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Extruded sheets from wheat bran extracts

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Abstract

The development of films and coatings from renewable biodegradable materials, such as polysaccharides, is important to find replacements for non-biodegradable oil-based products in packaging industry. In this study, hemicellulose containing wheat bran extracts were used in sheet extrusion for the first time. Two types of wheat bran extracts were produced from wheat bran and straw using a twin screw extrusion fractionation process followed by concentration and purification steps. Part of the wheat bran was de-starched enzymatically prior the extraction while the other part contained starch. Wheat bran extracts were mixed with water and glycerol, sorbitol or their blends prior the sheet extrusion. Sheets were produced from extracts using one screw extruder equipped with a 100 mm wide sheet die thickness adjusted to 250 m. Mechanical properties as well as water vapor permeability (WVP) and water vapor sorption were determined. Starch containing sheets were stronger and elongated more compared sheets, which did not contain starch. Glycerol plasticization increased WVP, water vapor sorption and elongation at break, whereas tensile strength decreased compared to sorbitol plasticized sheets. Starch removal increased water vapor sorption of the glycerol plasticized sheets, whereas it did not have effect on sorbitol plasticized sheets.

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