

Reaction kinetics of pressure-induced denaturation of bovine immunoglobulin G

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Abstract

Kinetic parameters for pressure-induced denaturation of immunoglobulin G (IgG) in skim milk, rennet whey and phosphate buffer were determined over the pressure range 450–700 MPa at 20 °C. Denaturation of IgG was estimated by the loss of reactivity with their specific antibodies using radial immunodiffusion. Values of residual immunoreactive IgG after each pressure treatment were determined, and data were subjected to kinetic analysis. Denaturation of IgG in the three media was best described assuming a reaction order of $n = 1.5$. The rate constants for pressure-induced denaturation of IgG were similar when treated in milk and buffer whereas higher values were obtained when treated in rennet whey, indicating that IgG is more sensitive to pressure in this medium. These results should be considered in the design of pressure treatments of IgG to preserve its structure and thus its biological function.