

## High methoxyl pectin extracts from *Hylocereus polyrhizus*'s peels : extraction kinetics and thermodynamic studies

Rubaiyi M.Zaid<sup>a</sup>, Puranjan Mishra<sup>a</sup>, Shabana Tabassum<sup>b</sup>, Zularisam Ab Wahid<sup>a</sup>, A.M. Mimi Sakinah<sup>a</sup>

<sup>a</sup> Faculty of Engineering Technology, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Kuantan, Pahang, Malaysia

<sup>b</sup> Faculty of Industrial Science and Technology, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Kuantan, Pahang, Malaysia

### ABSTRACT

The effect of physicochemical treatment on pectin yield, degree of esterification, along with the kinetics and thermodynamics characteristics was investigated in the present study. Several extraction parameters were observed to have impacted the yield and degree of esterification significantly, and the best extraction condition was as follows: agitation rate of 250 rpm, temperature of 70 °C, extraction time of 120 min, pH 2, and liquid to solid ratio of 10 v/w which has resulted in 28.20% of pectin yield, with DE (degree of esterification) of 57.00%. A theoretical model which describes the extractability, dissolution and degradation rate of pectin to predict the maximal yield at the maximal time was established to study the extraction kinetics of pectin from HPP. The kinetic analysis from Panchev's model shows the extraction rate was found highest at LSR 10 with  $y_{\max}$  30.85%. The calculated activation energy for pectin dissolution and degradation was found to be 4.532 kJ/mol and 28.054 kJ/mol, respectively. The thermodynamic study has suggested that the process was endothermic, spontaneous and reversible. These results suggest that the physical and chemical treatment applied could be an efficient technique for the extraction of pectin from *Hylocereus polyrhizus* peels.

### KEYWORDS

Pectin extraction; *Hylocereus polyrhizus*; High methoxyl pectin; Extraction kinetics

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