

Casein Experiment – Advanced MCQs

1. Why is casein considered structurally “less organized” than many proteins?
 - A. It lacks amino acids
 - B. It contains many proline residues disrupting folding
 - C. It forms strong disulfide bonds
 - D. It is highly crystalline
2. The absence of disulfide bonds in casein implies that:
 - A. It is highly stable structurally
 - B. Its tertiary structure is limited
 - C. It is completely unfolded
 - D. It cannot interact with calcium
3. Casein exists in milk as calcium caseinate. Philosophically, this suggests:
 - A. Proteins exist independently of ions
 - B. Structure and function depend on ionic balance
 - C. Calcium is irrelevant to stability
 - D. Proteins are always neutral
4. Why do casein micelles remain stable in milk at pH 6.6?
 - A. They are neutral
 - B. They carry net positive charge
 - C. Electrostatic repulsion prevents aggregation
 - D. They are chemically bonded
5. The role of κ -casein in micelles is BEST described as:
 - A. Structural core
 - B. Solubilizing and stabilizing agent
 - C. Enzyme catalyst
 - D. Energy source
6. At the isoelectric point, casein precipitates because:
 - A. It becomes highly charged
 - B. It loses solubility due to zero net charge
 - C. It reacts chemically with acid
 - D. It denatures completely
7. Why does excess acetic acid redissolve casein?
 - A. Because protein degrades
 - B. Because charge is restored at extreme pH
 - C. Because ethanol interferes
 - D. Because micelles reform

8. Which statement BEST explains casein solubility at both high and low pH?

- A. It is always neutral
- B. It gains charge in both extremes
- C. It becomes hydrophobic
- D. It loses phosphate groups

9. The concept of isoelectric point reflects:

- A. Maximum solubility
- B. Minimum interaction with solvent
- C. Zero net charge condition
- D. Maximum enzymatic activity

10. Why does rapid mixing prevent proper precipitation?

- A. It increases temperature
- B. It dissolves forming aggregates
- C. It reduces pH
- D. It destroys proteins

11. Casein micelles differ from typical micelles because:

- A. They are hydrophobic inside only
- B. Their interior is highly hydrated
- C. They contain lipids only
- D. They are unstable

12. The presence of phosphate groups in casein primarily contributes to:

- A. Hydrophobicity
- B. Calcium binding
- C. Protein folding
- D. Enzyme activity

13. Why is casein insoluble at neutral pH?

- A. It is degraded
- B. It is uncharged
- C. It is hydrophobic only
- D. It binds to lactose

14. The use of ethanol and ether mixture serves to:

- A. Dissolve casein
- B. Remove fats from precipitate
- C. Increase protein charge
- D. Denature protein

15. Casein not coagulating by heat implies:

- A. It is not a protein

- B. Its structure resists thermal denaturation
- C. It lacks hydrogen bonds
- D. It is unstable

16. Why is milk stable before acid addition despite containing proteins?

- A. Proteins are inactive
- B. Electrostatic repulsion prevents aggregation
- C. Proteins are dissolved chemically
- D. Temperature stabilizes them

17. The formation of cheese is fundamentally based on:

- A. Oxidation
- B. Protein precipitation
- C. Lipid breakdown
- D. Carbohydrate hydrolysis

18. The slow release of amino acids from casein in the stomach suggests:

- A. Rapid digestion
- B. Gel formation delays breakdown
- C. Immediate absorption
- D. Protein instability

19. Which concept BEST explains why casein forms micelles?

- A. Random aggregation
- B. Balance of hydrophobic and ionic interactions
- C. Enzymatic catalysis
- D. Hydrogen bonding only

20. Why is the percent yield of casein limited (~3–5%)?

- A. Milk contains only casein
- B. Casein is the only protein
- C. Casein is only part of milk composition
- D. Extraction is inefficient

Model Answers

1. B
2. B
3. B
4. C
5. B
6. B
7. B
8. B
9. C
10. B
11. B
12. B
13. B
14. B
15. B
16. B
17. B
18. B
19. B
20. C