Production and physicochemical properties of carboxymethyl cellulose films enriched with spent coffee grounds polysaccharides

Extracts rich in polysaccharides were obtained by alkali pretreatment (PA) or autohydrolysis (PB) of spent coffee grounds, and incorporated into a carboxymethyl cellulose (CMC)-based film aiming at the development of bio-based films with new functionalities. Different concentrations of PA or PB (up to 0.20% w/v) were added to the CMC-based film and the physicochemical properties of the final films were determined. Scanning electron microscopy, Fourier-transform infrared spectroscopy, X-ray diffraction, thermogravimetric analysis, as well as determinations of optical and mechanical properties, moisture content, solubility in water, water vapor permeability, contact angle and sorption isotherms were performed. The addition of PA or PB resulted in important changes in the properties of the CMC-based film, mainly in color and opacity. The polysaccharides incorporation significantly improved the light barrier of the film and provided an enhancement or at least a preservation in the physicochemical properties.