**Rheological characterization of fish skin gelatin and κ-carrageenan mixtures**

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Marine gelatin has a broad range of applications in both the food and pharmaceutical industries as it is as a hydrocolloid with exceptional texture characteristics. Fish and animal skins which are by-products of the meat and fish processing industries, can be used for extracting gelatin, that has important nutritional and functional properties1. The skin of warm-water fish such as tilapia is a potential source for gelatin that can be used in products requiring high gel strength. The aim of this study was to investigate the interaction of tilapia fish skin gelatin with к (kappa)-carrageenan, a common stabiliser used in dairy products, in terms of the rheological properties. Tilapia gelatin (TG) was extracted from the skin of tilapia (*Oreochromis niloticus*). Aqueous solutions were prepared with 5% (w/v) TG and 0.25%, 0.50% or 0.75% (w/v) κ-carrageenan (CG) and subjected to small and large deformation rheological tests. The gelling temperatures of 5% TG + 0.25% CG, 5% TG + 0.50% CG and 5% TG + 0.75% CG were 21.7°C, 28.7°C and 38.9°C respectively, which were higher than for 10% TG alone (19.9°C). Thus an increase in the к-carrageenan concentration resulted in a higher gelling temperature of the mixture. The mixtures of tilapia gelatin containing increasing concentrations of κ-carrageenan (0.25, 0.5 and 0.75% CG) resulted in high elastic modulus (G’) values; 33.0 Pa, 134.5 Pa and 627.4 Pa respectively compared to 20.5 Pa for tilapia gelatin alone. The gel melting behaviour was explained as a two- step process, which is the conformational change of helices involved in the network junction zones followed by the melting of aggregates 2. The complexes of fish gelatin and к- carrageenan at 60°C were probably stabilised by electrostatic interactions3. The Bloom strength of gelatin at 6.67% (w/v) in water was 218.2 + 10.4 whereas the commercial samples had Bloom values of 78.4 + 0.6 and 107.7 + 1.0 respectively. In conclusion, an increase in κ- carrageenan concentration in the mixture resulted in better gelling properties. The formation of gelatin-к-carrageenan complexes and concentration of free gelatin in an aqueous phase determine the stability and the rheological properties. Thus, an increase in the к-carrageenan/ gelatin (w/w) ratio led to increased gelatin-к-carrageenan complexes and higher storage modulus values.

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