

Extraction and physicochemical characterization of chitin and chitosan isolated from house cricket

ABSTRACT

Chitin ranks next to cellulose as the most important bio-polysaccharide which can primarily be extracted from crustacean shells. However, the emergence of new areas of the application of chitin and its derivatives are on the increase and there is growing demand for new chitin sources. In this study, therefore, an attempt was made to extract chitin from the house cricket (*Brachytrupes portentosus*) by a chemical method. The physicochemical properties of chitin and chitosan extracted from crickets were compared with commercial chitin and chitosan extracted from shrimps, in terms of proximate analysis in particular, of their ash and moisture content. Also, infrared spectroscopy, x-ray diffraction (XRD), scanning electron microscopy and elemental analysis were conducted. The chitin and chitosan yield of the house cricket ranges over 4.3%–7.1% and 2.4%–5.8% respectively. Chitin and chitosan from crickets compares favourably with those extracted from shrimps, and were found to exhibit some similarities. The result shows that cricket and shrimp chitin and chitosan have the same degree of acetylation and degree of deacetylation of 108.1% and 80.5% respectively, following Fourier transform infrared spectroscopy. The characteristic XRD strong/sharp peaks of 9.4 and 19.4° for α -chitin are common for both cricket and shrimp chitin. The percentage ash content of chitin and chitosan extracted from *B. portentosus* is 1%, which is lower than that obtained from shrimp products. Therefore, cricket chitin and chitosan can be said to be of better quality and of purer form than commercially produced chitin and chitosan from shrimp. Based on the quality of the product, chitin and chitosan isolated from *B. portentosus* can replace commercial chitin and chitosan in terms of utilization and applications. Therefore, *B. portentosus* is a promising alternative source of chitin and chitosan.

Keyword: Chitin; Chitosan; Elemental analysis; House cricket; Infrared spectroscopy; Scanning electron microscopy; X-ray diffraction