**The effect of cellulose and starch on the rheological and thermal properties of collagen paste**

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Collagen is the major structural protein of connective tissues such as tendons, bones and skins of humans and animals. About 27 forms have been identified of which collagen type 1 has found a wide range of applications in food, pharmaceutical, chemical and cosmetic industries due to its unique physical characteristics1, 2. In the food industry, collagen type 1 obtained from bovine or porcine hide is made into a paste and formed into sausage casings through a process involving liming, pH adjustment, grinding, ingredient mixing and finally extrusion. Currently, collagen casings are used as an alternative to casings made from natural gut. However, it has been identified that the properties of collagen casings can be adapted to provide new properties beyond what natural casings can offer. One potential approach is to add natural biopolymers to the collagen paste, inorder to improve the properties and process performance, it is important to understand how these pastes behave regarding thermal and rheological properties. In this study, cellulose with different fibre lengths and corn starch with different amylose and amylopectin content were added as fillers and their effect on the rheological and thermal properties of collagen paste was investigated at a dispersed phase volume of 15%. Final collagen concentration was attained by mixing a stock collagen paste with cellulose and starch suspensions of different starting concentration by varying the mixing ratios. Results will be presented indicating the importance of these parameters on the thermal transitions and rheological profiles of collagen paste. Dynamic frequency sweeps measurement revealed that all the pastes had a gel-like behaviour (*G´* > *Gʺ*). Also, the addition of cellulose and starch suspensions increased the viscoelastic properties (*Gʹ*, *Gʺ* and tan *δ*) of collagen paste at the different mixing ratios. In addition, temperature sweep results showed that cellulose and starch had an effect on the tan δ peak of collagen pastes. The results of the DSC thermograms showed that the thermal stability of collagen was not affected by the addition of cellulose and corn starch. Therefore, it can be concluded that the addition of cellulose and starch may be suitable for modifying the rheological properties of collagen paste as well as the designing of collagen casing with improved properties. Additional findings of interest are that collagen pastes affect the gelatinisation of starch similar to that seen recently in cellulose: starch blends3 but we found that this is mixing ratio dependent. Theories to explain this finding will be proposed.

*References:*

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