RHEOLOGY OF ALCAYOTA GUM

Marisa Zanon [(1)], Martin Masuelli[(2)]

[(1)] Ingeniería en Alimentos, FQByF-Universidad Nacional de San Luis, Chacabuco 917, San Luis, Argentina.
[(2)] Instituto de Física Aplicada-CONICET y FQByF-UNSL, Chacabuco 917, San Luis, Argentina.
E-mail address: masuelli@unsl.edu.ar

Abstract

Cucurbita ficifolia is a creeping plant with a fleshy fruit, round and elongated, with a thick, smooth shell, resistant to low temperatures but not to severe frost (Figure 1). The mesocarp (pulp) is white with a granular and fibrous texture. The fruit was separated into three parts: peel, pulp and seeds. The pulp was dried and then ground to obtain the flour from which the hydrolysis was carried out.



Figure 1: Some cucurbits. to. Cucurbita maximum (pumpkin). B. Cucumis melo (yellow melon). C. Citrullus lanatus (watermelon). D. Cucumis sativus (cucumber). and. Cucurbita ficifolia (alcayota). F. Cucurbita moschata (zapallo anco).

Hot aqueous extracts were made to the moist pulp and a Cy (d) dispersed (used for rheology) solution Cy (d) solution (used for capillary viscosimetry) was obtained.

From Cy concentrations of 0.1%, 0.2%, 0.4% and 0.6% wt. in an aqueous solution of 0.1M NaCl, which acts as a stabilizer, the intrinsic viscosity was measured with an Ubbelodhe 1B viscometer and density with Anton Paar DM35N densimeter in the thermostatic bath at 25°C.

The hydrolysis procedure was performed on the Cy (d) dispersion, with 0.1M NaOH at 65°C for two hours and then precipitated with ethanol. The precipitate is washed with ethanol several times, obtaining a polysaccharide of average molecular weight having free oxydril groups called CyOH (d).

To the above dispersion (CyOH (d)) was added 5 ml of glycerol and stirred cold for a few minutes to homogenize, these solutions were used to measure the flow ability curve. Also, dispersions of Cy (d) of different concentrations: 2, 3, 4, 5, and 6% in distilled water were prepared. Some of them were hydrolyzed, being named as CyOH (d) and measured with a Brookfield DVIII rheometer at a temperature of 25°C. The assay was repeated by adding 2, 4 and 5% glycerol to some of the hydrolyzed dispersions at temperatures of 35 and 40°C in a thermostatic bath.

The intrinsic viscosity was 149.83 cm^3/g and the molecular weight was 1867000 g/mol (Marck-Houwink parameters of k = 0.00263 and a= 0.7583), with a hydrodynamic radius of 53nm, a shape factor of 3.12 and a hydration value of 47.63 g/g. Studies for CyOH (d) showed a thixotropic behavior for dispersed solutions which increased with increasing hydrolysis and glycerin and decreased with increasing temperature. The degree of thixotropy is higher for CyOH (d) compared to Cy (d).

Recent publications

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