Ovomucin from hen egg white shows weak gel properties

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Abstract

Ovomucin is a mucin-type heteropolymer responsible for the gel-like nature of the egg white. As a natural gelling agent, there is a vast potential in utilization of the gelling ability of ovomucin. The purpose of the study was to understand the gelling properties of ovomucin and determine its possible applications. Rheological properties of ovomucin aqueous dispersions were studied by dynamic mechanical analysis. Ovomucin formed a weak gel at room temperature upon rehydration with distilled water with similar properties to other mucin gels. The gel exhibited reversible shear thinning behavior, suggesting that ovomucin can be used as a thickener and stabilizer in food, cosmetics and biomedical applications such as drug-delivery. Scanning and transmission electron microscopy revealed a fibrous network of the gel, the stability of which was maintained by electrostatic interactions. An isoelectric point at pH 2.6 was determined by zeta potential measurements of 0.1% ovomucin dispersions that precipitated upon acidification. The ability of ovomucin to form a gel at room temperature at pH close to neutrality is important the protective properties of ovomucin against pathogen penetration to the embryo, in the same way the gel forming mucins protect epithelial cells. The results from this study demonstrate that ovomucin can form a weak gel at room temperature in distilled water upon rehydration with similar rheological properties to those of polysaccharide weak gels and other mucins.