

Viscoelastic Properties of Oil-Water Interfaces Covered by Bovine β -Casein Tryptic Peptides

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A combination of proteolysis and dilational rheology has been used to study the behavior of films of β -casein (β -CN) and of peptides spread at the oil-water interface. Identification of the peptides produced by trypsin hydrolysis of β -CN in emulsion at 37° C provided information on the structure of β -CN adsorbed at the oil-water interface. Good interface properties were observed for β -CN or its peptides, probably because of the amphipathic nature of β -CN or a synergistic effect between hydrophilic and hydrophobic peptides. Remarkable surface activity was found for the amphipathic peptide β -CN (f114-169). Rheological studies had shown that interface films made with peptide fractions or with β -CN were elastic rather than viscous. Film made with the purified peptide β -CN (f114-169) was merely elastic at the triolein-water interface. A decrease of the viscoelastic modulus was observed for aging β -CN film but not for aging peptide films; The β -CN decrease was related to the flexibility of its structure. When the interface is increased by the dilation of an aqueous droplet plunged into oil, β -CN may expose new polypeptide trains to cover the increased interface, unlike peptides with simpler structures.

Key Words: oil-in-water emulsion • casein hydrolysis • bovine milk • viscoelasticity

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