



Extraction and characterization of chitin from some stored products pests and their effects as biofertilizers in agriculture production

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Abstract

Chitin is the most abundant biopolymer after cellulose in nature. It has great economic value because of its biological properties and diverse applications. In the present study, chitin was extracted and characterized from three stored products' pests including the confused flour beetle, *Tribolium confusum*, the cowpea seed beetle, *Callosobruchus maculatus* and the angoumois grain moth, *Sitotroga cerealella*. Chemical demineralization and deproteinization were done by treatment with 1 M hydrochloric acid solution and 1 M sodium hydroxide solution, followed by a 1% potassium permanganate solution for decolorization. In addition, elemental analysis was conducted on obtained chitins. The investigation revealed that *C. maculatus* had the highest yield of chitin at 18.28%, followed by *T. confusum* and *S. cerealella* with the yields of 13.96% and 5.51%, respectively. The dry body weight of *C. maculatus*, *T. confusum* and *S. cerealella* were found to be 61.05%, 51.04% and 42.75%, respectively. Results from this investigation also showed that the carbon-nitrogen ratio of the angoumois grain moth chitin was 8.13 with a deacetylation degree of 174.34 calculated from the elemental analysis. In addition, the elemental analysis showed that the carbon-nitrogen ratio of the confused flour beetle chitin was 7.13 with a deacetylation degree of 115.94 whereas the carbon-nitrogen ratio of the cowpea seed beetle chitin was determined to be 5.40 with a deacetylation degree of 15.13. Soil application of the chitin specimens as biofertilizers on growth and yield of grain sorghum, *Sorghum bicolor* showed a significant increase in the dry matter and the plant leaf surface.

Keywords: biopolymer, *Callosobruchus*, deacetylation, *Sitotroga*, *Tribolium*