

Title Effect of polyphenol and glycerol content on water absorption and permeability properties of carboxymethylcellulose based edible Films

Author Andrea Silva, Valerio Bifami, Marcela Quilaqueo, Alejandra Jara and Mónica Ihl

Citation Abstracts, 10th International Controlled & Modified Atmosphere Research Conference, 4-7 April 2009, Antalya, Turkey. 80 pages.

Keyword Water absorption; permeability; edible Films

Abstract

Leaves extracts of the Chilean native plant murta (*Ugni molinae* Turcz) show different polyphenols and antioxidant activity. Quercetin is a typical flavonoid present in this extracts, which is an antioxidant, anticarcinogenic, antiinflammatory, and antimicrobial compound. The beneficial properties of natural antioxidants have been studied in foods along with other technologies such as edible films and coatings, used to improve shelf life of foods. Physical properties of edible films are affected by food characteristics, mainly moisture, and storage conditions (temperature and humidity) as well the additives. In this study, the effect of the polyphenol quercetin and the glycerol content on thickness, water vapour and oxygen permeability, besides moisture sorption isotherms of the sodium carboxymethylcellulose (CMC, DS 0.7-0.9) based edible films, was studied. Edible films were made through the casting method with 1.98 % w/w of CMC, quercetin (0 and 0.075 g/g CMC), sunflower oil (0.125 g/g CMC) and glycerol as plasticizer at different concentrations (0.0, 0.2, 0.5, 0.7 g/g CMC). Thickness of films increases with the glycerol addition, from 0.056 mm for film without glycerol to 0.080 mm when 0.7g of glycerol/g of CMC, was used. Absorption isotherms were obtained storing samples of films (25 x 25 mm) in hermetical vessels at $21 \pm 1^\circ\text{C}$ and 15, 33, 61, 78 and 91% RH. Applying BET model ($r^2 > 0.990$), monolayer moisture increase from 0.043 g H₂O/g dry basis for film without glycerol to 0.121 g H₂O/g dry basis for film with 0.7g glycerol/g CMC. Using GAB model ($r^2 > 0.996$), a lower value of monolayer moisture were reached (0.081 g H₂O/g dry basis for film without glycerol and 0.154g H₂O/g dry basis for film with 0.7g glycerol/g CMC). Therefore, the content of glycerol used as plasticizer affects thickness and sorption properties of CMC based edible films and is important because of the film composition and the storage conditions for the fruits and vegetables to be coated.