EFFECT OF THE INCLUSION OF ORGANIC ACIDS ON THE PROPERTIES OF STARCH/POLYESTER BIODEGRADABLE FILMS.

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Starch modification by reactive extrusion using non-volatile and nontoxic organic acids is an interesting way to improve biodegradable packaging for foods. Citric acid (CA), malic acid (MA) and tartaric acid (TA) (in concentrations of 1.5 and 0.375 wt%) were used as additives in blown films of cassava starch/poly (butylene adipate co-terephthalate) (PBAT) (in proportions of 55:45) plastified with glycerol. The films tensile strength, (according ASTM D882-91/2001), was improved with the inclusion of greater concentrations of the acids, reaching values of 6.80 ± 0.34 MPa in the films with 1.5 wt% TA. The elongation at break was also improved with the inclusion of the organic acids in any concentration. Using 1.5 wt% MA, film with 551.41 ± 69.46% of elongation was obtained while 21.22 ± 2.15% was the elongation of the control sample (without acid). The water vapor permeability (WVP) (according ASTM E96-95/1996) was reduced for all the formulations containing organic acids and for these samples, scanning electronic microscopy images showed an homogeneous and compact structure. The weight loss in water was greater with the inclusion of 1.5 wt% CA (27.7 ± 1.7%) which also promotes the higher increase in opacity. The results indicate a compatibilizer effect exerted by the studied organic acids, promoting esterification/transesterification reactions between the polymeric chains even as the reduction of the molecular mass of the starch by acid hydrolisis, resulting in films with better mechanical and barrier properties, a biodegradable alternative to the synthetic packaging utilized currently.