

Preparation of chitosan from *Penicillium spp.* and determination of their degree of deacetylation

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Background and Aims: The purpose of this work was the preparation of chitosan from *Penicillium waksmanii*, *Penicillium aurantiogriseum*, *Penicillium viridicatum* and *Penicillium citrinum* with three different methods and comparing the yield of the product in each method.

Methods: After the growth of the *penicillium spp.*, it was separately processed by three **Methods:** 1) NaOH and acetic acid, 2) Perchloric acid, 3) Nitric acid. The degree of deacetylation and the yield of each method for each species were calculated by the analytical methods such as FT-IR. Also, the viscosity of 1% chitosan in acetic acid solution was determined.

Results: The total yield of chitosan was demonstrated to be 20-30% of dry mycelia mass. The result indicated that the degree of deacetylation (DD) of the prepared chitosan by perchloric acid was 76.3%, 70.7%, 61.1% and 58.9% for *P. waksmanii*, *P. citrinum*, *P. viridicatum*, *P. aurantiogriseum* respectively. But after treating with NaOH+CH₃COOH and HNO₃ separately the degree of deacetylation was 57.9 %,53.6%,35.7%, 38.9% and 65.1%, 62.4%, 47.5%, 47.3% respectively. The viscosity of the prepared chitosan was 11.3, 10.2, 8.9 and 9.4. *P. waksmanii* showed the highest degree of deacetylation and viscosity in the method of perchloric acid.

Conclusions: In comparison to alkaline treatment, it was observed that the utilization of acid treatment as the extracting solution yielded higher product. The result confirmed that the chitosan content of fungi and DD depends on fungal strains, type of the acid or alkaline treatment and the chitosan extraction method. In this work we concluded that only the use of strong acid is enough to obtain high DD. Meanwhile, the alkaline treatment is absurd. It seems that *P. aurantiogriseum*, *P. waksmanii*, *P. viridicatum* and *P. citrinum* are good candidates for the production of chitosan in an economical condition.

Keywords: Chitosan; Degree of deacetylation; *Penicillium*