Antimicrobial Activity of Different Molecular Weight Chitosan on Pseudomonas aeruginosa

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ABSTRACT
The antimicrobial effects of different molecular weight (MW) chitosan (water-soluble-grade W031, chitosan-grade SK10P8, food-grade N96, industry-grade A72 with MW 27.5, 94.1, 245.9, 350.7kDa, respectively) in 1% acetic acid solutions on the growth of Pseudomonas aeruginosa were investigated in this study. For the complete inhibition of P. aeruginosa growth, the minimum efficiency concentration (MEC) for all the chitosan solutions was 0.1% (w/v) or more. The close complete inhibition time (CCIT) for P. aeruginosa growth was at the first 48hr for all 0.1% chitosan solutions except for A72 chitosan (only at the first 32 hr), meanwhile the CCIT was at the first 72 hr for W031 one. The antimicrobial activity of chitosan increased as increasing its addition concentration in 1% acetic acid solution and then became unchangeable. In addition, the complete inhibition effect of chitosan on the growth of P. aeruginosa decreased with the chitosan MW increase when its addition concentration was less than 0.1%, while the complete inhibition of P. aeruginosa growth seemed not clearly vary according to the MW of chitosan as its addition concentration was higher than 0.1%. In this study, the low MW chitosan showed much more effective on the growth inhibition of P. aeruginosa than the high or medium MW one.

Keywords : chitosan, molecular weight, Pseudomonas aeruginosa, antimicrobial activity


2001. Fabrication and characterization of a sponge-like asymmetric chitosan membrane as a wound dressing, Biomaterial, 22, 165-173

M., and chitosan applications, Reactive & Functional Polymers, 46, 1-27


thin-layer chromatography. Journal of Chromatography. 161:279-286


Lepri, L. and Desideri, P.G. 1978. Separation and identification of water-soluble food dyes by ion-exchange and soap


chitin and chitosan, Polymer Degradation and Stability, 59, 117-120

Lee, J.Y., Nam, S.H., Im, S.Y., Lee, Y.M., Seol, Y.J., Chung, C.P., and Lee,

chitinous polymers in food-A challenge for food research and development. Food Technol., January: 85-97

Knorr, D., Wampler, T.P., and Sc., 47(2): 593-595


Knorr, D. 1984. Use of application of chitin and chitosan, Biomaterial, 24, 2339-2349


Domard, A. 1987. Determination of N-acetyl content in chitosan samples by C.D.

percentage of free amine groups. Anal. Biochem. 211: 240


the organism, disease it causes, and their treatment, 15-24

Curotto, E., and Aros, F. 1993. Quantitative determination of chitosan and the


York, 209-214


31. Bough, W.A. 1975. Coagulation with chitosan-an aid to recovery of

by-products from egg breaking wastes. Poultry Sci., 54(6): 1904-1912


Bough, W.A. 1975. Coagulation with chitosan—an aid to recovery of


Thermal Analysis. 28: 189


