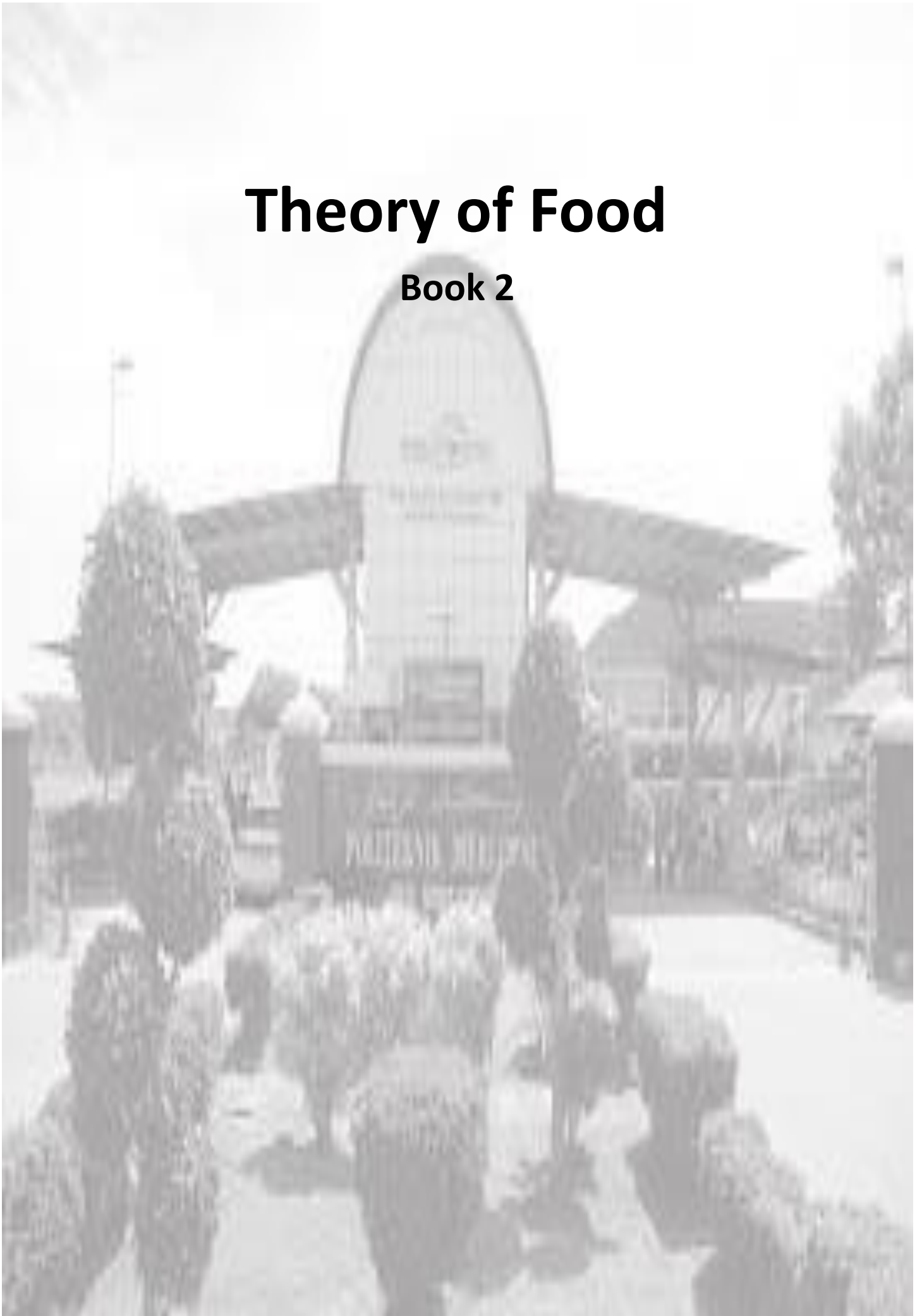


**MUHAMMAD RASLAH AIMAN MOHAMAD  
MAISARA ZAINAL ABIDIN  
ABDUL RAZAK WARI**



# Theory of Food

## Book 2





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**Published in 2022**

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THEORY OF FOOD. BOOK 2 / MUHAMMAD RASLAH AIMAN MOHAMAD,  
MAISARA ZAINAL ABIDIN, ABDUL RAZAK WARI.

Mode of access: Internet

eISBN 978-967-2762-31-7

1. Food service.
  2. Flour.
  3. Cooking (Oils and fats).
  4. Cooking (Sugar).
  5. Government publications--Malaysia.
  6. Electronic books.
- I. Maisara Zainal Abidin. II. Abdul Razak Wari.  
III. Title.  
642

**Published by:**

Politeknik Merlimau, Melaka  
KB1031 Pej Pos Merlimau,  
77300 Merlimau Melaka



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## **Acknowledgement**

First and foremost, praise and thanks to Allah the Almighty, for His showering of blessings, we are able to complete our second book project, and I hope the will be able to produce more books in the future. We hope that the readers will continuously benefit from this book as guidance and knowledge In shaa Allah. I would like to express our deep and sincere gratitude to the e-learning team of Politeknik Merlimau for this opportunity and providing guidance throughout our journey in this project. By providing some courses and seminar, we realise that by writing we can continuously spread the knowledge to many readers especially our students. To the writer team, all of us are so great that we are able to give cooperation and contribution of knowledge, energy and find many sources to make sure all of the tasks can be done. Congratulation to us. Thanks also to our family members for their love, prayers, caring and give moral supports that we can complete this book project.

Lots of love to all.



## **Preface**

Knowledge in food and cooking is crucial when one involve in foodservice industry. Although one can search many information in the internet however for some people need a book as their references. Digital book is becoming the new trend in gathering information and knowledge. As digital book is trending today, it is convenient and easily stored in our phone, tablet or computer as reader will always have this book with them. This Theory of Food Book 2 consists of 1 chapters which is ingredients that summarises the role, types, composition, and functions of flour, starch, fats, and sugar. This Chapter will discuss about the stated ingredients above to give the necessary knowledge to the reader especially students in Culinary studies and also for those who are in the hospitality and food-related field. This process can be used as guidance for many cooks and planning throughout their production session. By using this book, it is hoped that readers and hospitality students will possess the knowledge and skills, as well as right attitude, and thus are able to understand and performs any tasks given in their daily life.



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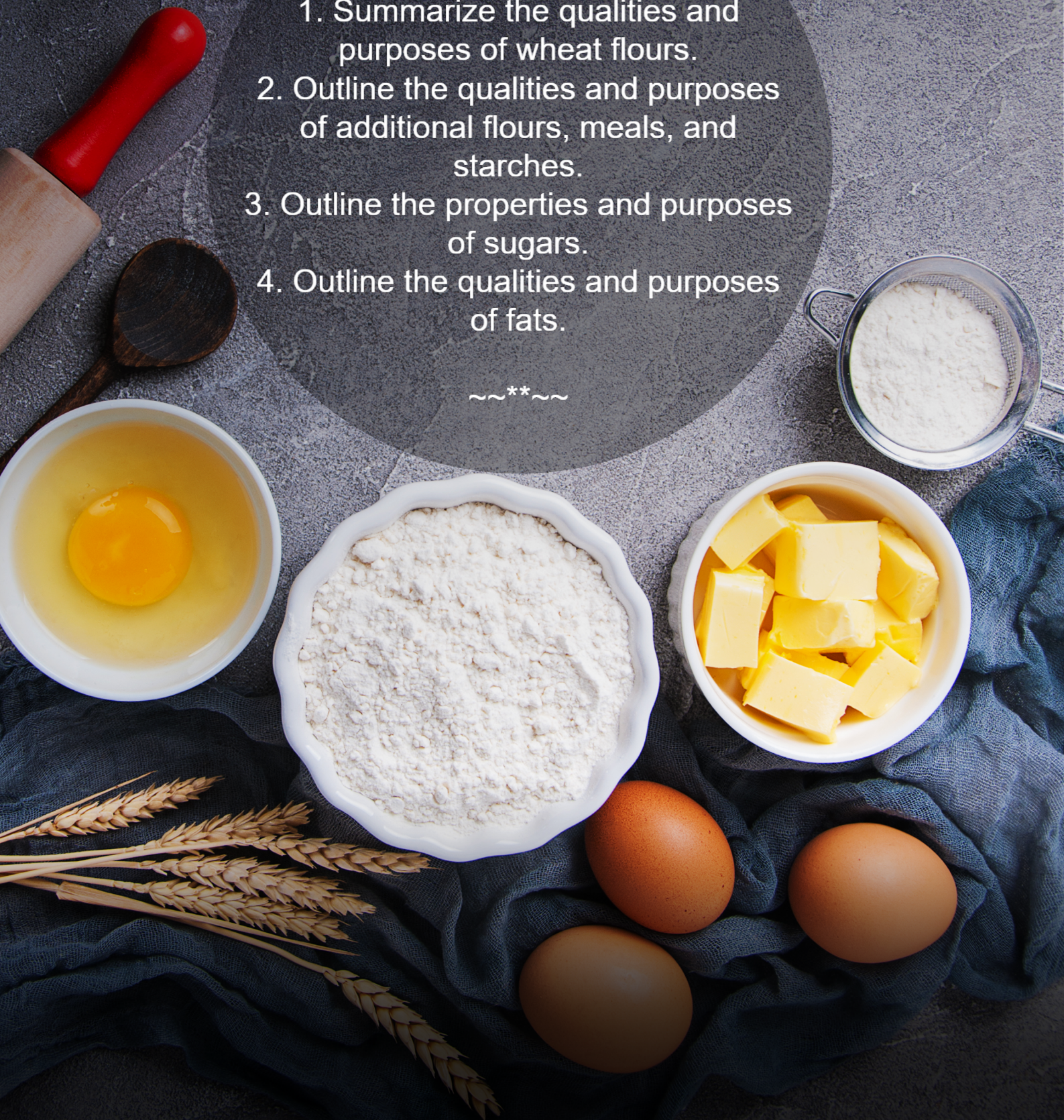


# INGREDIENTS

## OBJECTIVES

1. Summarize the qualities and purposes of wheat flours.
2. Outline the qualities and purposes of additional flours, meals, and starches.
3. Outline the properties and purposes of sugars.
4. Outline the qualities and purposes of fats.

~~\*\*~~





A close-up, high-speed photograph of a hand sifting white flour over a wooden surface. The flour is captured mid-air, creating a dynamic, cloud-like effect. The background is dark and out of focus, showing a wooden egg and a wooden spoon. The word "FLOUR" is written in large, bold, yellow capital letters in the upper right quadrant.

**FLOUR**



The fundamental feature of flour in baking, flour creates structure. When the proteins included in wheat flour are hydrated, they interact with one another to create gluten. An elastic community emerges as wheat flour is turned into dough or batter. The leavening gases in the baked item are included in the gluten community. The production of gluten and wheat flour are essential for the form of typical baked items.



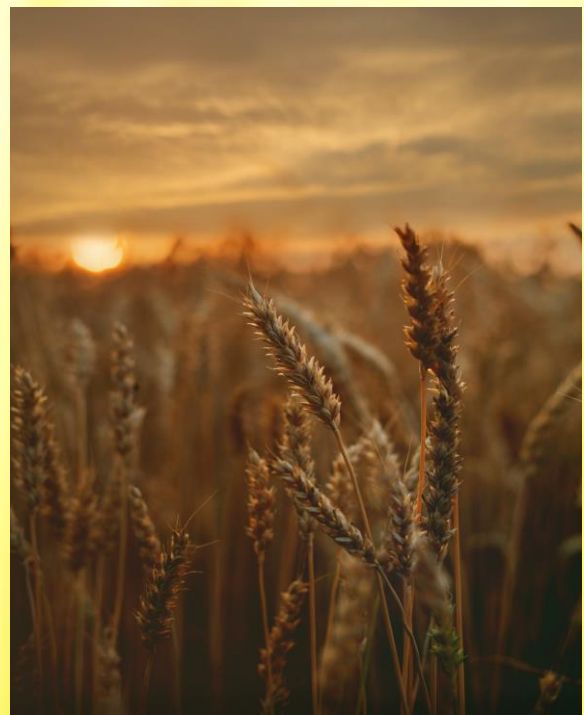
It is the basic ingredient in baked items and is commonly blended first with different dry components like sugar, baking powder, baking soda and yeast. Salt is additionally an vital ingredient, even if your bakes are sumptuously sweet. You won't style an eighth of a teaspoon of salt, however it will decorate the different flavours.





## Wheat

Wheat is the most adaptable grain because its storage proteins have the ability to interact with and build the gluten network, which provides the fundamental structure for many baked goods. Due to the deep crease in the kernel, the milling process—a series of breaking, sifting, and size-reduction procedures—is used to obtain flour. This technology allows for the simultaneous separation of the bran and germ regions as well as the destruction of the endosperm cells into a very good product that is suitable for rapid hydration and the synthesis of gluten. The variety of wheat utilised and the milling circumstances have a significant impact on both the milling yield and flour fineness. The latter has a significant impact on the bread's technological performance (as determined by a number of instrument tests) and flour efficacy. In addition to refined flours, complete wheat flours that also contain the bran and germ fractions—currently regarded as by-products despite their abundance in several beneficial compounds—are also receiving more and more attention.



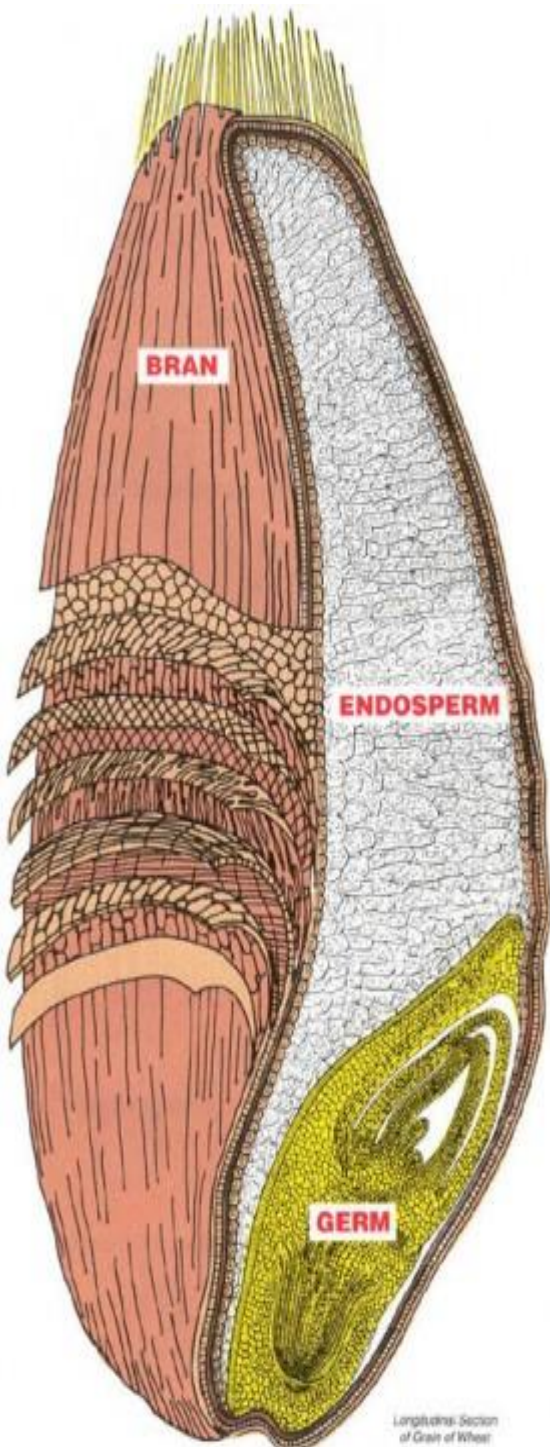


## Composition on wheat

Most grains have a tough outer covering, like wheat and oats. This layer, which is known as bran, will be produced as a byproduct when they are processed. Miller's or wheat bran is produced when wheat is processed to form wheat flour. It is nutrient-dense and offers a variety of nutritional advantages.

**Wheat bran** is typically included in several cereals, such as Bran Flakes or Raisin Bran, as well as bran muffins, which gained popularity in the 1980s. Due to its high levels of dietary fibre, wheat bran helps to promote digestive regularity and relieve constipation. Some claim that foods that include bran give you a fullness sense. Given that it has a propensity to soak in water and grow in the digestive system, this assertion may also be accurate.

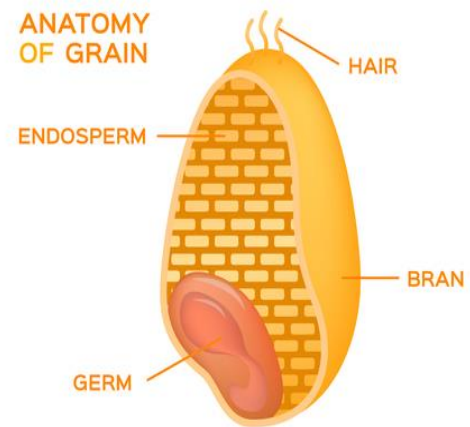
In general, there is no debate about wheat bran's nutritional advantages. It was formerly believed that it may fight cancer, but this is still mostly unsubstantiated. However, a cup (58 g) of wheat bran does provide a comprehensive range of nutritional benefits. Nine grammes of protein, 34 percent of the recommended daily amount for iron, and 99 percent of the daily limit for fibre are all found in one cup. In addition, it contains a lot of protein, phosphorus, zinc, magnesium, manganese, niacin, and vitamin B6 and is low in fat, cholesterol-free, sugar-free, and sodium-free.





Wheat germ is one of the three fit to be eaten parts of the wheat kernel, along with the endosperm and bran. The germ is like a little tiny wheat embryo in the middle of the grain. It performs a position in the replica and production of new wheat.

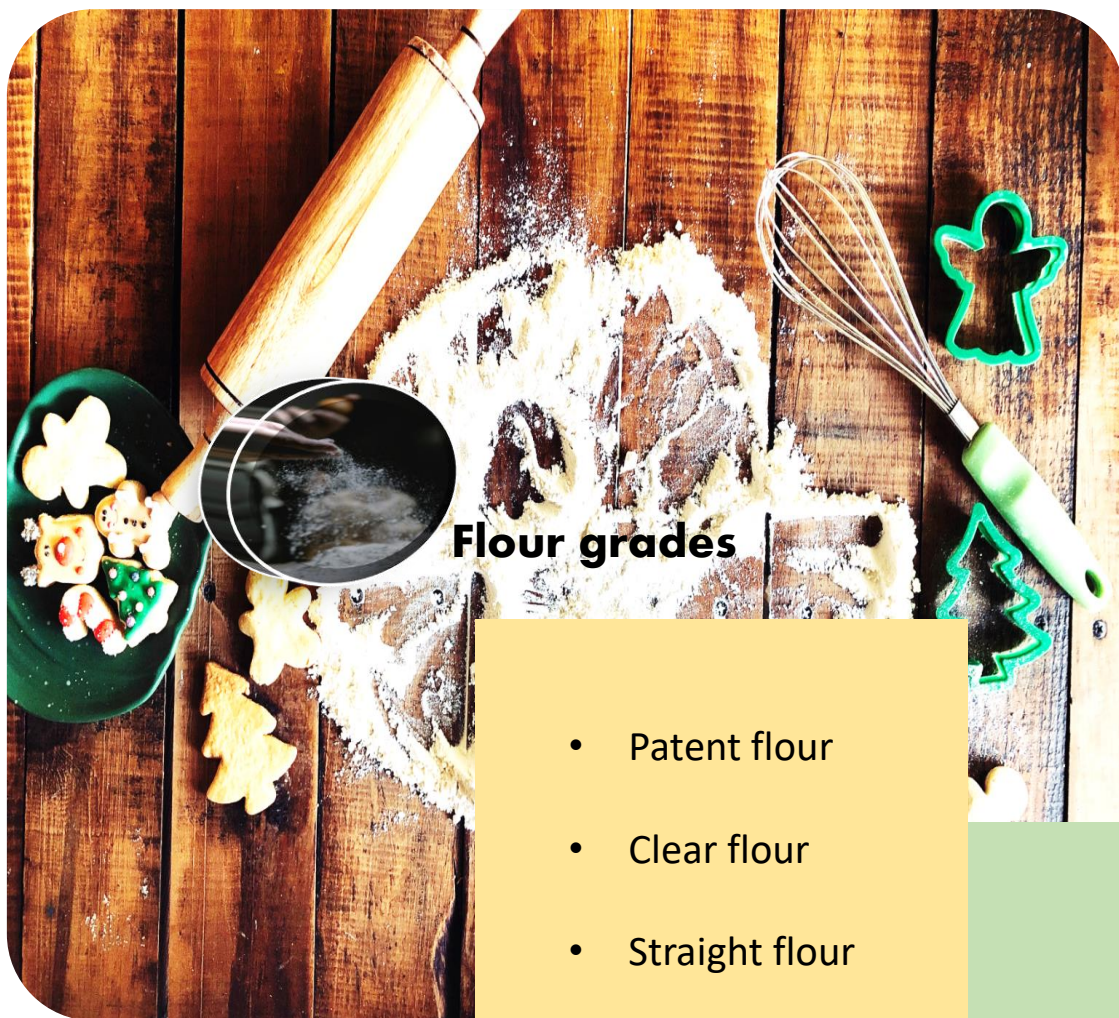
Although the germ is packed with nutrients, the bummer is that it's eliminated from most processed wheat. Refined wheat products, like these containing white flour, have the wheat germ and husk eliminated so the products last longer in storage



Endosperm is the source of white endosperm flour and makes up around 83% of the weight of the kernel. The majority of the protein, carbohydrates, and iron are found in the endosperm, along with B vitamins like riboflavin and niacin. Additionally, it provides soluble fibre.



The subsequent layer is the bulk of the kernel, about eighty three percentage of its total weight. The majority of the protein, carbohydrates, and iron are found in the endosperm, along with B vitamins like riboflavin and niacin. Additionally, it provides soluble fibre.



- Patent flour
- Clear flour
- Straight flour
- Extraction

Different types of flour are produced from various parts of the endosperm, as is clearly stated. To distinguish these parts, modern milling processes have been created.



- **Patent flour**

The purest and best-quality commercial wheat flour is patent flour. The central component of the endosperm is used to make patent flour. Depending on how much straight flour it yields, patent flour is divided into 5 types. Soft wheat is used to make extra rapid, fancy, and first patent flours, which are utilised as cake flours. A 40–60% portion of extra short or fancy patent is made using straight flour. 60 to 70 percent of first patent flour is made up of straight flour. The most often recommended commercially milled flour for bread making is short patent flour manufactured from hard wheat; it contains 70 to 80 percent straight flour. Long patent flour, which is made with 90 to 95 percent straight flour, as well as medium patent flour, which is made with 80 to 90 percent straight flour, are both excellent for baking bread.







- **Straight flour**

Straight grade flour, or SGF, is the wheat flour produced via a wheat milling run which consists of a gradual milling, sifting and purifying process. In essence, this type of flour is a mixture of all flour streams produced at the mill after Bran and germ have mostly been eliminated.

One characteristic of straight grade wheat flour is its kernel content levels commonly from 72% to 76%, expressed as extraction rates of 72 to 76%.

Given its comfort and low cost, straight grade flours have progressively changed real patent flours in the production of regular products.

- **Extraction**

The amount of flour extracted from a specified amount of grain is referred to as extraction. It is represented as a percentage of the whole grain volume. For instance, whole wheat flour is described as being extracted 100 percent if 100 kilogrammes of grain are used to make 100 pounds of whole wheat flour. Another illustration: If a flour grade is advertised as having a 60% extraction rate, it would require 100 kg of whole grain to create 60 kg of this grade of flour. Bran, germ, shorts, and darker, lower-grade flour make up the remaining 40%. Straight flour has a high extraction rate compared to patent flour's low extraction rate.





## **Bread flour**

Bread flour is a high-protein flour that is used for making yeasted breads and typically includes between 12 and 14 percent protein. Due to its high protein level, bread flour can include more gluten, which increases the dough's elasticity and softness and gives it a chewy and airy quality when baked. Bread flour differs from other types of flour in that it needs a lot of kneading to develop the desired gluten structure, which results in the chewy and airy texture.



## Cake flour

Low protein flour that has been finely ground is known as cake flour. Compared to all-purpose flour, a more complex flour, which has anywhere between 10 and 12 percent protein, it has approximately 7-9 percent protein. What does this mean in terms of baking? You see, the development of gluten is directly tied to protein content. Due to cake flour's decreased protein content, less gluten is created when the batter is being combined. A softer, fluffier texture results from less gluten production.

## Pastry flour

Low-protein pastry flour is a specialty flour that works well for baked items. In comparison to all-purpose flour, which contains around a 10 to 12 percent protein count, pastry flour typically has an 8 to 9 percent protein content. Reduced protein content makes the dough for pastries like biscuits, scones, pie crusts, and quick breads lighter and flakier.



## All-purpose flour

Although all-purpose flour is extensively used as a general-purpose flour in restaurants, where it is advertised as restaurant and hotel flour, it is less common in bakeries despite being freely available in supermarkets. Due to its somewhat lower strength than bread flour, this flour may also be used in pastries. Between 10% to 11.5 percent of all-purpose flour has protein.



## Durum flour

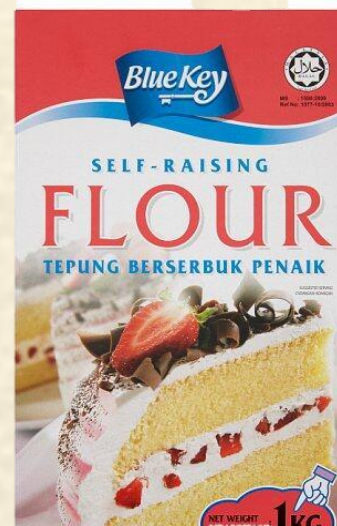
Durum wheat, a high-gluten wheat of a different species from other flour grains, is the source of durum flour.. It's mostly used to create spaghetti and other types of dry pasta. It's occasionally used in bakery specialty items like Italian bread with semolina (semolina is another term for durum flour or durum meal). Durum flour contains between 12 and 16 percent protein.

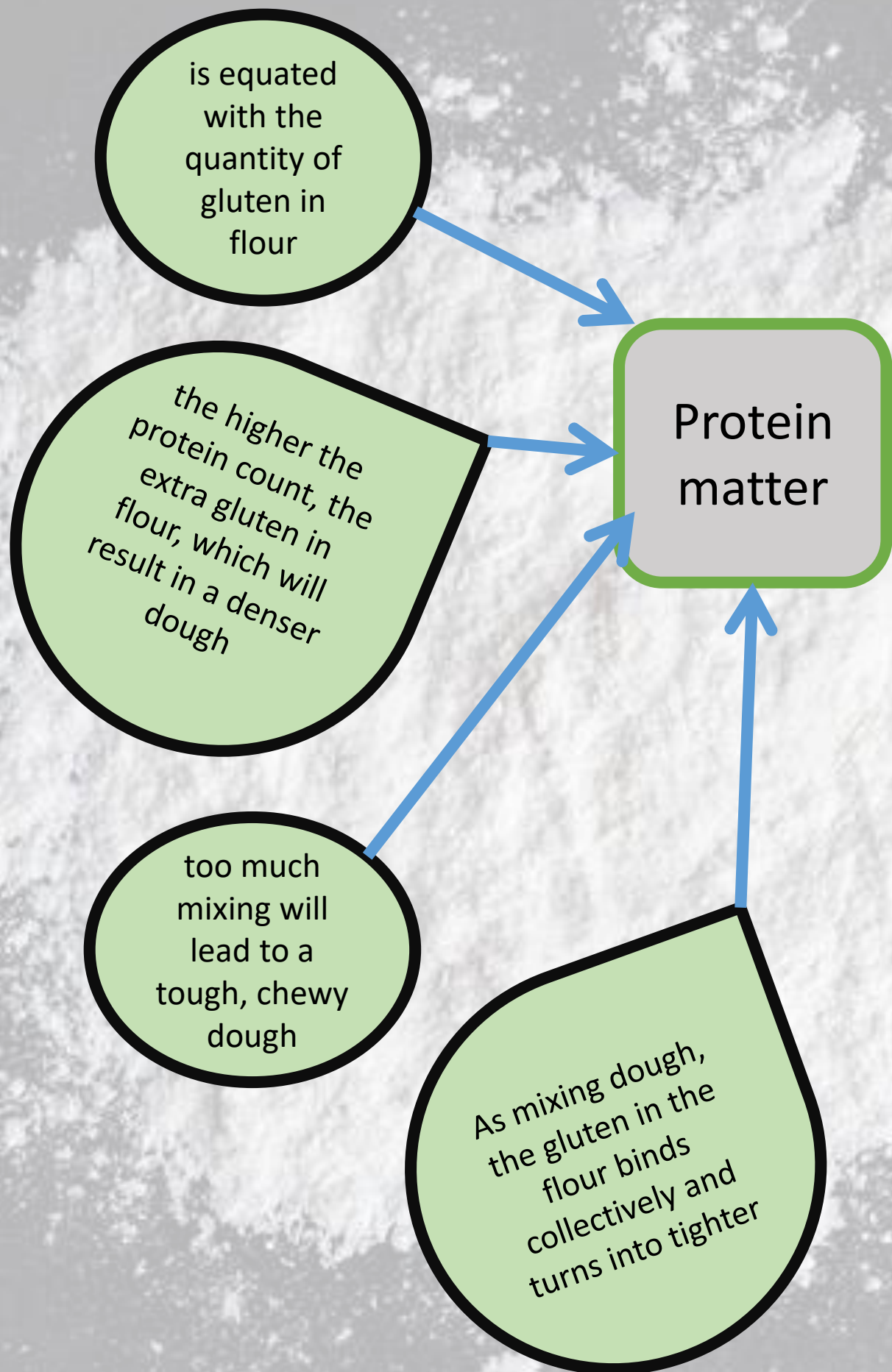




## Self-rising flour

White flour that has been combined with baking powder and, occasionally, salt is known as self-rising flour. It has the advantage of distributing the baking powder uniformly. Two issues, however, limit its application. For starters, different baking powder quantities are required by different formulations. There is no one-size-fits-all blend. Second, because baking powder gradually loses its ability to aerate or leaven food, the quality of baked goods made with it might change.







## White Flour

White flour contains between 68 and 76 percent starch. Complex carbohydrates known as starches are made up of long chains of simpler sugars bound together.

Tiny particles of starch are present in flour. Until they come into touch with water during the mixing process, the majority of them are in tact; nevertheless, at that point, they absorb water and swell.

From one-fourth to one-half of its weight in water can be absorbed by starch. During grinding or storage, a very tiny portion of the starch is broken down into sugars. This sugar is available to feed yeast.

## White Flour

Protein makes up 6 to 18 percent of white flour, depending on the wheat variety. Proteins act as binders in the endosperm, holding the starch granules together.

Controlling the development of gluten is one of the most important things a baker can do. The baker's concern is it's impossible to make yeast-raised bread without gluten.

Glutenin and gliadin make up about 80% of the proteins in flour. These two proteins, together, form gluten, an elastic substance that forms when flour is combined with water and mixed into a dough.

Weight in water terms: White flour also contains other proteins, including enzymes, the most significant of which is amylase, also referred to as diastase. Starch is transformed into simple sugars by this enzyme, which is necessary for yeast fermentation. Starch cannot be fermented by yeast, but amylase enables this process to happen, even in bread doughs made without sugar.

The structure of breads depends on gluten. Proteins in gluten can take up as much water as they weigh.



## Composition of Flour



### MOISTURE

In optimal condition, the moisture level of flour ranges from 11 to 14 percent. If it rises above this level, spoiling is likely. Therefore, flour must constantly be protected and kept in a dry atmosphere..

**GUMS** are a form of carbohydrate, much as starches. Gums make up between two and three percent of white flour. The most important gums are pentosans. They are important because they have a far greater capacity for water absorption than either carbs or proteins do. Pentosans have a considerable effect on dough formation even in small amounts since they absorb 10 to 15 times their weight in water. Gums are an excellent dietary source of fibre.



### FATS

Despite only having a 1% fat and fat-like component content in white flour, emulsifiers are crucial. to be aware of them They are essential for the formation of gluten first and foremost. Additionally, they are easily spoiled. adding a sour flavour to wheat Because of this, flour has a limited shelf life and should only be used in emergency situations. in a timely fashion





### **ASH**

Ash is a different name for the flour's mineral component. Bakers focus on two crucial statistics in the product description when purchasing flour: the protein content and the ash content. To determine the ash content, a sample of flour is burnt in a controlled environment. In contrast to minerals, which do not burn and are left as ash, starch and protein release carbon dioxide, water vapour, and other gases when they are completely consumed. The amount of ash in the flour increases with its colour. This is because the endosperm's bran and outer areas contain more minerals than its whiter, internal regions do. White flour has less ash than whole-grain flour.

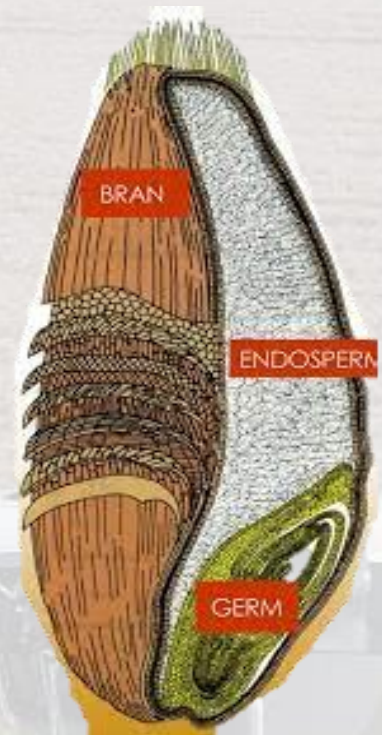


### **PIGMENTS Carotenoids,**

which are orange-yellow pigments, constitute a minor component of flour, unbleached flour is a creamy tint rather than a pristine white because of these pigments. When an aged flour is milled, Some of these colours are bleached by oxygen in the air, making the flour whiter. fully coloured



To create whole wheat flour, the entire wheat kernel—including the bran and germ—is pulverised. It's advisable to consume the germ intact because it contains a lot of fat that might get rancid. Compared to white flour, wheat flour has a lower shelf life. Since whole wheat flour is made from wheat, it contains proteins that cause gluten to develop. It may be used on its own to produce bread. (Protein content ranges from 12 to 13 percent.) However, whole wheat bread tends to be heavier than white bread due to the presence of gluten. The strands were severed by the bran flakes' pointed edges.



Shortening effect may also be aided by the fat found in wheat germ. This is one of the reasons why whole wheat breads are so popular. White flour is used to strengthen the dish. Another factor is that many individuals don't like the strong flavour of whole wheat, and instead prefer the softer flavour that a combination of flours imparts. Whole wheat flour has more gluten than white flour, making whole wheat bread heavier to bake. The strands were severed by the bran flakes' pointed edges. Bran flakes are added to flour to create bran flour. The bran can be either coarse or fine depending on the criterion.



## **Cracked wheat**

Instead of flour, cracked wheat is a type of meal made from grains that have been split into large pieces. It is used sparingly to add flavour and texture to some gourmet breads.



## **Rye**

Rye flour is the most common bread flour after white and whole wheat. While rye flour includes certain proteins, they do not produce high-quality gluten. This is due to the fact that, while rye flour has enough gliadin, it lacks glutenin. As a result, loaves made entirely of rye flour are thick and dense. A blend of rye and hard wheat flours is required to generate a lighter rye bread. 60 to 75 percent hard wheat flour and 25 to 40 percent rye flour are typically used in recipes.



Wheat and rye make up the majority of the grain flours and meals used in the bakery. Other grains are mostly utilised to spice up baked dishes. Of these other grains, corn is presumably the most widely consumed. The most prominent word in English that means "grain" is corn (Note: In the United Kingdom, corn is referred to as maize, but in the United States, it is simply referred to as corn.). Proteins that cause gluten are absent from corn., but it does contain considerable amounts of gluten-inducing carbohydrates. As a result, it plays a significant role in vegetarian diets.



Only wheat flour has enough high-quality gluten to produce standard yeast loaves. Other grains, like rye and spelt, contain gluten proteins as well, which is important for those who have celiac disease or gluten sensitivity. Unfortunately, the proteins do not come together to create a gluten that is good and elastic enough to be utilised in bread. With the exception of a few speciality baked goods, these other flours and meals are combined with wheat flour for baking most things.





## Maize

The most common kind of maize used by bakers is yellow cornmeal. Cornmeal in blue colour is also available. Because the oil in the germ quickly goes rancid, The majority of cornmeal is exclusively made from the endosperm. Whole-grain cornmeal, on the other hand, is available. Cornmeal comes in a variety of grinds, between fine and coarse. Coarse cornmeal gives cornbread a crumbly, gritty texture that is advantageous in some applications.

## Oats

Oats, which are most commonly associated with morning porridge, are also used in bakeries in many forms. Although they contain enough gluten proteins to make them inedible to gluten-free people and are high non protein, oats do not form a gluten structure when added to a dough. In oats, there are lots of gums, which are a source of dietary fibre. The gum component in oats porridge is what gives it its sticky or gluey texture.





## Buckwheat

Buckwheat is not considered a grain because it comes from a plant with branching stems and wide, arrow-shaped leaves, not a grass. Buckwheat endosperm alone is often processed into a lighter-coloured, milder-tasting flour than whole buckwheat, which is frequently ground into a dark, strong-tasting flour. The grains can be cooked like rice when they have been broken up into little pieces and are then known as buckwheat groats. The most popular uses for buckwheat flour are pancakes and crêpes, although it may also be used in modest amounts in multigrain goods and speciality breads.



Soy is not a grain; it is a bean or legume. However, it may be milled into flour much like a grain.. It is, however, deficient in starch compared to ordinary grains. It's also high in fat and protein, despite the fact that it's gluten-free. It is useful in vegetarian diets because of its high protein content. A portion of the fat in soy flour is normally removed before it is used in baking. Soy flour may be used in baking since it contains enzymes when it is raw. These enzymes help yeast work and lighten the colour of wheat flour. Soy flour that is raw or untoasted should only be used in very small amounts (approximately 0.5 percent) in yeast breads. Breads with larger levels have a bad texture and an unpleasant beany flavour. The enzymes in soy flour are eliminated when it is toasted, giving it a more pleasing flavour. Soy flour that has been toasted can add flavour and nutrients to baked items.

## Rice Flour

Rice flour is a smooth, white flour produced by milling white rice. It is a well-liked ingredient in gluten-free baked products due to its modest protein content and lack of gluten.





# FATS

- Fats, Saturated and Unsaturated at normal temperature
- While some fats are liquid, others are solid. It is called liquid fats "oils" because they are liquid fats.
- The fatty acids that make up fat molecules determine if the fats are liquid or solid.
- Long chains of carbon atoms linked by hydrogen atoms make up the majority of fatty acids.
- A fatty acid chain that has all the hydrogen atoms it can hold is referred to as a saturated fat.
- Unsaturated fats have vacant gaps in their chain that may hold more hydrogen. At room temperature, saturated fats are solid, Unsaturated fats are liquid, in contrast.

**Natural fats** are composed of several fat molecules. The consistency of the fat increases with the amount of saturated fats present.

The softer the mixture is, the more unsaturated fats it contains. Manufacturers use a process called hydrogenation to turn oils into solid, malleable fats for bakeries. By attaching hydrogen atoms to the open gaps in the chains, this process transforms unsaturated fatty acid chains into saturated ones. By controlling the process, the producer may give the fat the ideal balance of saturated and unsaturated fats, producing shortening with the required softness, moldability, and melting point.

## Shortenings

In baking, any fat acts as a shortening by shortening gluten strands and tenderising the product. Shortening, on the other hand, is a term that refers to a collection of solid fats that are specially created for baking and are usually white and tasteless. In most cases, shortenings are almost entirely made up of fat. Vegetable oils, animal fats, or a mix of the two can be used to make shortening. Through the course of manufacture, the fats are hydrogenated. This technique converts liquid oils into solid fats. Manufacturers have developed a range of fats with various properties since shortenings are used for so many different purposes. The three fundamental kinds are regular or all-purpose (AP) shortenings, high-ratio plastic shortenings, and high-ratio liquid shortenings.





## REGULAR SHORTENINGS

- Regular shortenings, sometimes referred to as all-purpose shortenings, have a waxy, hard consistency, and small particles of the fat tend to hold their form in batters and doughs.
- Since they may be moulded at room temperature, they are sometimes referred to as plastic shortenings.
- Regular shortenings are available in a variety of hardness's. They have a strong capacity to cream. This indicates that a large amount of air may be added to increase the batter's leavening power and lightness.
- Furthermore, shortening in this condition can only be melted at very high temperatures.
- Regular shortenings are employed in flaky items like piecrusts and biscuits because of their texture.
- They're also utilised in a variety of different pastries, breads, and cream-based goods including pound cakes, cookies, and ice cream. Regular shortening is typically used unless different shortening is specified in a recipe.



## Plastic Shortenings With A High Ratio

- These are smooth, soft shortenings that quickly cover the flour and sugar granules in a batter. Because they are made to be used in cake mixes with a high sugar and liquid-to-flour ratio, they are known as high-ratio.
- They also have emulsifying agents added to them, allowing them to hold more liquid and sugar than ordinary shortenings. As a result, cakes have a smoother, finer texture and are more moist.
- This shortening is also known as emulsified shortening due to the addition of emulsifiers. High-ratio shortening, nonetheless, does not cream smoothly. Ordinary shortening should be used in place of high-ratio shortening when a recipe asks for creaming shortening and sugar. Because emulsified shortening spreads so well, high-ratio cakes may be made using a less complicated mixing technique.
- In addition, high-ratio shortening is frequently used in icings since it can accommodate more sugar and liquid without curdling.
- In a strict sense, the phrase "emulsified shortenings" is inaccurate. Because an emulsion involves a mixture of at least two components, pure fat cannot be emulsified. It's perhaps more accurate to refer to them as emulsifiers or shortenings can be emulsified. On the other hand, the term "emulsified shortenings" is more often used and known.





### **High-ratio Liquid Shortenings**

High-ratio liquid shortenings, commonly referred to as liquid cake shortenings, are less hydrogenated than plastic shortenings, which makes them liquid and pourable even if they have a thick, cloudy, or opaque look. They may be used to manufacture high-ratio cakes since they include more emulsifiers than high-ratio plastic shortenings. The cakes are moist and have a delicate texture thanks to the emulsifiers. These shortenings also boost the volume and suppleness of cakes since air is easily integrated while mixing.

Because they distribute so effectively into the batter, high-ratio liquid shortenings make mixing easier. Also, because shortening is so versatile, the amount of it in a batter may easily be lowered is effective

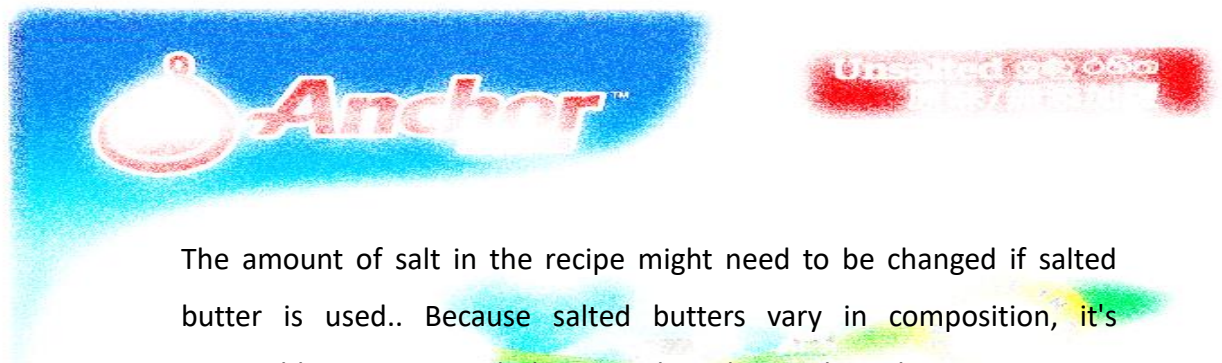
## Fresh butter

In North America, fresh butter has a fat content of around 80%, a moisture content of 15%, and a milk solids content of 5%. In North America, the bulk of butter is produced using sweet cream. Many European butters include less moisture and a larger percentage of fat than American butters—up to or even more than 82 percent. Additionally, they are more likely to be made using cultured cream, giving them a deeper flavour.

Butter is graded in accordance with US Department of Agriculture (USDA) standards even though grading is not necessary. AA, A, B, and C are the letter grades. Because the majority of operations use grades AA and A, It's possible that the flavours of the lower grades are off. There are three grades in Canada: Canada 1, Canada 2, and Canada 3. There are two types of butter: salted and unsalted. Salted butter lasts longer than unsalted butter, yet unsalted butter tastes better. It is preferred in baking because of its fresher, sweeter flavour.. In addition, salt hides any unpleasant flavours. Because foreign flavours in salted butter are absorbed during storage, it's tougher to discern if it's got them. Deduct from the baked items once they've been baked







The amount of salt in the recipe might need to be changed if salted butter is used.. Because salted butters vary in composition, it's impossible to say exactly how much to lower the salt concentration. Shortenings are made with particular textures and degrees of difficulty to suit them for specific purposes. Contrarily, butter is a natural substance with no such advantage.. When cold, it is stiff and brittle, but when room temperature, it is very soft and melts quickly. As a result, butter dough is significantly more difficult to work with. Butter is also pricier compared to shortening

### **Margarine**

Margarine is made from a combination of hydrogenated animal and vegetable fats, as well as flavourings, emulsifiers, colouring agents, and other additives. It contains 80 to 85 percent fat, 10 to 15 percent moisture, and only around 5 percent of additional elements including salt and milk solids. As a result, it may be considered a kind of shortening, water, and flavouring-based butter alternative. Unlike margarines offered in supermarkets, baker's margarines are made in a variety of methods for varied uses. The two primary categories are listed below.

Marjerin  
مرجرين



## Oils

Oils are fats that are liquid at room temperature. They're not commonly utilised as shortenings in baking because they spread too thinly and shorten too much in batters and doughs. Oil is used as a shortening in some breads, cakes, and quick breads. Apart from that, oil's only other uses in the bakery are for lubricating pans, deep-frying doughnuts, and washing specific kinds of rolls..

## Lard

Lard is hog fat that has been rendered. Due to its plastic quality, it was traditionally highly regarded for producing traditional American flaky piecrusts and biscuits., and it is still occasionally used for these items. However, since the development of contemporary shortenings, it is rarely utilised in bakeries.





# SUGAR





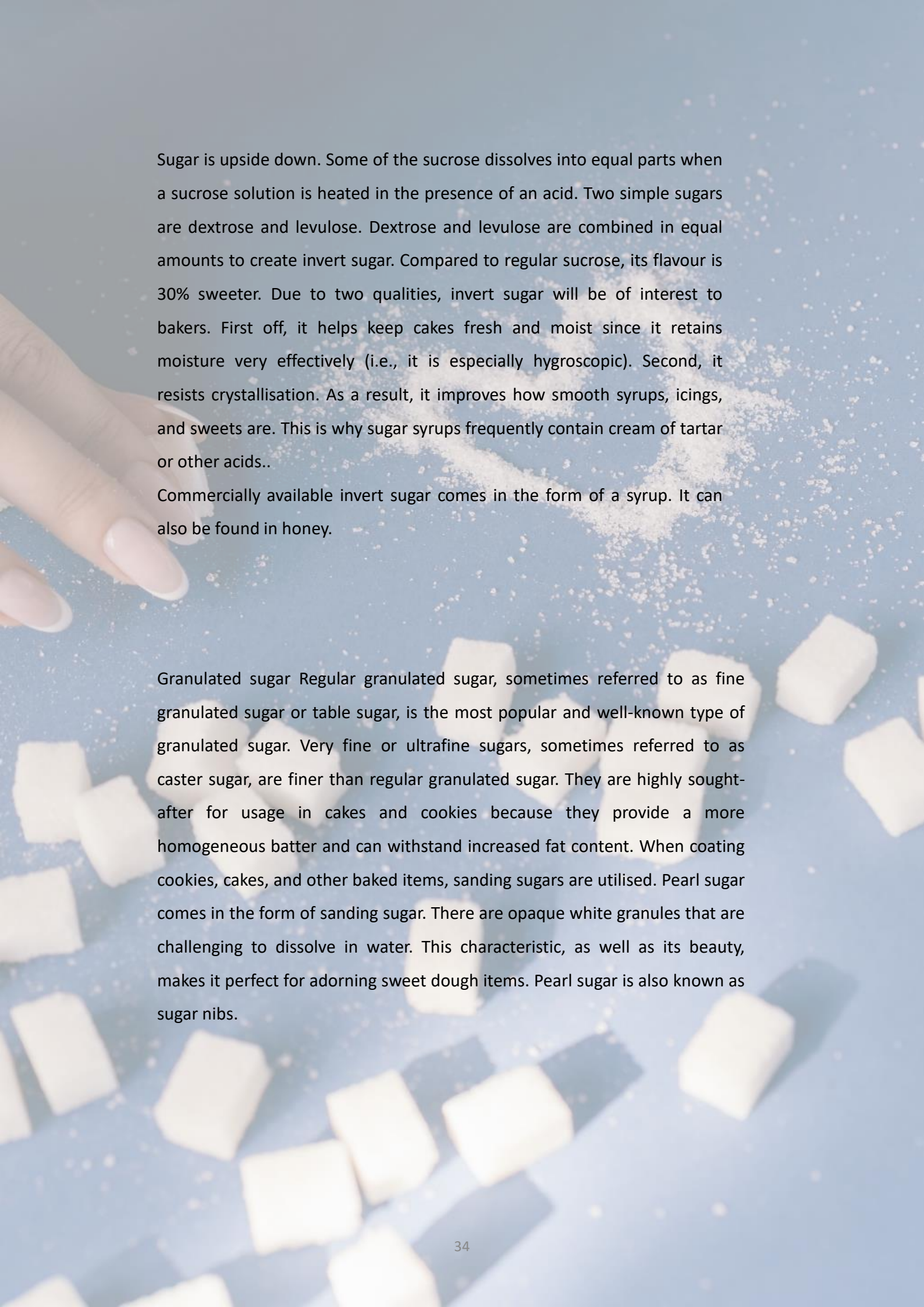
# Sugar

Regular refined sugars obtained from sugarcane or beets are commonly referred to as sugar. These sugars are referred to chemically as sucrose. Within the bakery, however, other sugars with various chemical structures are also used. Sugars are part of a class of chemicals known as carbohydrates, which also includes starches. The two forms of sugars are simple sugars (also known as monosaccharides, or "single sugars") and complicated sugars (sometimes known as disaccharides, or "double sugars"). Starches, commonly referred to as polysaccharides, are chemically more complex than sugars. Sucrose is a disaccharide, just as lactose and maltose (malt sugar) (the sugar found in milk). Simple sugars include glucose and fructose, for instance.

These sugars all have varied degrees of sweetness. For instance, fructose (also known as fruit sugar, one of the sugars found in fruits) is substantially sweeter than lactose, which is significantly less sweet than regular table sugar (sucrose). Compared to honey, sucrose is substantially sweeter. Bakers and pastry chefs should be aware that all sugars have the same characteristic: Their hygroscopicity is quite high. This proves that they have the capacity to extract and store water. Different sugars have different potencies. Some people are more water-repellent than others. Fructose, a component of honey, is much more hygroscopic than sucrose.

This characteristic is helpful in some situations. For instance, baked goods with sugar retain their moisture longer than those with little or no sugar. This is inappropriate for other uses. For instance, spun sugar only lasts a short time before it turns sticky from absorbing moisture from the air. As a dusting agent, sugar may draw in moisture and disintegrate.





Sugar is upside down. Some of the sucrose dissolves into equal parts when a sucrose solution is heated in the presence of an acid. Two simple sugars are dextrose and levulose. Dextrose and levulose are combined in equal amounts to create invert sugar. Compared to regular sucrose, its flavour is 30% sweeter. Due to two qualities, invert sugar will be of interest to bakers. First off, it helps keep cakes fresh and moist since it retains moisture very effectively (i.e., it is especially hygroscopic). Second, it resists crystallisation. As a result, it improves how smooth syrups, icings, and sweets are. This is why sugar syrups frequently contain cream of tartar or other acids..

Commercially available invert sugar comes in the form of a syrup. It can also be found in honey.

**Granulated sugar** Regular granulated sugar, sometimes referred to as fine granulated sugar or table sugar, is the most popular and well-known type of granulated sugar. Very fine or ultrafine sugars, sometimes referred to as caster sugar, are finer than regular granulated sugar. They are highly sought-after for usage in cakes and cookies because they provide a more homogeneous batter and can withstand increased fat content. When coating cookies, cakes, and other baked items, sanding sugars are utilised. Pearl sugar comes in the form of sanding sugar. There are opaque white granules that are challenging to dissolve in water. This characteristic, as well as its beauty, makes it perfect for adorning sweet dough items. Pearl sugar is also known as sugar nibs.

### Finer granulations

They dissolve more rapidly and are excellent for adding to batters and doughs because of this. Coarse sugars are prone to leave undissolved grains even after thorough mixing. These have an uneven texture, black streaks on the crust, and sticky places after baking. Since fine sugars offer a finer, more uniform air cell structure and higher volume, they are also preferred when creaming with fats. On the other hand, syrups can be made with coarse sugar without concern for its ability to combine. Even though the sugar is quite granular, it dissolves fast when boiled with water. Actually, coarse crystalline sugar frequently has a higher purity level and makes clearer syrup than fine sugar.





### **Powdered Sugars or Confectioners' Sugars**

Confectioners' sugar is finely powdered and combined with a small amount of starch.(about 3%) to avoid caking. Coarseness and fineness are used to categorise them. The finest sugar is 10X. It produces the smoothest icing texture. The texture of 6X is slightly rougher than that of 10X. It is hence less prone to clump or create lumps. when exposed to moisture, disintegrate Typically, it's used to sprinkle sugar on top of sweets. Coarser variants are used for dusting and when 6X or 10X are too fine. Confectioners' sugar, often called frosting sugar, is used to manufacture a variety of icings.



**Fondant** that has lost moisture. Dry fondant icing comes in the form of fondant sugar, sometimes referred to as dehydrated fondant. It is significantly finer than 10X and has no starch to prevent caking, in contrast to confectioners' sugar. A part of the sucrose is changed into invert sugar when manufacturing fondant. As a result, the sugar crystals remain tiny and the icing is smooth, creamy, and glossy.



**Brown Sugar** is a kind of sugar used for The majority of brown sugar is sucrose (85–92%), but it also has trace quantities of molasses, caramel, and other impurities that give it its particular flavour and colour. The darker grades have a higher concentration of these pollutants. Simply put, brown sugar is cane sugar that hasn't been completely refined. However, refined white sugar may be made with these pollutants in small concentrations. There used to be 15 different grades of brown sugar, ranging from extremely dark to very light. Today, just two to four grades are frequently offered.



Brown sugar has a little amount of acid, therefore it can be used with baking soda to provide some leavening. It is replaced when the flavour of traditional white sugar is desired but the colour is not objectionable. Naturally, it shouldn't be used in white cakes. In order to prevent drying out and hardening, brown sugar should be kept in an airtight container. Demerara sugar has a crystalline structure and is black in colour. It is not wet like regular brown sugar; instead, it is dry. Although demerara sugar is more frequently used to sweeten coffee and tea, it is occasionally used in baking.



## Syrups

One or more forms of sugar are dissolved in water to create syrups, which may also contain trace quantities of pollutants or flavouring agents. The simplest syrup in the bakery, simple syrup, is made by dissolving sugar in water. Dessert syrup is simple syrup that has been flavoured.



## Molasses

Sugarcane juice that has been concentrated is known as molasses. Sulphured molasses is a by product of sugar refining. It is what remains in cane juice after the majority of the sugar has been taken out. Unsulfured molasses is not a by product of the sugar industry; it is a product. Compared to molasses that has been sulfurized, it tastes better. Sucrose and other sugars, especially invert sugar, are abundant in molasses.



sugar. Acids, moisture, and other ingredients contribute to the flavour and colour of the product. The flavour of darker grades is stronger, and they have less sugar than lighter grades. Molasses helps to keep baked items fresh by retaining moisture. Due to the invert sugars' capacity to take in moisture from the air, crisp cookies prepared with molasses can soften quickly.

**Corn Syrup with Glucose** The simple sugar glucose is the most common. It's a common bakeshop component in syrup form. Approximately half of the starch in standard all-purpose corn syrup is converted to glucose, making it a medium-conversion glucose syrup.

Corn syrup is good for adding moisture and softness to baked goods.





## Honey

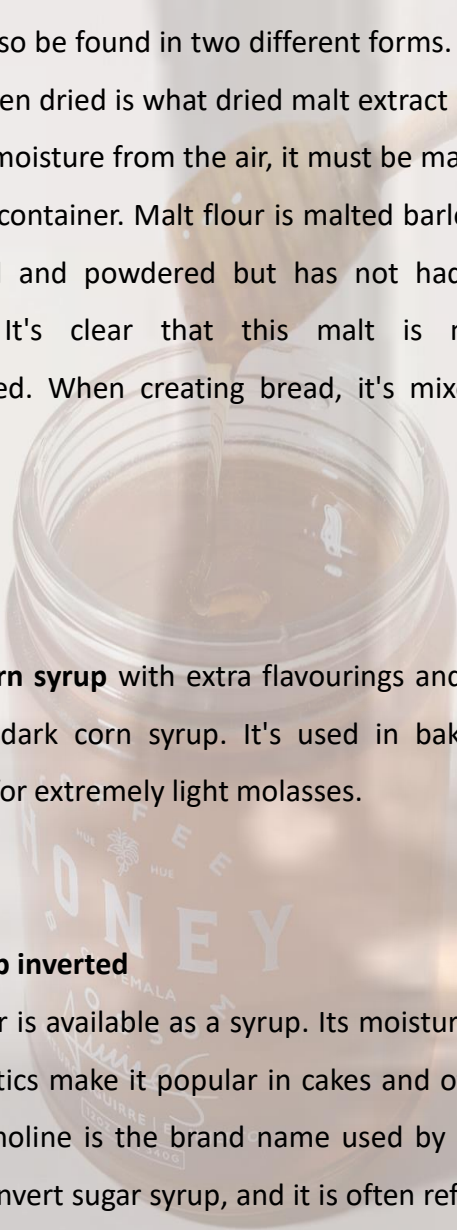
Honey is a natural sugar syrup made up mostly of the basic sugars glucose and fructose, as well as additional flavours and colours. Honey has a wide range of flavour and colour depending on where it comes from. Honey is primarily used for flavour, especially because it can be costly.

Because, honey contains invert sugar, which aids in the preservation of moisture in baked foods. It contains acid, just like molasses, thus it can be used as a leavening with baking soda.



**Syrup de Malte/Malt syrup**, Frequently used in yeast breads, malt extract is also known by that name. It feeds the yeast and gives the crusts of the loaves flavour and colour. After being dried and processed, sprouted (malted) barley is used to make malt. There are two types of malt syrup: diastatic and non-diastatic. Diastase, a family of enzymes found in diastase malt, converts starch into sugars that yeast can consume. Diastatic malt transforms into a powerful yeast food when added to bread dough. It is used when fermentation times are limited.





Malt can also be found in two different forms. Malt syrup that has been dried is what dried malt extract is. To avoid absorbing moisture from the air, it must be maintained in an airtight container. Malt flour is malted barley that has been dried and powdered but has not had the malt removed. It's clear that this malt is much less concentrated. When creating bread, it's mixed in with the flour.

**Regular corn syrup** with extra flavourings and colours is known as dark corn syrup. It's used in bakeries as a substitute for extremely light molasses.

**Sugar Syrup inverted**

Invert sugar is available as a syrup. Its moisture-retaining characteristics make it popular in cakes and other baked goods. Trimoline is the brand name used by one of the makers of invert sugar syrup, and it is often referred to as such by bakers.



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All of the authors are the lecturers from Department of Tourism and Hospitality, Politeknik Merlimau, Melaka. They have been involve in teaching and learning in Culinary courses for many years in the institution.

The need of students to have a pocket reference is crucial as their on the go lifestyle but still attach with education. It is hoped that this book will increase students' knowledge in the basics of culinary, which includes an introduction to kitchen and restaurant operations, equipment, *mise en place* or preparation and culinary arts.

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e ISBN 978-967-2762-31-7



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Theory of Food