

**Shahjalal University of Science & Technology**

**Department of Genetic Engineering & Biotechnology**

**Assignment**

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# Structure of casein micelles

**Caseins:**

Casein is a conjugated proteinof milk thatgivesmilk itswhitecolor. Cow's milk consists of around 80% casein protein. The main fractions are **alpha (s1) caseins, alpha (s2) caseins, ß-caseins** and **kappa-caseins**. The property which distinguish all caseins is their low solubility at pH 4.6.The role of fractional component of caseins are:

**Alpha (s1)-casein:**

Two hydrophobic regions, containing all the proline residues, separated by a polar region, which contains all but one of eight phosphate groups. It can be precipitated at very low levels of calcium.

**Alpha (s2)-casein:**

Concentrated negative charges near N-terminus and positive charges near C-terminus. It can also be precipitated at very low levels of calcium. **ß -casein:**

Highly charged N-terminal region and a hydrophobic C-terminal region. Very amphiphilic protein acts like a detergent molecule. It will form a large polymer at 20° C but not at 4° C. Less sensitive to calcium precipitation.

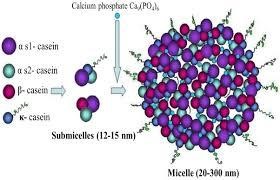
**Kappa-casein:**

Very resistant to calcium precipitation, stabilizing other caseins.

**Structure: The Casein Micelles**

The casein proteins found in sponge like colloidal particle which are highly hydrated known as the **casein micelle**.

In the "casein sub-micelle" model, the small aggregation of whole casein, containing 10 to 100 casein molecules, called **submicelles**.

It is thought that there are two different kinds of submicelle: with and without kappa-casein. These submicelles contain a hydrophobic core and are covered by a hydrophilic coat. The hydrophilic CMP of the kappa-casein exists as a flexible hair.

**Colloidal-calcium phosphate** (CCP) acts as a cement between the submicelles that form the casein micelle, binding by

Covalent bond or electrostatic force. Submicelles rich in kappa-casein occupy a surface position. The hairy layer of 7 nm thick (at least) acts to block further aggregation of submicelles by **steric repulsion** but the casein micelles are not static.