

Thesis Title	Pilot Scale Production of Tamarind Seed Polysaccharide
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Abstract

Preliminary study on production of polysaccharide from tamarind kernel powder (TKP) was started by defating, decolorizing and deodorizing the TKP with petroleum ether and 95% ethanol, respectively. The pretreated TKP obtained was extracted with water. The effect of slurry concentration, the effect of precipitation and drying processes and the effect of extraction temperature were investigated. The property of tamarind seed polysaccharide (TSP) obtained and its rheology were evaluated. From the study of slurry concentration, it was found that the dilution ratios of pretreated TKP:water of 1:40, 1:60 and 1:80 w/v were suitable. The extrartrate could be separated by centrifugation. The TSP was obtained from the extractrate by one of the four methods. Method (I) precipitating with 1-1.5 volumes of 95% ethanol, draining through a muslin cloth and drying in a hot air oven at 60°C or Method (II) precipitating with salt-ethanol, draining through a muslin cloth and drying in a hot air oven at 60°C or Method (III) tray drying in hot air oven at 60°C or Method (IV) spray drying. From Method (II) it was found that there was difficulty in eliminating salt from the precipitated polysaccharide eventhough large amount of ethanol was used in the washing process. The results observed from effects of drying processes indicated that the tray drying process gave a hard cake product which adhered tightly to the tray. The product obtained from ethanol precipitation process (Method (I)) gave whitish powders. The spray drying process also gave whitish powders. The effect of extraction temperature showed that after consecutively

extraction of pretreated TKP at three temperatures, i.e. at 5°C, at 25-30°C and at 85-90°C, the polysaccharide obtained from fraction extraction at 25-30°C and 85-90°C were whitish and viscous..

In pilot scale production, TKP was extracted in three steps. Firstly, TKP was extracted with 10 volumes of 5°C water for 5 minutes (Fraction I). Secondly, TKP was then extracted with 40 volumes of water at 25-30 °C which yielded 8% of TSP (Fraction II). Finally, TKP was extracted with 40 volumes of water at 85-90°C which yielded 21% of TSP (Fraction III). It was found that the TSP Fraction I has low viscosity even at high concentration. The latter two fractions, Fraction II and III, gave higher viscosities than Fraction I. At concentration of 2.0% and above, TSP Fraction II exhibited a pseudoplastic flow. This behavior was also observed with Fraction III at the concentration of 1.5% and above. The viscosity of TSP Fraction III was slightly less viscous than the commercial product. The viscosity of aqueous solutions of the prepared TSP did not alter significantly after a long storage (180 days), and no sedimentation was found.

Feasibility study on industrial production of tamarind seed polysaccharide indicated that the industrial production of tamarind seed polysaccharide would give a high rate of return in investment. The calculated internal rate of return in investment is higher than the interest rate (>20%) and if no problem about the marketing of TSP, this project would be feasible in the commercial production and would give a reasonable profit.