PP-109

Extraction and Physicochemical Properties of Chitins from Four Different Insect Species

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Aim of the study: In the scope of the project, chitin was extracted from four different insect species, *Lucanuscervus* (Linnaeus, 1758), *Gryllotalpagryllotalpa* (Linnaeus, 1758), *Bradyporus* (*Callimenus*) *macrogaster* (Lefèbvre 1831) and *Polyphylla fullo* (Linnaeus, 1758), for the first time.

Material and Methods: Sample of each species was powdered using liquid nitrogen and mortar. In order to demineralize chitin, all samples were treated 1M HCL at 95°C under stirring conditions for 1 hour. Then, biomasses were separated through filtration with filter paper. Filtrates were washed with distilled water. After that samples were treated by 1M NaOH at 90°C for 14h to remove proteins. Solutions were filtered again. Then, the samples were washed distilled water and were treated with chloroform-methanol-water (1:2:4, v: v) mixture at room temperature for 1 hour. Finally chitin extracts were left to dry at room temperature for 5 days. The extracted chitins were characterized by using FTIR, TGA and SEM to determine their physicochemical properties.

Results: The bands observed at about 1652 and 1620 cm^{-1} for amide groups, 1154 cm^{-1} for oxygen connecting N-acetylglucosamine rings and 1065 cm^{-1} for C-O bonds in N-acetylglucosamine ring are characteristic to chitin species. FTIR spectra analysis specifies that the method used for seperation of chitin from other organic species was successful. Four chitin samples follow similar thermal degradation in three steps which are based on the loss of moisture up to 100^0C, then decomposition of main chitin structure with the highest rate and decomposition of residual species. The different behaviours for the third thermal decomposition step for chitin samples are because of the rearrangement of chemical bonds at higher temperatures. No further thermal decomposition were observed up to 800^0C. Scanning Electron Microscope (SEM) analysis was recorded for surface analysis of isolated chitin samples. For the chitin isolated from BM, GG and PF have a microfibrillar structure with large porosity, large porous surface is homogeneous for BM as well as it is regional for PF and in addition to large ones, the small porosity was observed for GG and PF. The chitin isolated from LC has different morphology than other isolated chitin samples; it has a complex microfibrillar structure without porosity.

Keywords: Insecta, chitin, extraction, physicochemical, characterization