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Poster Presentation

Impact of Honey as a Natural Plasticizer on Cassava Starch Suspensions Used for Coating Matrices

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Abstract:
The development of a matrix for use as a coating or film requires knowing the impact that the composition and concentration of materials will have on the qualities of the final product. Honey's physicochemical qualities and high sugar content put it in an ideal position while searching for novel plasticisers. In addition, using natural plasticisers like honey would reduce the migration of synthetic chemical additives from the film into the meal. This work aimed to carry out the effect of honey on the acidity and rheological properties of cassava starch-based coating matrices, comparing with a system with glycerol as a plasticiser. Multiflora honey from the northern region of Argentina was used. The Folin–Ciocalteu and aluminium chloride methods were used to determine the total phenolic and flavonoid content, respectively. Antioxidant activity of honey was evaluated by DPPH and ABTS methods. The film-forming matrices were prepared by mixing the plasticiser (glycerol or honey, 1.5% w/v) with distilled water and, then, cassava starch (4% w/v) was added under stirring and heated at 90°C for 20 min. Filmogenic suspensions were characterized by their pH and rheological behaviour (transient assays) using a rheometer with a plate-plate system. The following values were obtained from the physicochemical analysis of honey (AOAC methods): pH 3.90±0.20, acidity 17.7±4.2 mEq/Kg, moisture 14.40±0.70 g/100g, total polyphenol content 171.90±4.40 mg gallic acid/100g, total flavonoids content 15.76±0.76 mg quercetin/100g, inhibition of radical DPPH 15.63±0.24%, ABTS 19.05±1.02 µM Trolox/100g, vitamin C 0.70±0.24 g AA/100g. The acidic character of honey influenced the pH of filmogenic suspensions, with a significant decrease ($p<0.05$) (5.12±0.05) compared to the glycerol matrix (5.69±0.08). The addition of honey, instead of glycerol, decreased the pseudoplasticity (fluid index n from 0.44±0.01 to 0.58±0.02) and thixotropy of the suspensions, leading to more rheologically stable systems. Consistency index K decreased from 6.01±1.06 for honey matrix to 1.65±0.20 Pa.s^n for glycerol one. The same behaviour was observed for the apparent viscosity (from 195±32 to 120±2 mPa.s, at 500 s^{-1}). The matrices with honey as a plasticiser are interesting options for bioactive coating due to the antioxidant activity of honey, improving food quality, safety and stability.

Keywords: honey, cassava starch, coatings, rheological properties, antioxidant activity

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