F19_P82

Thermal analysis and mechanical properties of cassava starch edible films added of barbados cherry

Daniele P. Amaral[1], Kelita Andrade[1], Fábio Barbosa[1], Carlos W. P. Carvalho[1], Cristina Y. Takeiti[1], José L. R. AScheri[1], Farayde M. Fakhouri[2]

[1]EMBRAPA Food Technology, Rio de Janeiro, RJ, Brazil, [2]UNICAMP, Campinas, SP, Brazil

Edible films are fine membranes made of varied natural food sources that can be used as packing to

protect food products and, in addition, can also have additives like vitamin C with the advantage of being

safely consumed. The aim of this study was to use freeze dried Barbados cherry (BC) (0, 5, 10, 20 and 25%) to produce edible films made from cassava starch (4%) and glycerol (30% starch base) that were characterized through mechanical properties and thermo analysis. The rheological properties of the filmogenic solutions were also analyzed.

The solutions were prepared in Viscoamilograph Brabender (Duisburg, Germany) and the films produced by casting were dried for 48 hours at 30° C and 40% UR. The films were conditioned at 53% UR for 7 days before the analysis. The rheological behavior of the filmogenic solutions were carried out in a MARS Thermo Haake rheometer (Karlsrueh, Germany), equipped with an optical microscope. The mechanical analysis were conducted in a texture analyzer TA XT Plus (Surrey, England). The thermal analysis were carried out in DSC Q200 (TA Instrument, New Castle, USA).

The results showed that the sample with 25% w / w of the pulp showed a well-defined Tg at -9.86 ° C (Figure 1), which was slightly lower than the other concentrations. This finding could be attributed to the high content of sugar in the pulp. As Tg is related to the molar mass, a reduction of the total mass would depress the Tg. In contrast, samples with high starch content did not show a clear transition. When cassava starch filmogenic solution is compared to the samples added of BC, it is possible to observe a considerable drop in paste viscosity, particularly when the addition was 10% or higher. The mechanical properties also showed that 10% pulp addition considerably increased de tensile strength of the biofilms. No difference was observed for the filmogenic solutions viscosity at 20 and 25% BC addition. It also interesting to observe that there is no sudden drop in viscosity after reaching the maximum viscosity around 90°C, which indicates that BC may stabilize the gel formation by biding the starch molecules. Among the samples with BC the high paste viscosity value at 5% was kept high and constant even after the peak viscosity has occurred, which suggests its use as an ingredient as starch gel stabilizer.

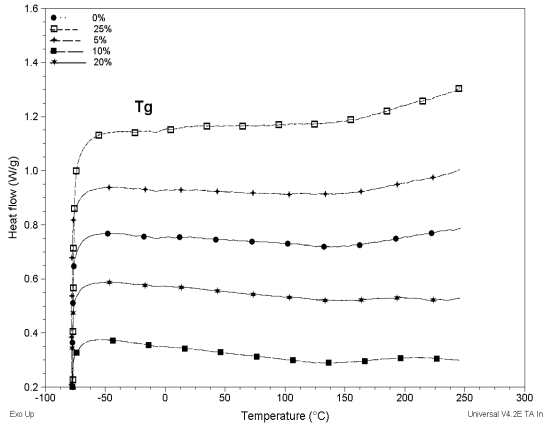

Figure 1. Thermal analysis of cassava starch edible films added of barbados cherry

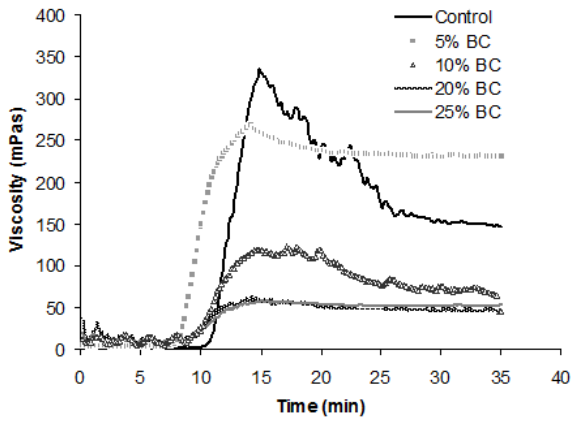

Figure 2. Viscosity curve of varied concentration of freeze dried Barbados cherry and cassava starch in filmogenic solution.