

Gastronomic Science and Food Chemistry

Gastronomy · Answer Key · 12 Questions

1. What is the chemical process responsible for the non-enzymatic browning of food that occurs when amino acids and reducing sugars are heated together?

- A) Caramelization
- B) Maillard reaction**
- C) Saponification
- D) Polymerization

2. Which protein structure is primarily responsible for the structural elasticity and extensibility of wheat-based doughs?

- A) Amylose and Amylopectin
- B) Glutenin and Gliadin**
- C) Casein and Whey
- D) Collagen and Elastin

3. In molecular gastronomy, which substance is commonly used to create spheres through the process of ionotropic gelation with calcium chloride?

- A) Sodium alginate**
- B) Xanthan gum
- C) Agar-agar
- D) Carrageenan

4. What is the critical temperature range for the denaturation of egg white proteins (ovalbumin), leading to coagulation?

- A) 40-50°C
- B) 60-65°C**
- C) 80-85°C
- D) 95-100°C

5. Which fatty acid is the primary component of extra virgin olive oil, typically comprising 70-80% of its total fatty acid profile?

- A) Linoleic acid
- B) Palmitic acid
- C) Oleic acid**
- D) Stearic acid

6. What chemical reaction causes the green color change in chlorophyll when vegetables are cooked in an acidic environment?

A) Pheophytinization

- B) Chelation
- C) Oxidation
- D) Reduction

7. Which natural enzyme found in pineapple (*Ananas comosus*) acts as a potent protease, capable of hydrolyzing peptide bonds in meat proteins?

A) Papain

B) Bromelain

- C) Ficin
- D) Actinidin

8. What is the primary physical mechanism by which an emulsion, such as mayonnaise, remains stable over time?

A) Steric stabilization

- B) Coalescence
- C) Sedimentation
- D) Flocculation

9. In the context of meat science, what is the 'rigor mortis' phase primarily caused by in post-mortem muscle tissue?

A) Depletion of ATP

- B) Excessive hydration
- C) Increase in glycogen
- D) Formation of lactic acid

10. Which polysaccharide, derived from red algae, is uniquely capable of forming a thermoreversible gel that melts at 85°C but sets at 32-45°C?

A) Pectin

B) Agar-agar

- C) Guar gum
- D) Locust bean gum

11. What is the specific type of chemical bond responsible for the secondary structure of proteins, critical for the stability of a cooked gel?

A) Covalent bonds

B) Hydrogen bonds

- C) Ionic bonds
- D) Van der Waals forces

12. Which volatile organic compound is the primary contributor to the characteristic aroma of 'earthiness' in beetroot?

A) Geosmin

B) Limonene

C) Vanillin

D) Diacetyl