

UV light irradiation on poly (lactic acid): surface modifications

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Poly (lactic acid) (PLA) is an aliphatic polyester derived from lactic acid obtained by bacterial fermentation of starch. It is seen as a "green polymer" due to be fully biodegradable and derived from renewable sources. Furthermore, it is biocompatible and bioresorbable, can be applied not only the environmental, agricultural and consumer products in general, but also in pharmaceutical and biomedical industry.^[1] Exposure to the UV light of polymeric materials is an strategy to modify surface properties of polymeric materials.^[2,3] The insertion of polar groups changes the characteristics of hydrophilicity of the material without changing the properties of bulk material. In this study, PLA films were irradiated with ultraviolet light and analyzed by infrared spectroscopy with Fourier transform (FTIR). It was observed by analysis of generated spectra the chain scission due to photodegradation, with formation of peroxide, hydroxyl and carbonyl groups. The materials were also analyzed by contact angle measurements for the determination of its surface energy, and we observed a decrease in its surface energy. With the changes made and the consequent formation of polar groups due to the degradation process, it was expected an increase of surface energy, because the material has a higher concentration of polar groups and possibly the ability to form groups with hydrogen bonding. However, by analyzing the contact angle, we obtained a reduction of surface energy and, consequently, the surface of PLA film showed higher hydrophobic character. The process used was effective in generating new chemical groups on the surface of the PLA. However the results of surface energy are being studied in greater depth.

Keywords: PLA, photodegradation, FTIR, contact angle, hydrophilicity.

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