Optimization of a gelled emulsion intended to supply ω-3 fatty acids into meat products by means of response surface methodology

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Abstract

The optimization of a gelled oil-in-water emulsion was performed for use as fat replacer in the formulation of ω-3 PUFA-enriched cooked meat products. The linseed oil content, carrageenan concentration and surfactant–oil ratio were properly combined in a surface response design for maximizing the hardness and minimizing the syneresis of the PUFA delivery system. The optimal formulation resulted in a gelled emulsion containing 40% of oil and 1.5% of carrageenan, keeping a surfactant–oil ratio of 0.003. The gel was applied as a partial fat replacer in a Bologna-type sausage and compared to the use of an O/W emulsion also enriched in ω-3. Both experimental sausages contributed with higher ω-3 PUFA content than the control. No sensory differences were found among formulations. The selected optimized gelled oil-in-water emulsion was demonstrated to be a suitable lipophilic delivery system for ω-3 PUFA compounds and applicable in food formulations as fat replacer.