

NUTS OIL SEEDS AND SUGAR



5.1 Nuts

Nuts are very important in our diet. They are a concentrated source of energy. They give us great energy boosts and provide our body with plenty of antioxidants, vitamins and minerals. Most of the fats contained in nuts are healthy fats like Omega 3 and other monosaturated and polyunsaturated fats (MUFA and PUFA). Groundnut, cashew nut, coconut and almonds are the nuts commonly used in India.

A wide variety of nuts are available throughout the year. They can also be stored for a long period of time. Certain nuts

like almonds, pistachio, walnuts and cashew nuts are used in sweets and desserts while groundnuts and coconuts are used as oil source.

Sugar is a concentrated source of energy like fat. Sugar, jaggery and honey are used for confectionery. Jaggery and honey have more medicinal value than sugar.

In this lesson, the students will be able to:

- understand the major contribution of nuts and oil seeds in food preparation.



Nuts oil seeds and sugar



- learn about fatty acid composition of different oils seeds.
- gain knowledge about the role of fats in cooking.
- role of sugar and jaggery in confectionary.
- learn about nutritive value of sugar, jaggery and honey.

5.1.1 Groundnuts

Groundnuts are a very rich source of protein and fat. They are exceptionally rich in *Niacin*, a B- complex vitamin. Groundnut is called the '*king*' of oilseeds. It is one of the most important food item and cash crop of our country. Besides being a valuable source of all the nutrients, it is a low priced commodity. Groundnut is also called as "*wonder nut*" and poor man's "*cashew nut*".

Importance of groundnut

- Groundnut is particularly valued for its protein content .
- Groundnuts contain more protein than meat and two and a half times more than in eggs.
- In addition to protein, groundnuts are a good source of calcium, phosphorus, iron and zinc.



Fig 5.1: Groundnut

- Groundnuts also contain vitamin 'E' and less amounts of vitamin 'B' complex.
- Being an oil seed crop, it contains 40 to 49% of oil.
- Groundnut oil is extremely high in mono-unsaturated (MUFA) and polyunsaturated (PUFA), which help in lowering low-density lipoprotein (LDL) cholesterol.



Role of groundnut in cookery

1. It is also called peanut.
2. Groundnuts are boiled or roasted and consumed.
3. It is also used in the preparation of peanut butter.
4. The chief product is the oil which can be used for cooking.
5. The cake left after the oil is extracted , purified and used as a supplementary mix.
6. It is also used to make various food preparations like butter, traditional candies (peanut candy) and chocolate, chutney, laddu, barfi , etc.

5.1.2 Cashew nuts

1. Cashew nuts are rich source of protein, fat and some amount of iron.
2. One ounce of cashewnut contains 5 grams of protein and high levels of essential minerals such as iron, magnesium, phosphorus, zinc, copper and manganese, which are good for health.



Fig 5.2: Cashew nuts

3. Cashew oil contains anti-bacterial properties that help our body to build up the immune system and fight against various infections and diseases.
4. It also enhances the eye sight alongside lessening irritation.



ACTIVITY - 1

Cashew fruits are commonly grown in _____ parts of India. The fruit is used to make wine.



Role of cashew nuts in cookery

1. Sweet can be made from cashew nuts.
2. Whether roasted, salted, sugared or covered in chocolate, cashew nuts are often used as a flavour complement to appetizers, main dishes and deserts.

5.1.3 Coconut

The coconut palm (Cocos nucifera) is one of the most useful palm in the world. Every part of the tree is useful for human

for some purpose or the other. Therefore, the coconut palm is also called as 'Kalpavriksha' meaning "the tree of heaven".

The white kernel of coconut is rich in calories though not a very good source of protein. It is extensively used in cookery in Tamil Nadu and Kerala. The white kernel when dried is called "copra" and has a high content of oil.



Fig 5.3: Coconut



ACTIVITY - 2

Name some Major coconut growing states in India.



Role of coconut in cookery

1. Kernel is ground and are used as thickening agent. In the preparation of curries, chutneys, sweets and puddings.
2. Made into sweets.
3. Coconut dried and made into flour is used in bakeries.
4. Coconut oil is used as a medium of cooking.

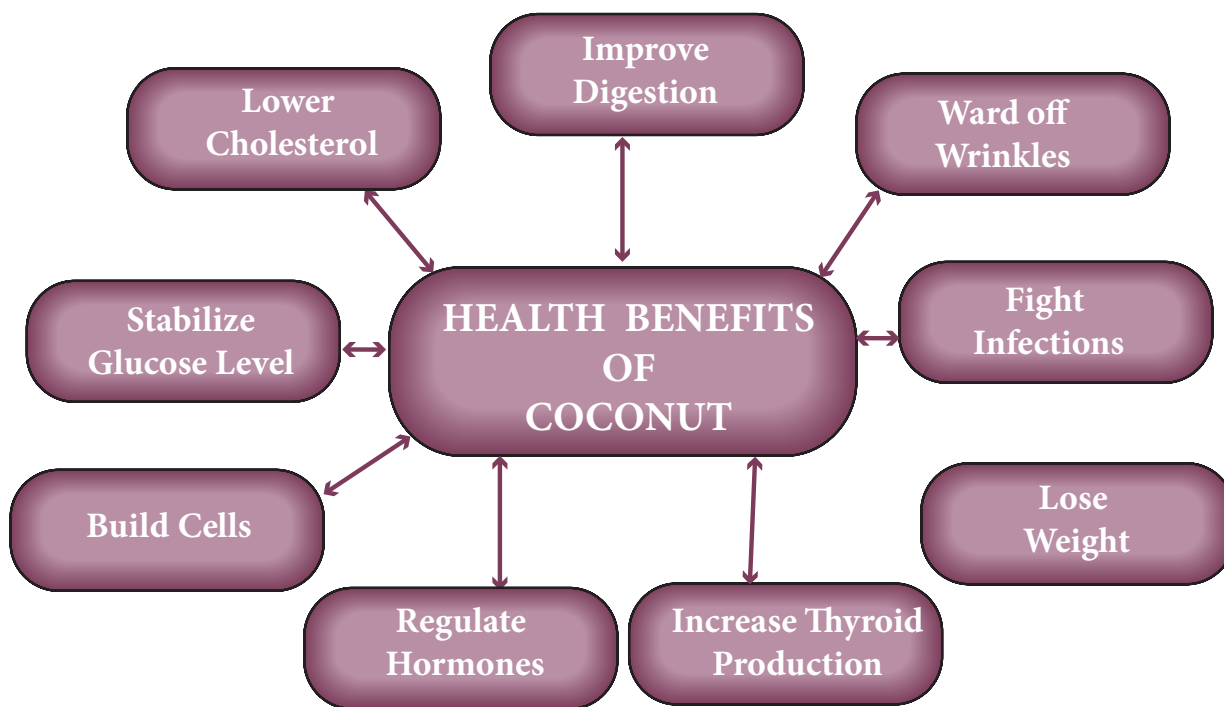


Fig 5.4: Health benefits of coconut

Coconut is used for its strong antioxidant properties and health benefits.

5.1.4 Almonds

Almonds or Badam are concentrated source of energy as they have 60 percent fat. Almonds have 20 percent protein like pulses. Like other nuts, carbohydrate content is low.

1. Almonds are used in the preparation of badam milk and sweets.
2. It is a rich source of protein that are not of high biological value.



Fig 5.5: Almonds

3. Almonds are an excellent source of vitamin E, an antioxidant.
4. It reduces the heart disease by reducing **LDL (bad) cholesterol**.



ACTIVITY - 3

List some commonly used nuts world wide.

- | | |
|----------|----------|
| 1. _____ | 2. _____ |
| 3. _____ | 4. _____ |

Nuts and oilseeds as source of antioxidants

1. Groundnuts are rich in the antioxidant flavonol.
2. Sesame seeds contain sesamol which has superior oxidative stability.
3. Mustard possess strong antioxidant activity.

5.2 Oil seeds and their importance

Oil is extracted from a range of oilseeds, fruits, nuts and seed kernels. However, not all oil bearing seeds and nuts contain edible oil. Some contain poisons or unpleasant flavours and are only used as thinner in paints.

A variety of vegetable oils are used for household cooking, and also as an ingredient for other food products such as baked items and snacks. Many oilseeds like mustard, corn, sunflower, sesame, palm and olive seeds are used everyday in various parts of our country for cooking purpose.

5.2.1 Mustard Seeds

- Mustard seeds are used for making mustard oil which is widely used for cooking in India.
- Mustard oil is a great oil substitute for traditional cooking oil as it is often used as a stimulant to help digestion and circulation.



Fig 5.6: Mustard

Due to its antibacterial properties, this oil can help protect the skin. It can also prevent cold, cough and skin problems.

5.2.2 Corn Oil

- Corn oil is a healthy edible oil.

- It is composed mainly of poly unsaturated fatty acids (PUFAs) and low on saturated fat.

5.2.3 Castor Seeds

- Castor seeds are used for making castor oil which is mostly used for beauty care purpose like hair care, skin care and other health benefits.
- Castor oil has a little higher viscosity so it is stickier than other types of oil.



Fig 5.7: Corn Oil



Fig 5.8: Castor Seeds

5.2.4 Sunflower Seeds

- Sunflower seeds are used for making sunflower oil which is widely used in cooking.
- It is low in carbohydrate and contains 40 percent fat and quality protein.
- Sunflower oil is a great option as it is a good source of vitamin E. It

contains all the essential nutrients that are required for a healthy body.

- The Poly Unsaturated Fatty Acid (PUFA) helps in lowering cholesterol. It prevents colon cancer and is helpful in the repairing of the body, boosts the immune system and also promotes proper functioning of the nervous system.

5.2.5 Sesame Seeds

- Sesame oil is made from sesame seeds. It is used for cooking, body massage, ayurveda and also as alternative medicine.
- Sesame oil is one great choice as it has a few restorative properties. Sesame oil is beneficial for diabetics and also brings down the circulatory strain of the heart.
- It enhances oral cleanliness and dental well being of a person.

5.2.6 Palm Oil Seeds

- Palm oil seeds are largely obtained from tropical, subtropical and warm regions of the world.
- These seeds are used for making palm oil which has many benefits. Palm oil is a rich source of antioxidants, carotenes and Vitamin E.

5.2.7 Olive Oil Seeds

- Olive seeds are largely found in Mediterranean region in some parts of Asia and Africa.
- Olive oil is used in cooking, and it is also good for heart.



Fig 5.9: Sunflower Seeds



Fig 5.10: Sesame Seeds



Fig 5.11: Palm Oil Seeds



Fig 5.12: Olive Oil Seeds



ACTIVITY - 4

List some recipes based on nuts and oils in our diet? _____

5.3 Fats and oils

Fat is an important component of our diet and serves a number of functions in the body. Fat provides our body with energy. Although we can get energy from other nutrients in our diet, we need some fat as it provides essential fatty acids that our body cannot make. It is also a carrier of the fat-soluble vitamins and is necessary for their absorption. In general, no more than about one third of our energy intake should come from fat as too much fat can be associated with high energy intakes that can lead to weight gain.

5.3.1. Nutritional significance

- A small amount of fat is an essential part of a healthy, balanced diet.



Role of fats in cooking

- They have high energy value.
- Impart palatability to diet.
- Add flavour and texture to the food.
- Improve taste and blends well with the food.
- Makes the food crispy.

In common usage, it is classified as fats and oils. Fats are solid at room temperature where as oils are liquid at room temperature.



DO YOU KNOW...?

1. Saturated eg. Butter, coconut oil
2. Mono unsaturated eg., olive oil
3. Poly unsaturated eg. Vegetable seed oil (soya been , corn, cotton seed)

Table 5.1 fatty acid composition of oil

Oil / Fats	Total Saturated	Total mono unsaturated	Total poly unsaturated
Groundnut oil	20.9	49.3	29.9
Coconut oil	89.5	7.8	2.0
Mustard oil	10.7	56.0	32.6
Sunflower	9.1	25.1	66.2
Sesame	13.7	41.3	44.5
Palm Oil	46.3	43.7	10.0
Olive Oil	14.8	74.5	10.0
Corn oil	12.7	29.6	57.4



- Fat helps the body to absorb vitamins A, D and E. These vitamins are fat-soluble, meaning they can only be absorbed with the help of fats.
- Any fat not used by body's cells or to create energy is converted into body fat. Likewise, unused carbohydrate and protein are also converted into body fat.
- All types of fat are high in energy. A gram of fat, whether saturated or unsaturated, provides 9kcal (37kJ) of energy compared with 4kcal (17kJ) for carbohydrate and protein. The fatty acid composition of oil is given in **table 5.1**.

5.3.2 Refined oils

Vegetable oils are produced from oil-containing seed, fruits or nuts by various pressing processes, by solvent extraction and also by combination of these. A seed cake that is relatively high in protein remains, after fat extraction is often used for animal feed.

5.3.3. Hydrogenation – vanaspathi and margarine

Hydrogenation

Plant oils contain a large percent of unsaturated fatty acids and hence have a tendency to become rancid. These unsaturated glycerides in oil can be converted to saturated glycerides by the addition of hydrogen. This process is known as "**hydrogenation**".

Hydrogenated fat is manufactured from vegetable oils by the addition of molecular

hydrogen to the double bonds in the unsaturated fatty acids in the presence of nickel.

Unsaturated Fatty Acids are of two types. There are

➤ MUFA – Mono Unsaturated Fatty Acids

PUFA – Poly Unsaturated Fatty Acids

DO YOU KNOW...?



As per the Heart Association of America, an individual should consume PUFA up to 10% and MUFA up to 15% of his/her total calories of the daily intake. MUFAs lower the level of bad cholesterol (LDL) in the blood and raise the good cholesterol (HDL). PUFAs reduce both the good and the bad cholesterol.

Vanaspathi

Hydrogenated oil in India is known as "**Vanaspathi**". It is manufactured by hydrogenating refined groundnut oil or a mixture of groundnut oil with other edible vegetable oils. Good and Bad Fatty Acids are found in Vanaspathi.

DO YOU KNOW...?



According to Vanaspathi Control Order, the melting point of Vanaspathi should be between 31°C and 37° C and it should contain 5 percent sesame oil and should be fortified with vitamin A.

Margarine

- Margarine is made from vegetable oils like cotton seed oil, soya bean oil, corn oil, groundnut oil, coconut oil and also meat fat.
- Margarine is made from one or more optional fat ingredients churned with cultured pasteurized skimmed milk or whey.
- Margarine is often used as a substitute for butter.



Fig 5.13: Margarine

5.4 Rancidity

Spoilage of fats may occur on storage, particularly if the fats are highly unsaturated and the conditions of storage are conducive to chemical change in the fats. It is called Rancidity. There are two types of rancidity.

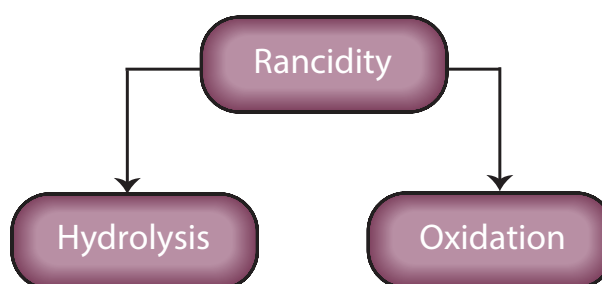


Fig 5.14: Types of rancidity

"**Hydrolysis**" is the decomposition of fats into free fatty acid and glycerol by enzymes in the presence of moisture. These free fatty acids released are responsible for the unpleasant flavour and odour.

During "**oxidation**" oxygen is added to the unsaturated linkage and this result in the formation of peroxides. These peroxides

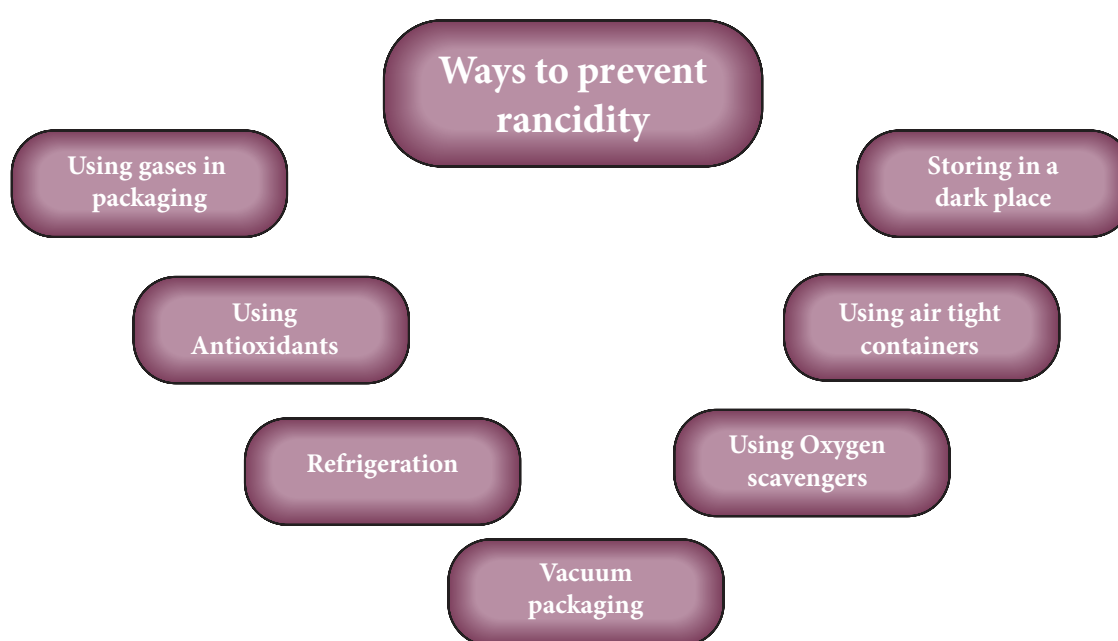


Fig 5.15: Ways to preventive measures



decompose to yield aldehyde and ketones which are responsible for the pronounced flavour.

Rancidity may also be caused by the absorption of odour and action of micro organism and enzymes.

Preventive Measures :

1. Adding inert Gases: Inert gas can be added to the packet or the container like nitrogen, which does not react with oxygen. Example Chips packets are flushed with nitrogen gas, so they don't become rancid.

2. Adding Antioxidant : Antioxidant are added to some foods to slow down or eliminate oxidative deterioration.

3. Refrigeration reduce the temperature and hence don't allow the microbes to continue their processes.

4. Vacuum Packaging is done to keep oxygen out.

5. By using oxygen scavengers or oxygen absorbers are added to enclosed packaging to help remove or decrease the level of oxygen in the package. They are used to help maintain product safety and extend shelf life.

6. Keeping food in air tight containers Less air too prevents rancidity.

7. By storing food in dark place.

Examples of Antioxidant:

- ▶ BHA – Butylated Hydroxy Anisole.
- ▶ BHT - Butylated Hydroxy Toluene.

5.5 Sugar, jaggery and honey

Sugar, jaggery and honey are sweetening agents. They are added to beverages and foods to increase palatability. Sugar is made up of glucose and fructose. It is a source of energy providing 4 kilocalories per gram. Sugar provides only empty calories. Jaggery is made from sugar cane juice after processing it. Jaggery is a fair source of iron. Palmyra palm, date palm or coconut palm is used to make jaggery. Honey is the golden coloured syrup made by bees from the nectar of flowers. It is a mixture of glucose and fructose.

5.5.1 Sugar

Sugars are carbohydrates from the sugarcane plant and sugar beets. It is also present naturally in fruits, vegetables and dairy. Our body uses sugar to give energy to our cells by breaking it down to glucose.

5.5.2 Types of sugar

Regular or white granulated sugar: It is the most common sugar called for in recipes when cooking and baking.

Confectioneries or powdered sugar: Powdered sugar is simple granulated sugar ground to a smooth powder and then sifted. Commercially available powdered sugar is mixed with a small amount of corn starch (3%) to prevent caking. It is often used in icings, confectionaries and whipping cream.

Castor sugar (Super fine sugar): This sugar has the smallest crystal size of white granulated sugars. It is generally used in making delicate or smooth desserts such as puddings. Because the crystals are so fine, they dissolve easily, even in cold drinks.



White granulated sugar



Palm sugar



Brown sugar



Beet sugar



Powder sugar

Fig 5.16: Types of sugar

Brown sugar: Brown sugar is made by mixing white sugar with various amount of molasses. Light brown sugar is often used in sauces and most baked goods.

Liquid sugar: Liquid sugar is white granulated sugar that has been dissolved in water. Liquid sugar is often used in drinks.

Palm sugar: It is a sweetener derived from any variety of palm tree. Palm sugar is an ingredient in both sweet and savoury dishes used throughout Asia, Middle East and North Africa.

Sugar and related products

1. Sucrose
2. D- Glucose
3. D- Fructose
4. Dextrose Syrup
5. Corn Syrup

Beet sugar: Sugar beet is a plant whose root contains a high concentration of sucrose and which is grown commercially for sugar production.

Function of sugar in foods

Sugars have a number of functions in the preparation of foods, such as improving taste and texture.

- Providing sweetness.
- Used as preservatives in jams and jellies.
- Increasing the boiling point or reduces the freezing point of foods.
- Allowing fermentation by yeast.

Health facts about sugar :

- Sweetened beverages such as colas, packaged fruit juices, aerated drinks should be avoided/limited as far as possible as the sugar in these products provide empty calories.

- High amounts of fat and sugar are used to prepare confectionery (cakes, pastries) and sweets. These foods should be consumed sparingly.

Sugars have long been cited for contributing to obesity, high blood pressure and high cholesterol. Here are some of the effects that consumption of too much sugar on health:



ACTIVITY - 5

List the different types of traditional sweets prepared with sugar and jaggery.

Too much sugar

- ▮ Cardiovascular Disease
- ▮ Dizziness
- ▮ Cholesterol
- ▮ Colon & Pancreatic Cancer
- ▮ Attention Deficit Disorder-ADD
- ▮ Attention Deficit Hyperactivity Disorder-ADHD
- ▮ Obesity
- ▮ Tooth decay
- ▮ Allergies
- ▮ Hypertension
- ▮ Type 2 Diabetes
- ▮ Metabolic Syndrome



Dizziness



Obesity



Allergies



Tooth decay

Sugar as a source of energy

Sugar is an important source of energy. During digestion, all carbohydrates in food (starches and sugars) break down into simple sugars. These molecular sugars are absorbed from the intestine into the blood stream and travel to the cells, where they are used to provide energy for cellular functions. In parts of the world, where people suffer from energy malnutrition and are undernourished, sugar is valued as an inexpensive source of energy to support human activities.

5.5.3 Stages of sugar cookery

When sugar is boiled at different temperatures, various sweets can be made.

5.5.4 Jaggery

Jaggery is a concentrated product of cane juice and can vary from golden brown to dark brown in colour. It contains upto 50% sucrose, 20% invert sugars and 20% moisture. It is mostly produced in India and Africa. It is used to make several Indian desserts and is known as a healthy replacement of sugar, primarily because it is unprocessed.

Forms of Jaggery

- Jaggery square – *Achu vellam*
- Jaggery palm – *Karuppatti*
- Jaggery (paagu) – *Paagu vellam*

Jaggery can also provide therapeutic benefits, and hence used as various medicines in ayurveda and folk medicine.

Table 5.2 Stages of sugar cookery

Product	Temperature	Test	Description of
Syrup	110-112°C	Thread	When syrup is dropped from a spoon, syrup spins a 5cm thread
barfi, fondant, fudge	112-115°C	Soft ball	Forms a soft ball when syrup is dropped in cold water.
Caramels	118-120°C	Firm ball	Forms a firm ball when syrup is dropped in cold water, does not flatten on removal from water.
Divinity, laddu, marshmallow	120-130°C	Hard ball	Forms a ball hard enough to hold its shape when syrup is dropped in cold water.
Butterscotch	132-143°C	Soft crack	Forms threads which are hard but not brittle when syrup is dropped in cold water.
Brittle	150-154°C	Hard crack	Forms threads which are brittle when syrup is dropped.
Caramel	170°C	brown liquid	Sugar melts and browns.



Some medicinal uses of jaggery are given below:

a) Common cold

The simple use of jaggery helps to get remedy from common cold. It is taken with dried ginger and black pepper and has similar effects as conventional medications.

Jaggery	3 grams
Black pepper	250 mg
Dried ginger powder	500 mg
Honey	1 tsp

Crush jaggery crystal, mix it with other ingredients. Eat it after meal three times a day. It works immediately after eating first dose.

Benefits of honey:

1. Useful for Weight reduction
2. Used for healing wounds
3. Home remedy for cough
4. Acts as a natural sleeping aid
5. Natural home remedy for dandruff
6. Natural energy drink
7. Bleaches Face & Skin
8. Boosts memory
9. Boosts Immune System
10. Helps with herbs.

b) Chronic Cough

Jaggery also works as chronic cough remedy. It reduces throat irritation due to soothing and smoothening effects on soft

tissues of throat. According to ayurveda, it produces warmth to the lungs and dilates the respiratory tract, so it helps in cough, asthma and breathing trouble.



5.5.5 Honey

Honey is a sweet food made by bees from the flowers nectar or honeydew droplets. It is the only food that includes all the substances necessary to sustain life, including enzymes, vitamins, minerals, and water and even more.

Honey is one among the most popular and widely used sweeteners with enormous health benefits. The health benefits and advantages of honey have been valued since ages.

Summary

- Nuts are very important for our diet. They give us energy and provide our body with plenty of antioxidants, vitamins and minerals.
- Groundnuts are a very rich source of protein and fat. They are exceptionally rich in Niacin.
- Cashew oil contains anti-bacterial properties that help our body to build up the immune system and fight against various infections and diseases.
- Almonds are an excellent source of vitamin E an antioxidant.
- Hydrogenated fat is manufactured from vegetable oils by the addition of molecular hydrogen to the double bonds in the unsaturated fatty acids in the presence of nickel.



- Margarine is made from vegetable oils. These types of fats help to reduce low-density lipoprotein (LDL), or bad, cholesterol when substituted for saturated fat.

- Vacuum packaging is done to keep oxygen out.
- Sugar, jaggery and honey are sweetening agents.
- Jaggery is a sweetener that is made from sugarcane.

Glossary

Terms	Meaning
MUFA	Mono Unsaturated Fatty Acid- fatty acids that have one double bond in the fatty acid chain with all of the remainder carbon atoms being single bonded
PUFA	Poly Unsaturated Fatty Acids- fatty acids that contain more than one double bond in the fatty acid chain.
Ounce	A unit of weight (one sixteenth of a pound approximately 28gms)
Kernel	A softer usually edible part of a nut, seed or fruit stone
HDL	High Density Lipoprotein called as good cholesterol
LDL	Low Density Lipoprotein called as bad cholesterol
Viscosity	State of being thick sticky and semifluid in consistency, due to internal friction
Free radicals	An uncharged molecule having an unpaired valency electron
Restorative	Having the ability to restore health strength or well being
Rancidity	Spoilage of oil foods
Oxidation	It is the chemical process by which an atom or group of atoms loses electrons
Deterioration	The process of becoming progressively worse
Confectionery	collection of Sweets and chocolates
Chronic	Persisting for a long time or constantly recurring

Questions

Part- A

Choose the correct answer: (1 mark)

1. Nuts are a rich source of _____ and _____

- a) Protein, Fat
- b) Calcium, Fat
- c) Carotenoids, Fat
- d) Carotenoids, Protein



2. Mustard oil contain _____ amount of total saturated fatty acid

- a) 56.0
- b) 20.9
- c) 20.10
- d) 20.11





3. Hydrogenated oil in India is known as _____

- a) Vanaspathi
- b) Butter
- c) Margarine.
- d) Ghee.

4. Fat helps the body absorb vitamins _____, _____ and _____

- a) A, D, E
- b) A, C, E
- c) A, D, K
- d) A, D, B

Part- B

Write short answers (2 mark)

1. Write the importance of groundnut
2. List the uses of cashew nuts
3. Write three uses of coconut in cookery.
4. Write short notes on Hydrogenation
5. Define Rancidity.
6. Write short note on sugar?
7. What are the benefits of Honey?
8. Write short notes on Jaggery.

Part – C Brief Answers (3 mark)

1. Write on the uses of fats in cookery.
2. Write short note on sunflower seeds
3. What is Margarine?
4. Discuss about refined oils
5. What are the functions of sugar?
6. Write on the ill effects of sugar
7. What are the types of sugars available in the market?

Part- D

Answers in detailed (5 mark)

1. What are the oils commonly used in your home and add a note on their characteristics
2. Explain the role of nuts in cookery.
3. Explain the types of sugars.
4. Compare the nutritive value of sugar, jaggery and honey.
5. Discuss the role of fats in cooking.
6. Discuss the nutritional significance of fats and oils.