

Anti Cancer Activity of Chitooligomers

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Abstract

The chitin obtained from the crab industries can be used as a source for production of chitooligomers which has an important biological activity. The aims of this research was to evaluate anti cancer activity of the chitooligomers obtained from enzymatic hydrolysis using chitosanase from thermophilic bacterium Bacillus licheniformis MB2 isolated from Tompaso Manado. Media for producing the enzyme contained colloidal chitosan 1% and the enzyme was harvested after seven days of incubation at 55⁰C. The heat stable protein enzyme was coagulated with 80% saturated ammonium sulphate and purified using hydrophobic interaction chromatography with butyl sepharose gel. Enzyme of 0.005, 0.0085, 0.10 dan 0,17 IU/mg chitosan on soluble chitosan 1% substrate with 85% degree of deacylation were used to produce chitooligomers through incubation for one and three hours. The reaction products were analyzed (and fractionated) using HPLC. The effect of this samples on cancer cells was evaluated using K562 cells (chronic myelogenous leukemia) and investigated after being treated with MTT (3-[4,5-Dimethylthiazol-2-yl]-2,5-diphenyl tetrazolium bromide). In general, hydrolysates and fractionated chitooligomers showed better anti cancer activity than the 2- Bromo deoxy uridine used as positive control at similiar concentration (17 ?g/ml). Both of hydrolysates and fractionated chitooligomers (trimer to hexamer) inhibited proliferation of human K562 cancer cells line in vitro about 20.57% and 15.68% respectively. The apoptosis phenomena was found on K562 cells treated with chitooligomer hydrolysate which can be examined by Hoechts staining fluorescent method. Chitooligomers hydrolysate showed anti metastatic potential, the chitooligomers were found also as potent protease inhibitor.

Keywords : chitooligomers, chitosan, anticancer