

Barrier Properties of Starch-Ethylene Vinyl Alcohol Nanocomposites

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Abstract : Replacement of plastics used in the food industry seems to be a serious issue to overcome mainly the environmental problems in recent years. This study investigates the hydrophilicity and permeability properties of starch biopolymer which ethylene vinyl alcohol (EVOH) (0-10%) and nanocrystalline cellulose (NCC) (1 -15%) were used to enhance its properties. Starch -EVOH nanocomposites were prepared by casting method in different formulations. NCC production by acid hydrolysis was confirmed by scanning electron microscopy. Solubility, water vapor permeability, water vapor transmission rate and moisture absorbance were measured on each of the nanocomposites. The results were analyzed by SAS software. The lowest moisture absorbance was measured in pure starch nanocomposite containing 8% NCC. The lowest permeability to water vapor belongs to starch nanocomposite containing 8% NCC and the sample containing 7.8% EVOH and 13% NCC. Also, the lowest solubility was observed in the composite contains the highest amount of EVOH. Applied Process resulted in production of bio films which have good resistance to water vapor permeability and solubility in water. The use of NCC and EVOH leads to reduced moisture absorbance property of the biofilms.

Keywords : starch, EVOH, nanocrystalline cellulose, hydrophilicity

Conference Title : ICBFS 2015 : International Conference on Biotechnology and Food Science

Conference Location : Kuala Lumpur, Malaysia

Conference Dates : February 12-13, 2015