

RHEOLOGICAL PROPERTIES OF THE BIOPOLYMER ISOLATED FROM TAMARIND SEED WASTE

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Introduction: The structure–property relationship of polymers is one of the most important aspects for the pharmaceutical, biomedical, and food industries. In this regard, the rheological properties of tamarind seed gum (*T. indica*) of interest are its viscosity and elasticity. These gums are marketed in powder form with various particle sizes and are mainly used to thicken and/or gel aqueous solutions, to modify and/or control the flow properties and texture of liquid foods and beverages, as well as to alter the deformation properties of semi-solid products. Xyloglucan is a polysaccharide extracted from the endosperm of *Tamarindus indica* linn seeds. This polysaccharide has potential application in the pharmaceutical, cosmetic, paper, textile and food industries, where it functions as an additive, gelling agent, binder and thickener. This study aligns with the sustainability goals of World Health Organization by proposing the valorization of agro-industrial waste. **Objective:** To characterize the rheological properties of the polymer from *T. indica* seed, considered agro-industrial waste in Sinaloa, Mexico. **Methods:** The biopolymer was obtained via aqueous extraction at 70°C for 1.5 h. Rheological properties were evaluated using a controlled-stress rheometer at 25 °C (1, 5 y 15 % w/v). The data were fitted to the Power Law model. Rotational viscometry and thermodynamic analysis were performed using a Brookfield viscometer in aqueous solutions at 0.4, 0.8 y 1 % w/v. **Results:** Apparent viscosity and shear stress curve graphs show the shear-thinning behavior of *T. indica* xyloglucan. By adjusting the results to the Power Law, it is shown that the polymer behaves as a pseudoplastic and gradually trending to at non-Newtonian flow. In rotational viscometry, the higher the concentration, the higher the viscosity, while in the thermodynamic analysis results show that as the temperature increases, the viscosity of the solution decreases. **Conclusion:** The use of tamarind seed enables the extraction of xyloglucan with rheological properties suitable for replacing synthetic substances and other biopolymers in the pharmaceutical, biomedical, textile, paper and agro-industrial applications.

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