Food Science CDE Practice Exam (Sample)

Study Guide

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Questions

1. Which essential nutrient provides the body with its most concentrated source of energy?

A. Vitamins

B. Carbohydrates

C. Proteins

D. Fats

2. Which type of fat is typically solid at room temperature?

A. Unsaturated fats

B. Saturated fats

C. Trans fats

D. Polyunsaturated fats

3. What process does chocolate undergo as part of its production from harvest to finished product?

A. Pasteurization

B. Homogenation

C. Fermentation

D. Lyophilization

4. Fats and oils belong to which family of compounds?

A. Protein

B. Carbohydrates

C. Lipids

D. Fiber

5. In which year did Andreas Sigismund Marggraf discover that sucrose is responsible for the sweetness of sugar beets and sugar cane?

A. 1650

B. 1774

C. 1829

D. 1888

6. What is the pretreatment for dehydration that inhibits enzyme activity but may extend drying time due to water absorption?

A. Sulfiting

B. Sulfuring

C. Blanching

D. Curing

7. Fats serve many functions in foods. Which function is not desired?

A. Emulsification

B. Tenderizing

C. Oxidation

D. Flavor

8. What is the primary use of sodium benzoate in soft drinks?

A. To prevent rancidity

B. To inhibit color deterioration

C. To inhibit mold growth

D. To prevent flavor breakdown

9. When measuring a volume of liquid in a buret, the volume is read from which part?

A. Meitnerium

B. Mendelevium

C. Meniscus

D. Mendotium

10. Inorganic elements essential for human health and growth are called _____.

A. Vitamins

B. Minerals

C. Proteins

D. Fiber

Answers

1. D
2. B
3. C
4. C
5. B
6. A
7. C
8. C
9. C
10. B

Explanations

1. Which essential nutrient provides the body with its most concentrated source of energy?

A. Vitamins

B. Carbohydrates

C. Proteins

D. Fats

Fats provide the body with its most concentrated source of energy because they contain more calories per gram than any other macronutrient. Specifically, fats provide about 9 calories per gram, while carbohydrates and proteins yield approximately 4 calories per gram. This higher caloric density means that fats serve as a vital energy reserve for the body, particularly during prolonged periods of activity or fasting. In addition to their role as an energy source, fats also serve other critical functions. They are essential for the absorption of fat-soluble vitamins (A, D, E, and K) and play a crucial role in cell membrane structure and hormone production. This energy concentration is particularly important in diets where efficient energy storage and utilization is necessary, highlighting the significant role fats play in overall nutrition and health.

2. Which type of fat is typically solid at room temperature?

A. Unsaturated fats

B. Saturated fats

C. Trans fats

D. Polyunsaturated fats

Saturated fats are typically solid at room temperature due to their molecular structure. These fats have no double bonds between the carbon atoms in their fatty acid chains, which allows the molecules to pack closely together. This tight packing results in a solid consistency when these fats are at room temperature. Common sources of saturated fats include animal products such as butter, cheese, and fatty cuts of meat, as well as some plant oils like coconut and palm oil. Other types of fats, such as unsaturated fats, trans fats, and polyunsaturated fats, generally have one or more double bonds in their fatty acid chains. This presence of double bonds introduces kinks or bends in their structure, preventing the molecules from stacking closely together, which keeps them in a liquid state at room temperature. Understanding these characteristics helps clarify why saturated fats remain solid, distinguishing them from other fat types.

3. What process does chocolate undergo as part of its production from harvest to finished product?

A. Pasteurization

B. Homogenation

C. Fermentation

D. Lyophilization

The production of chocolate involves several critical steps, and fermentation is one of the key processes that chocolate undergoes after the cocoa beans are harvested. This step is essential for developing the flavor and quality of the chocolate. During fermentation, freshly harvested cocoa beans, which are surrounded by a sweet pulp, are placed in shallow containers or heaped together for several days. This allows naturally occurring microorganisms, such as yeasts and bacteria, to thrive and break down the pulp. As a result, the beans undergo chemical changes that contribute to flavor development and help remove the undesirable bitter taste present in raw beans. Additionally, fermentation enhances the color of the beans and prepares them for subsequent drying. The fermentation process is crucial not only to the flavor but also to the overall quality of the chocolate, as it significantly influences the aromatic compounds that will be present in the final product. After fermentation, the beans are dried and then roasted, which further develops the chocolate flavor. The other processes mentioned in the options, such as pasteurization, homogenization, and lyophilization, are not part of the traditional chocolate production process. Pasteurization refers to the heating of a liquid to kill pathogens and extend shelf life, which is not applicable to cocoa beans. Homogenization

4. Fats and oils belong to which family of compounds?

A. Protein

B. Carbohydrates

C. Lipids

D. Fiber

Fats and oils are classified as lipids, which are a distinct category of organic compounds that are insoluble in water but soluble in organic solvents. This classification includes a variety of substances that share similar chemical properties and play vital roles in biological systems. Lipids can be further divided into several categories, including triglycerides (fats and oils), phospholipids, and sterols. Triglycerides, for instance, are the main form of stored energy in animals and plants; fats are typically solid at room temperature, while oils are liquid. In the context of nutrition, lipids are essential as they provide energy, support cell structure, and assist in the absorption of fat-soluble vitamins (A, D, E, and K). They also play important roles in hormone production and serve as signaling molecules in the body. The other categories of compounds—proteins, carbohydrates, and fiber—serve different functions and have distinct structures and characteristics that do not include the properties associated with fats and oils. Therefore, classifying fats and oils as part of the lipid family aligns with established scientific understanding of food science and nutrition.

5. In which year did Andreas Sigismund Marggraf discover that sucrose is responsible for the sweetness of sugar beets and sugar cane?

A. 1650

B. 1774

C. 1829

D. 1888

Andreas Sigismund Marggraf's discovery in 1774 identified sucrose as the compound responsible for the sweetness found in both sugar beets and sugar cane. This was a significant breakthrough in the understanding of carbohydrates, particularly in the context of sugar production. Marggraf's work laid the foundation for future developments in sugar chemistry and the agricultural practices surrounding sugar crops. His discoveries contributed to the broader understanding of plant biochemistry and eventually influenced the sugar industry, enhancing production methods and driving scientific inquiry into other types of sugars and their properties. The timeline places this discovery in the late 18th century, which coincides with significant advances in chemistry and a growing interest in understanding the constituents of food.

6. What is the pretreatment for dehydration that inhibits enzyme activity but may extend drying time due to water absorption?

A. Sulfiting

B. Sulfuring

C. Blanching

D. Curing

The pretreatment for dehydration that inhibits enzyme activity and can extend drying time due to water absorption is sulfiting. This process involves the application of sulfur dioxide or sulfites to the food, which serves to inhibit the enzymes responsible for browning and spoilage. By stopping enzymatic reactions, sulfiting helps preserve color, flavor, and nutritional quality during the drying process. However, sulfiting can lead to an extension of drying time. When sulfites are applied, they can cause the food to absorb additional moisture. This interaction can create a situation where the initial moisture content is temporarily increased, potentially delaying the overall drying process. It's important to manage this aspect of sulfiting to optimize the drying time and ensure product quality. Blanching and curing serve different purposes: blanching primarily involves briefly boiling the food to inactivate enzymes while also reducing microbial load, whereas curing typically refers to a preservation method involving salt and sometimes nitrates or nitrites. Sulfuring, often confused with sulfiting, specifically relates to the use of sulfur dioxide in gas form rather than in solution, which can have different effects on the food.

7. Fats serve many functions in foods. Which function is not desired?

A. Emulsification

B. Tenderizing

C. Oxidation

D. Flavor

Fats play a vital role in food formulation and have several desirable functions, including emulsification, tenderizing, and flavor enhancement. However, oxidation is typically an undesirable process associated with fats. Oxidation can lead to rancidity, which not only affects the flavor by producing off-tastes but also results in a loss of nutritional quality. The oxidative process can degrade the fatty acids in fats into harmful compounds, which can negatively impact both the safety and sensory characteristics of food products. This is why oxidation is not a desired function in the context of fats in food. In contrast, emulsification is the process that helps blend fat with water, improving texture and mouthfeel. Tenderizing contributes to the softness and palatability of baked goods and other foods, while flavor enhancement from fats contributes to the overall sensory experience of the food. Each of these functions is desirable and beneficial, whereas oxidation poses risks that are to be avoided in food processing and storage.

8. What is the primary use of sodium benzoate in soft drinks?

A. To prevent rancidity

B. To inhibit color deterioration

C. To inhibit mold growth

D. To prevent flavor breakdown

Sodium benzoate is primarily used in soft drinks for its ability to inhibit mold growth. As a preservative, it is effective in acidic environments such as those found in many soft drinks. Its antifungal properties help extend the shelf life of these beverages by preventing mold and yeast proliferation, which can spoil the product or create off-flavors. While sodium benzoate can have some influence on the stability of flavors and colors to a degree, its primary function in this context is to protect against microbial growth, ensuring the safety and quality of the drink over time. Other preservatives might be more effective for preventing rancidity or flavor breakdown, and specific agents are typically utilized for color preservation. Hence, the primary use of sodium benzoate stands out clearly as the inhibition of mold growth.

9. When measuring a volume of liquid in a buret, the volume is read from which part?

A. Meitnerium

B. Mendelevium

C. Meniscus

D. Mendotium

The volume of liquid in a buret is read from the meniscus, which is the curved surface of the liquid in the buret. This surface curve occurs due to the interactions between the liquid molecules and the material of the buret, as well as the effects of gravity. When taking a measurement, it is essential to ensure that the eye is level with the meniscus to achieve an accurate reading. Reading from the meniscus is a standard practice in laboratory procedures to avoid parallax errors, which can occur if the measurement is taken from above or below the level of the liquid. Thus, measuring from the bottom of the meniscus provides a consistent and precise volume reading, making it the correct answer for this question. The other options listed do not relate to the correct method of measuring liquid volume in a buret and are simply names of elements or made-up terms, unaffecting the principles of measurement in laboratory settings.

10. Inorganic elements essential for human health and growth are called _____.

A. Vitamins

B. Minerals

C. Proteins

D. Fiber

The term that refers to inorganic elements essential for human health and growth is minerals. Minerals play a crucial role in various bodily functions, including the formation of bones and teeth, the regulation of metabolism, and the maintenance of fluid balance. They are classified into two categories: macrominerals, which are needed in larger amounts (such as calcium and potassium), and trace minerals, which are required in smaller quantities (like iron and zinc). Unlike vitamins, which are organic compounds and can be broken down by heat or light, minerals retain their chemical structure and are inorganic. This distinction is important for understanding dietary requirements and the role various nutrients play in maintaining health. Thus, the correct choice highlights the significance of minerals in nutrition and their unique attributes compared to other nutrient types.