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Flow ability characteristics, functional properties and rheological properties of a natural carbohydrate-protein biopolymer

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Abstract

For selection of the polymer with desirable properties in the food and pharmaceutical industry, it is essential to enclose a concept on understanding of its flow characteristics and functional properties. In the current study, a natural biopolymer with complex polysaccharide-protein structure was extracted from the agricultural waste (durian seed). The crude biopolymer was purified by using the saturated barium hydroxide to minimize the impurities and subjected to different drying techniques. The main aim was to investigate the effect of different drying techniques (namely spray drying, freeze drying, oven- and vacuum oven drying) on the flow characteristics, functional properties and rheological behaviour of the purified durian seed gum (DSG). The current study focused on the main functional characteristics such as flow characteristics, water and oil holding capacity, solubility, foaming capacity and rheological properties. The results illustrated that the bulk density of all samples decreased except oven dried DSG. This phenomenon could be attributed to the increase in the inter-particle voids of smaller sized particles with larger contact surface areas per unit volume. Oven-dried and freeze-dried DSG exhibited the highest and lowest compressibility index, thus indicating the weakest and strongest flow ability among all samples. Furthermore, the freeze-drying resulted in the gum with the lowest angle of repose, bulk, tapped and true density, indicating the highest porosity among all samples. In addition, it also induced the highest solubility, and foaming capacity, thus providing the most desirable functional properties and flow characteristics among all drying techniques. Therefore, the present study illustrated that freeze dryer among all drying techniques provided the most desirable flow characteristics, functional and rheological properties for DSG.

Biography

Hamed Mirhosseini has graduated in the end of 2007 and received his Ph.D degree from University Putra Malaysia (UPM) in early 2008. He was appointed as a postdoctoral fellow researcher and subsequently senior lecturer in UPM in the middle of 2008. He has published more than 65 articles in reputed journals. He is serving as an editorial board member of a few journals.