

Adhesive Based upon Polyvinyl Alcohol And Chemical Modified Oca (Oxalis tuberosa) Starch

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Abstract : The development of adhesives from renewable raw materials attracts the attention of the scientific community, due to it promises the reduction of the dependence with materials derived from oil. This work proposes the use of modified 'oca (Oxalis tuberosa)' starch and polyvinyl alcohol (PVA) in the elaboration of adhesives for lignocellulosic substrates. The investigation focused on the formulation of adhesives with 3 different PVA:starch (modified and native) ratios (of 1,0:0,33; 1,0:1,0; 1,0:1,67). The first step to perform it was the chemical modification of starch through acid hydrolysis and a subsequent urea treatment to get carbamate starch. Then, the adhesive obtained was characterized in terms of instantaneous viscosity, Fourier-transform infrared spectroscopy (FTIR) and shear strength. The results showed that viscosity and mechanical tests exhibit data with the same tendency in relation to the native and modified starch concentration. It was observed that the data started to reduce its values to a certain concentration, where the values began to grow. On the other hand, two relevant bands were found in the FTIR spectrogram. The first in 3300 cm^{-1} of OH group with the same intensity for all the essays and the other one in 2900 cm^{-1} , belonging to the group of alkanes with a different intensity for each adhesive. On the whole, the ratio PVA:starch (1:1) will not favor crosslinking in the adhesive structure and causes the viscosity reduction, whereas, in the others ones, the viscosity is higher. It was also observed that adhesives made with modified starch had better characteristics, but the adhesives with high concentrations of native starch could equal the properties of the adhesives made with low concentrations of modified starch.

Keywords : polyvinyl alcohol, PVA, chemical modification, starch, FTIR, viscosity, shear strength

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