

THERMAL PROPERTIES OF BIOPLASTICS OBTAINED FROM MIXTURES OF CASSAVA AND CORN STARCH

Juan A. R. Ortiz, Thaisa M. A. Moro, Carlos W. P. Carvalho, Jose L. R. Ascheri, Melicia Galdeano, Cristina Y. Takeiti. Embrapa Food Technology, Av. das Américas, 29501, Guaratiba, CEP 23020-470, Rio de Janeiro - RJ, Brazil

The interest in the production of biodegradable packing which could both protect properly food and cause little impact in the environment is increasing in the last years. The objective of this work was to investigate the thermal properties of cassava and corn starch films produced by extrusion and heat-pressed method. Mixtures of cassava and corn starch (13% moisture) were processed in twin screw extruder (Clextral Evolum HT25, Firminy, France). The temperature profile along the extruder was 20, 30, 40, 50, 60, 90, 100, 100 80, 80°C and a rectangular die (3 x 1 mm) were used. The extruded pellets were cut, inserted in a molding press (GJR Com. Ltda, São Carlos, Brazil) and heat-pressed at 5 tonnes and 90 °C for 30 s. The effect of glycerol content (37.8 to 56.7 g/100g starch), screw speed (128 to 162 rpm) and corn starch content (13 to 47%) were studied resulting in 20 treatments. The specific mechanical energy varied from 241.44 to 565.86 WhKg⁻¹. The thermal properties of the extrudates were evaluated using differential scanning calorimetry (DSC). The results showed that the process of films production had two endothermic peaks well defined located in 55 and 72 ° C, corresponding to aging and gelatinization temperatures (T_{gel}), respectively. The statistical analysis was done using the surface response methodology and mathematical models were obtained. Lower values of corn starch (13%), glycerol (37.8%) and screw speed (128rpm) showed lesser starch degradation indicating that its gelatinization during the film production was only partially.

Key- words: Extrusion, DSC, specific mechanical energy.