

Science of Food Practice Test (Sample)

Study Guide



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Questions

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- 1. What is the effect of increasing water activity in a food product?**
 - A. Reduces flavor**
 - B. Increases freshness**
 - C. Promotes microbial growth**
 - D. Decreases shelf life**
- 2. What is a key benefit of learning about food chemistry?**
 - A. Understanding cultural dish preferences**
 - B. Knowing how to cook gourmet meals**
 - C. Recognizing the interactions of food components**
 - D. Learning about the history of food**
- 3. Which of the following is an example of an incomplete protein?**
 - A. Eggs**
 - B. Almonds**
 - C. Chicken**
 - D. Fish**
- 4. What is the role of the USDA in food science?**
 - A. Setting food prices for consumers**
 - B. Regulating food safety and conducting agricultural research**
 - C. Making food products available in grocery stores**
 - D. Controlling the international trade of food products**
- 5. The enzyme that breaks down starch is:**
 - A. Protease**
 - B. Amylase**
 - C. Lactase**
 - D. Cellulase**

- 6. What is the most common method of freezing food products?**
- A. Liquid nitrogen freezing**
 - B. Air freezing**
 - C. Contact freezing**
 - D. Blast freezing**
- 7. What is the role of proteins in the body, other than building tissues?**
- A. Providing energy**
 - B. Serving as enzymes and hormones**
 - C. Storing fat**
 - D. Regulating blood sugar**
- 8. Which of these is a critical factor that determines the effectiveness of HPP?**
- A. Temperature**
 - B. Pressure**
 - C. Light exposure**
 - D. pH level**
- 9. After what percent loss in total body water do function and performance begin to decline in athletes?**
- A. 1%**
 - B. 2%**
 - C. 3%**
 - D. 4%**
- 10. Which statement about drying is not true?**
- A. Increases the mass and volume of products**
 - B. Improves shelf life**
 - C. Reduces water content**
 - D. Prevents microbial growth**

Answers

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

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Explanations

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1. What is the effect of increasing water activity in a food product?

- A. Reduces flavor**
- B. Increases freshness**
- C. Promotes microbial growth**
- D. Decreases shelf life**

Increasing water activity in a food product has a significant impact, particularly by promoting microbial growth. Water activity refers to the availability of water in a food that is free for microbial use, as opposed to water that is bound to molecules like salts and sugars. When water activity is high, it creates an ideal environment for bacteria, yeast, and molds to thrive. Many microorganisms require a certain level of water activity to grow, and if the water content exceeds this optimal level, it accelerates their growth rate. This is why food products with higher water activity tend to spoil faster or become unsafe to consume, as the proliferation of these microorganisms can lead to foodborne illnesses or spoilage. This understanding is particularly important in food preservation methods, where techniques such as drying, salting, or sugar addition aim to lower water activity, thereby inhibiting microbial growth and prolonging shelf life.

2. What is a key benefit of learning about food chemistry?

- A. Understanding cultural dish preferences**
- B. Knowing how to cook gourmet meals**
- C. Recognizing the interactions of food components**
- D. Learning about the history of food**

Recognizing the interactions of food components is central to understanding food chemistry and is foundational for numerous applications in cooking, nutrition, and food science. By grasping how different chemical substances in food interact, one can predict how flavors will combine, how textures will change during cooking, and how nutrients will be preserved or altered. This knowledge enables better food processing techniques, enhances flavor development, and improves food safety. Additionally, it supports understanding dietary effects on health, as the way nutrients interact can influence absorption and metabolic processes in the body. This insight is crucial for food scientists, chefs, and nutritionists alike, making it an essential aspect of food studies.

3. Which of the following is an example of an incomplete protein?

- A. Eggs**
- B. Almonds**
- C. Chicken**
- D. Fish**

An incomplete protein is one that does not contain all nine essential amino acids that the body cannot synthesize on its own and must obtain from food. Almonds are considered an incomplete protein because they lack sufficient amounts of some essential amino acids, particularly lysine. While almonds do provide a variety of nutrients and are a good source of certain amino acids, they do not provide a complete amino acid profile necessary for muscle repair and overall health. On the other hand, eggs, chicken, and fish are complete proteins, as they contain all nine essential amino acids in adequate proportions. This makes food sources like these particularly valuable for dietary protein, especially for those focusing on muscle growth, recovery, or overall balanced nutrition. Understanding the distinction between complete and incomplete proteins is crucial for developing a well-rounded diet, particularly for individuals who may be vegetarian or vegan and need to combine different protein sources to ensure they receive all essential amino acids.

4. What is the role of the USDA in food science?

- A. Setting food prices for consumers**
- B. Regulating food safety and conducting agricultural research**
- C. Making food products available in grocery stores**
- D. Controlling the international trade of food products**

The role of the USDA (United States Department of Agriculture) in food science encompasses several critical functions primarily focused on regulating food safety and conducting agricultural research. The USDA is responsible for establishing and enforcing regulations to ensure that food products are safe for consumption, which includes overseeing the inspection of meat, poultry, and egg products. This regulatory function is essential to protect public health and maintain the integrity of the food supply. In addition to food safety, the USDA conducts agricultural research that supports the development of improved practices, technologies, and food products. This research contributes to advancements in food science, helping to increase agricultural productivity, enhance food quality, and promote sustainability within the food system. The USDA also engages in education and outreach efforts to inform producers and consumers about safe food handling and nutrition. This comprehensive scope of responsibilities underscores the USDA's pivotal role in maintaining the safety and quality of the nation's food supply while fostering innovation in agricultural practices. The other options such as setting food prices, making food products available in stores, or controlling international trade do not accurately reflect the core functions of the USDA in relation to food science.

5. The enzyme that breaks down starch is:

- A. Protease**
- B. Amylase**
- C. Lactase**
- D. Cellulase**

Amylase is the enzyme specifically responsible for breaking down starch into simpler sugars, such as maltose and glucose. It accomplishes this by hydrolyzing the glycosidic bonds between the glucose units in starch. This process primarily begins in the mouth, where salivary amylase is secreted, and continues in the small intestine, where pancreatic amylase further breaks down starch. The other enzymes listed do not perform the same function. Protease breaks down proteins into peptides and amino acids, lactase is involved in the digestion of lactose (the sugar found in milk), and cellulase breaks down cellulose, a component of plant cell walls. Thus, amylase is the key enzyme for starch digestion, making it the correct answer.

6. What is the most common method of freezing food products?

- A. Liquid nitrogen freezing**
- B. Air freezing**
- C. Contact freezing**
- D. Blast freezing**

The most common method of freezing food products is air freezing. This approach involves circulating cold air around the food items to lower their temperatures. Air freezing is popular in both commercial and home settings due to its simplicity and effectiveness for a wide variety of foods. In many household freezers, the air freezing method is employed, as it utilizes the freezer's fan system to distribute cold air evenly, allowing for gradual freezing. While this method may increase the time required for food to freeze compared to some other techniques, it is typically more accessible and requires less specialized equipment. Other methods, like blast freezing, utilize rapid airflow to quickly drop temperatures and are often used in commercial settings for efficiency but are not as commonly used in domestic environments. Liquid nitrogen freezing is specialized and used primarily in industrial applications or for certain culinary techniques. Contact freezing, while effective for certain food shapes and sizes, is less common for bulk freezing of diverse food products.

7. What is the role of proteins in the body, other than building tissues?

A. Providing energy

B. Serving as enzymes and hormones

C. Storing fat

D. Regulating blood sugar

Proteins serve a variety of crucial roles in the body, and one of their primary functions, aside from building and repairing tissues, is acting as enzymes and hormones. Enzymes are proteins that facilitate biochemical reactions throughout the body, speeding them up and enabling processes such as digestion and metabolism. Hormones, which are also often proteins, act as chemical messengers that regulate various physiological activities, such as growth, metabolism, and mood. The roles of enzymes and hormones are vital for maintaining homeostasis and facilitating communication between different systems in the body. While proteins can be involved in providing energy and other functions, their roles as enzymes and hormones are fundamental to the body's functioning. This differentiates them from other macronutrients and emphasizes the versatility and importance of proteins in biochemical processes beyond mere structural support.

8. Which of these is a critical factor that determines the effectiveness of HPP?

A. Temperature

B. Pressure

C. Light exposure

D. pH level

High-Pressure Processing (HPP) is a non-thermal food preservation method that aims to extend the shelf life of food products while maintaining their quality. Among the critical factors in HPP, pressure plays the most significant role. The effectiveness of HPP is largely determined by the amount of pressure applied to the food product. During the HPP process, food is subjected to extremely high pressures—typically between 200 and 600 megapascals—which can result in the inactivation of microorganisms and enzymes that can cause spoilage and foodborne illnesses. The high pressure alters the structure of these microorganisms and can denature proteins, thereby enhancing the safety and extending the shelf life of the food without the need for high temperatures. While temperature, light exposure, and pH levels can influence various aspects of food preservation, they are not the primary factors defining the effectiveness of HPP. For example, while temperature can affect enzyme activity, it is not the focal point of the HPP strategy which primarily revolves around pressure. Therefore, the critical factor that determines the effectiveness of HPP is indeed the pressure applied during the process.

9. After what percent loss in total body water do function and performance begin to decline in athletes?

- A. 1%
- B. 2%**
- C. 3%
- D. 4%

The correct answer is that a 2% loss in total body water is when function and performance in athletes begin to decline. This threshold is critical in understanding hydration's role in athletic performance. At this level of dehydration, physiological responses start to change significantly, affecting cardiovascular function, thermoregulation, and overall physical performance. When an athlete experiences a loss of 2% of body weight due to dehydration, they can start to feel fatigued, experience decreased endurance, and may notice an increase in perceived exertion during their activities. This is primarily because water is essential for maintaining blood plasma volume, which is crucial for transporting oxygen and nutrients to working muscles and removing waste products. Moreover, dehydration at this level can also impair cognitive function, which is crucial for sports that require quick decision-making and coordination. This understanding highlights the importance of maintaining adequate hydration before, during, and after exercise to optimize athletic performance and reduce the risk of heat-related illnesses.

10. Which statement about drying is not true?

- A. Increases the mass and volume of products**
- B. Improves shelf life
- C. Reduces water content
- D. Prevents microbial growth

Drying is a process used to remove moisture from food products, and it generally serves several purposes, among which are improving shelf life, reducing water content, and preventing microbial growth. When food is dried, the moisture that supports the growth of spoilage organisms is largely eliminated, which contributes significantly to extending the product's shelf life. In terms of volume and mass, drying typically decreases both. As moisture evaporates, the weight of the product reduces because water is a significant component of the food's mass. Furthermore, the overall volume of the product is also reduced as the structure contracts without the moisture. Therefore, the statement about drying increasing the mass and volume of products is indeed not true, as the drying process leads to the opposite effect. This understanding reflects the core principles of food preservation and the mechanics surrounding drying methods.