

THE IMPACT OF HYDROCOLLOIDS ON RHEOLOGICAL AND THERMAL PROPERTIES OF ACID-SWOLLEN COLLAGEN PASTE USED FOR SAUSAGE CASINGS

Introduction

It is estimated that about 80% of the edible casings used for sausage manufacturing are made from collagen obtained from the corium layer of bovine hide (Harper *et al.*, 2012). Increasingly, collagen casings manufacturers are looking to develop collagen casings with improved nutritional and sustainability profiles. One potential approach is to blend the collagen paste with hydrocolloids to control rheological, mechanical and thermal properties.

The aim of this study is to investigate the effect of different hydrocolloids on the rheological, micromechanical and thermal properties of acid-swollen collagen paste.

Methodology

Hydrocolloid solutions with comparable zero-shear viscosities were mixed with collagen paste.

- Methylcellulose (MC)
- Hydroxypropylmethylcellulose (HPMC)
- High (GH) & medium (GM) molecular weight guar gum,
- Carboxymethylcellulose (CMC)
- Dynamic frequency sweep tests were performed from 100 to 0.1 rad/s at constant temp of 20 °C.
- The thermal transition of the collagen/hydrocolloid pastes was determined by micro differential scanning calorimetry (Setaram). Samples were heated from 3 – 90 °C

Results

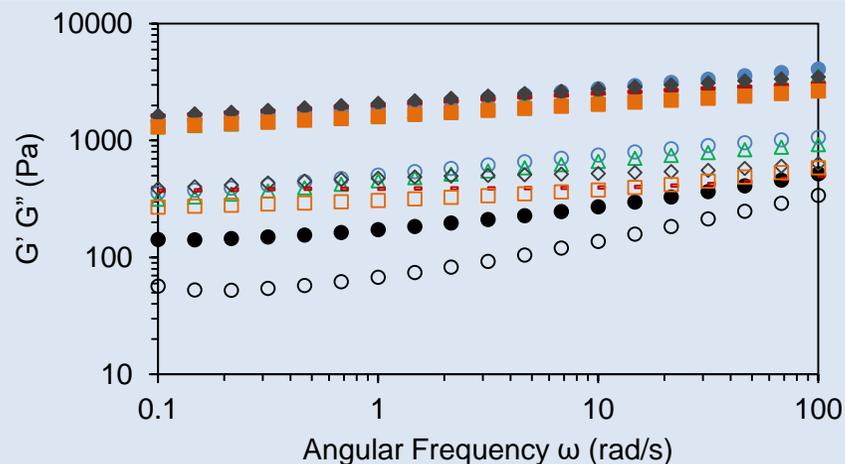


Fig 1. Elastic modulus (closed symbol) and Loss modulus (open symbol) COLLMC (green), COLLHPMC (blue), COLLGH (red), COLLGM (grey), COLLCMC (black) and COLLAGEN (black) pastes

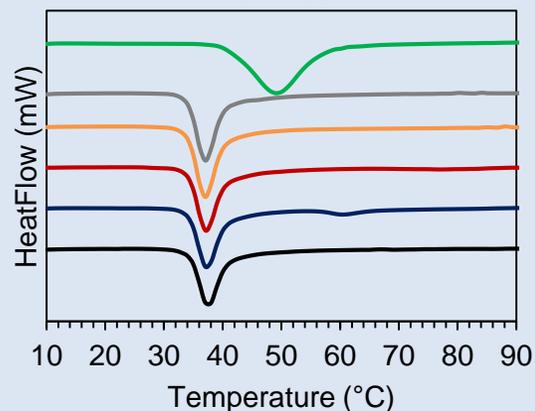


Fig 2. DSC thermograms for COLLMC (blue), COLLHPMC (red), COLLGH (orange), COLLGM (grey), COLLCMC (green) and COLLAGEN (black) pastes

Samples	T _m (°C)
COLLAGEN	37.38 ± 0.17
COLLHPMC	37.20 ± 0.00
COLLMC	37.29 ± 0.09
COLLGM	37.08 ± 0.04
COLLGH	37.06 ± 0.07
COLLMC	49.20 ± 0.11

Conclusions

- ✓ Incorporation of neutral hydrocolloids does not affect the melting temperature of collagen
- ✓ Negatively charged CMC shifts the melting temperature of collagen to higher temperatures
- ✓ Addition of neutral hydrocolloids increases the elastic and loss modulus of collagen paste.
- ✓ The different hydrocolloids increase the elastic modulus of collagen paste to similar extent.
- ✓ Negatively charged CMC hydrocolloid reduces the elastic and loss modulus of the paste

Reference

HARPER, B., BARBUT, S., LIM, L.-T. & MARCONE, M. 2012. Microstructural and textural investigation of various manufactured collagen sausage casings. *Food research international*, 49, 494-500