

Effect of high pressure processing on the rheological properties of frozen stored deacetylated glucomannan gels

C.A. Tovar¹, L. Piñeiro¹, A.J. Borderías² and B. Herranz²

¹University of Vigo, Spain.

²Institute of Food Science, Technology and Nutrition ICTAN-CSIC, Spain

The structural benefit produced by high pressure is evidenced at 400 MPa which enhanced the conformational stability (Fig. 1a) and preserved better the deformability of FP400 vs P0 (Fig. 1b) comparing with the other frozen gels, irrespective of pressure. The natural strengthening due to dehydration of GM matrix by frozen storage is observable in the marked decrease (43%) of strain amplitude (ϵ_{max}) in FP0 vs P0. The hardening of the GM network by frozen storage is evidenced in the notable increase of G' and G'' in all frozen gels irrespective of pressure over the entire frequency range (Fig. 2a). The higher values of G'' and their greater increase at the low frequency range, more intense for FP600 (Fig. 1a), shows the formation of a stronger vitreous structure at 600 MPa which reflects a more brittle network due to microcrystalline junctions in GM matrix. These characteristics explain the faster reduction of the ideal- network fraction [1] observed in FP600 gel at low frequencies.

tovar@uvigo.es

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