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Extraction and Characterisation of Pectin from Lemon Peels and Its Food Application

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Abstract

Citrus fruits are major processed fruits in the world that results in generation of large quantities peels from the processing industries as become one of the main sources of the municipal solid wastes, which have been an increasingly tough environmental issue so can be suitably exploited for production of pectin. Pectin is a structural polysaccharide present in the primary cell wall and the middle lamella of plant tissues. Pectin is widely used in the food industry as a thickener, emulsifier, texturiser, stabiliser, and jelling agent in jams and jellies. Pectin was extracted using the method of acid hydrolysis followed by ethanol precipitation. The objective of this study was to evaluate the impact of different extraction conditions on the yield to characterise the lemon peels pectin. The influence of pH and extraction time were analysed to maximise the yield of pectin and they were characterised by assessing the physicochemical properties. The feasibility of utilising extracted pectin in food applications were evaluated. In this study, dried lemon fruit peels were treated separately with citric acid at 3, 3.5, 4 pH, for 30, 60, 120 min and the pectin obtained from these methods were compared in terms of yield and physicochemical properties. The yield of pectin ranged from (14.96-20.14%) on a dry weight basis. The results suggested that the highest pectin content is in the lemon peel extracted using 0.05 N citric acid at 80° C, 3 pH for 60 min. In addition, ash content, equivalent weight, methoxyl content and anhydrouronic acid of extracted pectin varied significantly ($p > 0.05$) with the various extraction conditions. Based on the value of methoxyl content and the degree of esterification, lemon fruit peel pectin can be categorised as low methoxyl pectin. Sensory analysis revealed that there is no significant difference in colour, taste, aroma, spreadability and surface texture of two types of watermelon jam prepared using lemon peel and commercial pectin. Therefore, pectin which was extracted from lemon peels can be used as an effective food additive in watermelon jam production.

Keywords: Citric acid, Lemon peels, Methoxyl content, Pectin, Yield