

Effect of irradiation on the molar mass of chitosan from crab shells of *Charybdis hellerii*

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The importance of determining the molar mass of polymers is closely related to the size of the chain which is a controlling factor in the evolution of solubility, elasticity, fiber formation and mechanical strength properties. There are several methods used to determine the molar mass and they are divided into relative or absolute. Relative methods as viscosimetry require calibration with samples of molar mass known, whereas absolute methods as osmometry do not require it. The importance of molar mass determination is related to its high influence on the properties of chitosan, such as bacterial activity. There are some studies that show that the use of chitosan is more efficient in the inhibition of bacteria than the use of the oligomers that form the same (NO et al., 2002; HIRANO et al., 1989) and that the molar mass required for the inhibition of microorganisms should be greater than 10000 Da (SHAHIDI et al., 2000). The minimum inhibitory concentration of chitosan ranges from 0.005 - 0.1% and depends on the species of bacteria, the molar mass and the pH of the chitosan preparation (GUAN et al., 2001, NO et al., 2002). The method used in this work was the capillary viscosimetry because it is simple, fast and very efficient. For each sample, four dilutions were performed in order to make the extrapolation and determine the intrinsic viscosity. The average viscosity molar mass (M_w) was determined by the Mark-Houwink-Sakurada equation ($[\eta] = KM^a$). As one of the results it was observed that the chitosan coming from the crab shell is of low molar mass with a value correspondent about 10 times smaller when compared with the standard. The chitosan obtained with the use of electron beam irradiation also shows a decrease in the molar mass as a function of the increase of the absorbed radiation dose.

Keywords: Chitosan, molar mass, irradiation process, bacterial activity.

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