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Sterilization of Proteinaceous Food Additives by Irradiation: Molecular Alteration of Plasma Proteins by Electron Beam Irradiation

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Abstract

We performed a detailed study of the effects of electron beam irradiation on the functional characteristics of bovine blood plasma protein samples using indices of gel strength, syneresis, moisture adsorption, molecular weight distribution, viscosity, organoleptic evaluation and microbial experiments. The functional characteristics of plasma proteins subjected to five different levels of electron beam radiation were evaluated in comparison to non-irradiated samples.

1) No significant change was noted in gel strength, water holding capacity.
2) Electron beam irradiation was observed to polymerize plasma proteins. To prove this phenomenon of molecular weight, molecular alteration of plasma proteins was inferred from changes in viscosity and changes in peak components according to measured molecular weight distribution.
3) Regardless of molecular alteration, no significant changes were noted in terms of taste, flavor or the functional characteristics of plasma proteins appropriate for use in food products. It was therefore learned that such plasma proteins may be used to impart gel strength, viscosity or water retention characteristics to food items requiring sterilization treatment, regardless of the amount of electron beam radiation applied to such plasma proteins.

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