

Adhesive based upon polyvinyl alcohol and chemical modified oca *(Oxalis tuberosa)* starch

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The development of adhesives from renewable raw materials attract 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 1:0,33; 1:1; 1:1,67). 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, 2 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 characteristic, but the adhesives with high concentrations of native starch could equals the properties of the adhesives made with low concentrations of modified starch.

Biography

Samantha Borja is 22 years old, she is studying the last semester of Chemical Engineering at the National Polytechnic School in Quito, Ecuador. She has specialized in the mention of Food Technology and Environmental Remediation. Currently, she is part of a research project to obtain adhesives from Polyvinyl Alcohol (PVA) and chemically modified starch, which comes from different botanical sources such as oca (Oxalis tuberosa) and achira (Canna edulis). She has previously participated as speaker at the CONEIQ 2018, carried out at the San Francisco of Quito University, with the subject of degradation of azoic dye Direct Blue BRL through two absorption techniques:Fenton and Persulfate ions.

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