Valuation of Dates Cores of the Southern Region of Morocco (Zagora): Isolation of Hemicellulose and Their Use in the Development of Biodegradable and Hydrophobic Film

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Abstract

The nuclei of dates, from domestic consumption or as waste from the agro-food sector (date tab, syrup, oi etc.) on a small or large scale, or simply contained in the inedible dates, which remain abandoned in palm trees, are a very interesting material for the production of high value added products. They consist mainly of plant cell walls (cellulose, hemicellulose and lignin) that represent 82% to 92% of the initial dried material. The purpose of this study is the extraction of hemicellulose from the nuclei of dates first, then their introduction with the starch in the development of biodegradable and hydrophobic films. Hemicellulose in the nuclei of dates consists in large part of mannane. The originality of the method of extraction of the hemicelluloses in our study is the first time use of calcium chloride instead of zinc chloride widely used in the presence of acetic acid. Those fresh conditions allow the simultaneous obtaining of lignin and hemicelluloses, making the process economically interesting. The film preparation is carried out from a mixture containing corn starch, glycerol, a hydrochloric, an acid solution and a sodium hydroxide solution. Different fractions of hemicellulose derived from the nuclei of dates are added to this mixture with percentages going from 5% to 20% by weight compared to the starch. Hemicelluloses cores dates are constituted in large part by mannane, which are insoluble in water (ref book and article). Their introduction in the development of films has the consequence of reducing their water sensitivity. To confirm the biodegradability and hydrophobicity of these films, we have conducted tests such as the measurement of moisture absorption, of water absorption and of weight loss of films.