



INFLUENCE OF THE OXIDATION AND ACETYLATION OF BANANA STARCH ON THE MECHANICAL AND WATER BARRIER PROPERTIES OF MODIFIED STARCH AND MODIFIED STARCH/CHITOSAN BLEND FILMS.

ABSTRACT

Banana starch was oxidized at three different levels and afterwards acetylated. The double-modified starch was used for film preparation with the addition of chitosan. The physical, mechanical, and barrier properties were tested. The oxidation level increased the moisture content of the film, but the acetylation and the addition of chitosan decreased this characteristic. The oxidation level increased the whiteness of the film, but the second modification (acetylation) and the addition of chitosan to the blend did not affect this parameter. The solubility increased with the temperature and the oxidation level but decreased with the storage time of the film. The oxidation increased and the acetylation reduced the solubility with respect to the native starch film. The dual modification produced a solubility value less than that of its oxidized counterpart, and the addition of chitosan produced the highest solubility value. The addition of chitosan increased the tensile strength of the film, and the effect was higher with the oxidation level and longest storage time. The addition of chitosan produced a higher elongation value than that of its double-modified film, but at the longest storage time, this parameter decreased. The water vapor permeability increased with the oxidation level because of the hydrophilic character, but the acetylation reduced this parameter because the acetylation increased the hydrophobic character of the starch due to the ester group. Films prepared with the double-modified banana starch and the addition of chitosan had some improved physical, mechanical, and barrier properties, and they may be used in specific applications. © 2009 Wiley Periodicals, Inc. J Appl Polym Sci, 2010.

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