

Irradiation of Cellulosic Waste from Annatto Seeds (*Bixa orellana L.*) for Application in Polymeric Composites

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The study of natural vegetable, fiber-reinforced polymeric composites became popular in the last decades since because this type of material enables the reduction of both the biomass waste and the cost of the final polymer product (MARINELLI, 2008). Plant fibers are plenty, low cost, they feature biodegradability and renewability. Moreover, cellulose-polymer composites are more resistant to flexion and impacts than the same base polymer material (FONSECA, 2005; HILLIG, 2008). Specifically, cellulose from annatto seeds is present in concentration at around 40-45%, which becomes important for industrial use (ANSELMO, 2008).

In this work, the bagasse from annatto seeds after reddish pigment removal has been used to obtain high density polyethylene (HDPE) composites. The original raw material underwent a pretreatment that extracted the components from seeds such as residue of remaining pigment, sugars, proteins and acid fats. The remaining fibers have been dried and mashed, and then submitted to electron beam irradiation with doses of 30 kGy, 50 kGy and 70 kGy to verify the effect of the radiation on the cellulose structure and its subsequent effect on the incorporation into polymer matrix. The study covered the extrusion of these fibers (irradiated and non-irradiated) in the ratio of 1 % to 5 % with HDPE.

The sample characterization has been done by infrared spectrometry (FTIR), thermal degradation (TG) and mechanical tensile tests. The results are then discussed.

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