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Application of laccase during the attainment of PVA hydrogels reticulated with ferulic acid

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Many researches have been aiming at obtaining new possible vitreous humor substitutes. Therefore, we performed studies related to obtain hydrogels enzymatically cross-linked with ferulic acid. The hydrogels were obtained by varying PVA mass, enzyme concentration and the mass of ferulic acid, to obtain the best condition to have a material with similar characteristics in terms of density (1.0053 to 1.0089 g/mL), kinematic viscosity (greater than 4mm2/cm) and refractive index (between 1.3345 and 1.3348). The data was analysed using the Statistica 12.0 software, and it was possible to determine the best condition for obtaining the material: mPVA=12.05% (m/m), laccase concentration=836 (µg/mL) and ferulic acid concentration=1.95 (mM). Hydrogels were obtained under the best condition and on analyzing by DSC, confirmed the presence of crosslinks in the hydrogels and reinforced the hypothesis of the presence of crosslinks due to the action of the Laccase enzyme. This was justified due to a reduction of the glass transition temperature (69.99 and 74.49 °C), melt temperature (216.48 and 220.26 °C) and crystallization temperature (181.82 and 184.62 °C), as well as the degree of crystallinity (29.18 and 29.74 %) for the hydrogel obtained with and without PVA, ferulic acid and laccase, respectively. In this case, it is possibly attributed to the greater intensity of the hydrogen bonds between the PVA chains, which makes it difficult to move and pack the chains into crystallites.

Biography

Andreia de Araújo Morandim Giannetti has completed her PhD and Postdoctoral studies from Paulista State University (UNESP). She is a teacher at FEI University Center. She has published more than 18 papers in reputed journals and has been serving as a reviewer in several renowned journals.

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