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XRD as an analytical tool for analyses of tommy atkins mango KERNEL polysAcharide

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The aim of this work was to use X-Ray Diffraction (XRD) as an analytical tool for characterization of *Tommy Atkins* mango kernel starch and fibres. The experiments were performed in a Rigaku diffractometer DMAXB with CuKα (λ = 1.5406 Å) at 40 kV and 40 mA, analysis speed of 1º (2θ).min^{-1}, with step scan of 0.05º, ranging between 2θ angle from 5º to 40º at 25 ºC to calculate Sega Crystallinity Index (CI). Mango starch presented diffraction peaks at 2θ = 11.62º, 15.12º, 17.14º, and 23.1º, which represents a typical type A starch pattern. In this structure, amylopectin molecules are fitted to a monoclinic unit cell. Raw fibres presented peaks at 2θ = 12º and 22º, typical for a cellulose I pattern. Mercerized and bleached fibres, and nanowhiskers presented peaks at 2θ = 15º, 22º, and 34º, typical for cellulose II pattern. Cellulose I has two unit cell structures: I_a (triclinic) and I_b (monoclinic). Cellulose II occurs just as a monoclinic unit cell. The diffraction peaks of Cellulose II around 2θ = 22º are narrower and higher than in Cellulose I. Moreover, the chemical treatment washes off amorphous components of the fibre, remaining crystalline structures. It was possible calculate the CI for raw fibres (29.4%), mercerized fibres (50.3%), bleached fibres (69.8%), and nanowhiskers (58.0%). Thus, the XRD technique is an important analytical tool for identifies the crystalline pattern of the mango kernel polysaccharides, as well as to quantify the Segal Crystallinity Index.