

Q: Explain how a slice of bread after few days decomposes due to the growth of fungi. (5)

When a slice of bread is left exposed for a few days, it decomposes because of fungal growth.

Process

Here's how it happens:

- 1. Fungal spores:** Airborne spores from fungi like *Rhizopus* or *Penicillium* settle on the bread.
- 2. Favorable conditions:** Bread provides a moist, warm, and nutrient rich environment, which is ideal for fungal growth.
- 3. Germination and growth:** The spores germinate and grow, forming visible molds (fuzzy or colored patches).
- 4. Enzymatic Action:** Fungi release enzymes that break down the bread's starches and sugars into simpler substances for nutrition.

5. **Decomposition:** This leads to spoilage, with changes in texture, color, and smell, making the bread unfit for consumption.

Conclusion

Fungi play a crucial role in breaking down organic matter, such as bread, through enzymatic activity. While this process results in spoilage, it also demonstrates the natural recycling of nutrients in the environment.

Q.2. How carbohydrates, proteins, and fats are digested in humans? (5)

Introduction

The human digestive system efficiently breaks down carbohydrates, proteins, and fats into simpler

molecules that can be absorbed and utilized by the body for energy, growth, and repair.

1. Digestion of Carbohydrates

- **In the mouth :** Salivary amylase begins breaking down starch into maltose.

- **In the small intestine :** Pancreatic amylase further digests starch, while enzymes like maltase, lactase, and sucrase convert disaccharides (e.g., maltose, lactose, sucrose) into simple sugars like glucose, which are absorbed into the bloodstream.

2. Digestion of Proteins

- **In the stomach :** Pepsin, activated by hydrochloric acid, breaks down proteins into smaller peptides.

• In The Small Intestine :

Pancreatic enzymes such as trypsin and chymotrypsin break peptides into amino acids, which are absorbed through the intestinal lining into the blood.

3. Digestion of Fats

• In The Small Intestine :

Bile from the liver emulsifies fats into tiny droplets. Pancreatic lipase then breaks these droplets into glycerol and fatty acids, which are absorbed into the lymphatic system.

Conclusion

The digestion of carbohydrates, proteins, and fats is a complex yet efficient process that ensures the body receives essential nutrients for proper functioning and overall health.

Q.3: Difference between Antioxidants and preservatives? with examples. (5)

Introduction

Antioxidants and preservatives are important additives used in food and other products to maintain their quality and longevity. Both serve different purposes — antioxidants prevent oxidative damage, while preservatives protect against microbial spoilage.

Definitions

• Antioxidants :-

|| Substances that delay or prevent oxidation, protecting food and body cells from free radical damage. ||

• Preservatives :-

" Substances that inhibit the growth of microorganisms to prevent food spoilage and extend shelf life. "

Difference

Antioxidants

Preservatives

Function

Prevent oxidation and free radical damage.

Inhibit the growth of microorganisms.

Action

Delay chemical reactions caused by oxygen.

Stop biological activity from microbes.

Primary Use

Protect nutritional quality, color, and flavor of food.

Prevent food spoilage and decay.

Effect on Health

Reduces oxidative stress and protects cells from damage.

Prevents foodborne illness caused by microbes.

Application

Commonly used in fats, oils and beverages.

Widely used in canned foods, pickles and processed items.

Environmental Role

Reduces oxidative

Reduces spoilage

damage to
products exposed
to air.

caused by
microbial conta-
-mination in
storage.

source

Can be natural
(e.g., Vitamin C)
or synthetic
(e.g., BHT).

Can be natural
(e.g., salt, sugar)
or chemical
(e.g., sodium
benzoate.)

Examples

Vitamin C,
Vitamin E,
Beta-carotene,
BHT.

Salt, Vinegar,
Sodium Benzoate,
Potassium
Sorbate.

Conclusion

Antioxidants and preservatives

play complementary roles in maintaining food quality. Anti-oxidants focus on chemical protection by preventing oxidation, while preservatives control microbial activity to ensure safety and freshness. Together, they contribute significantly to food preservation and health protection.

Q.4: Role of Carbohydrates and Vitamins in the body? Discuss briefly.

Carbohydrates

Carbohydrates are the human body's key source of energy, providing 3.9 calories of energy per gram. The empirical formula of carbohydrates is $C_m(H_2O)_n$ (where m can be

different from n). carbohydrates are also known as saccharides, the word saccharides comes from Greek word sakaron which means sugar.

Classification

- **Monosaccharides:** Monosaccharides are often called simple sugars. They are the simplest sugars and cannot be hydrolyzed. e.g., glucose, fructose, and sucrose.
- **Oligosaccharides:** Oligosaccharides are compound sugars that yield 2 to 10 molecules of the same or different monosaccharides on hydrolysis. e.g., starches and fibers found in foods like grains, legumes, vegetables.
- **Polysaccharides:** Polysaccharides are

Compound sugars and yield more than 10 molecules of monosaccharides on hydrolysis.

e.g., starch, glycogen etc.

Functions

- Provide energy for daily activities and bodily functions.

Aid in the proper functioning of the brain, muscles, and organs.

Serve as a quick energy source for intense physical activity.

Help regulate blood sugar levels through fiber.

Sources

Fruits, vegetables, grains, legumes and dairy products.

Vitamins

Vitamins are organic compounds that are crucial for the body's metabolism, immune function, and overall health. They are needed by the body in a very small amount to trigger the thousands of chemical reactions necessary to maintain good health.

Classification

Vitamins are classified into two groups:

- **Fat-soluble vitamins** : Vitamins A, D, E, K, which are usually absorbed with the help of foods that contain fat.
- **Water-soluble vitamins** : Vitamins

B-complex (e.g., B₁, B₂, B₁₂) and vitamin C. These cannot be stored and rapidly leave the body.

Functions

- The most prominent function of the vitamins is that they act as cofactors.
- Along with their many functions, they enhance the body's use of carbohydrates, proteins, fats.
- **Fat-soluble Vitamins :**
 - > Vitamin D support bone health.
 - > Vitamin E act as antioxidants.
 - > Vitamin A help with vision.
 - > Vitamin K help in blood clotting.

• Water-soluble Vitamins :

- > B-vitamins aid in energy production.
- > Vitamin-C protect against cell damage, and support immune function.

Sources

- Fat-soluble : Liver, fish oils, dairy products, eggs, leafy greens.
- Water-soluble : Citrus fruits, vegetables, whole grains, meat etc.

Conclusion

Carbohydrates and vitamins are essential nutrients that play vital roles in maintaining overall

DAY: _____

DATE: _____

health. Carbohydrates provide the body with a primary energy source, fueling daily activities and bodily functions. Vitamins support various physiological processes, including metabolism, immunity, and cell protection. A balanced diet that includes a variety of carbohydrate-rich foods and vitamin sources is crucial for optimal health and well-being.
