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Light Scattering for the Masses Effect of Heating on Molecular Weights of Chitosan

Jul 2, 2010
 By: [Hang Thu Ta](#)
 THE APPLICATION NOTEBOOK

Heating is a common and essential requirement in most biopharmaceutical production methods. Chitosan is an amino polysaccharide obtained by alkaline deacetylation of naturally abundant chitin. It is known as a potentially beneficial material in many pharmaceutical applications such as tissue engineering, drug delivery, cell encapsulation and medical devices. In this study, we investigated the effect of high-temperature heating on chitosan molecular weights, the most important characteristic of chitosan.

In this study, a GPC-MALS system was used to determine molecular weight. The system employs a Shimadzu solvent delivery system. The

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system. The flow rate was set to be 0.5 mL/min. Waters Ultrahydrogel 250 and Ultrahydrogel 2000 with the separation range from 10^3 to 8×10^4 and from 50×10^4 to 7×10^6 kDa respectively were used. The columns were located in a Shimadzu column oven. System temperature was set to be 35 °C. Chitosan solution samples were diluted to a concentration of 2 mg/mL using the solvent, then filtered through 0.2 µm PVDF filters and injected into the GPC columns with a manual Rheodyne syringe injector equipped with a 100 µL sample loop.

Two detectors included the Wyatt Optilab (AUX1) and a Shimadzu UV/vis detector (AUX2) operated at 280 nm. The Wyatt DAWN EOS (enhanced optical system).

A value of 0.180 mL/g was used for the refractive index increment (dn/dc). The data were collected and analysed by the ASTRA software. The molecular weight of non-treated chitosan was found to be $(1.44 \pm 0.009) \times 10^5$ g/mol. Chitosan which was heated at 85 °C in an oven for 9 hours had a molecular weight of $(7.903 \pm 0.038) \times 10^4$ g/mol.

High temperature heating, therefore, caused the decrease in the molecular weight of chitosan.

This note was graciously submitted by Hang Thu Ta, Department of Chemical and Biomolecular Engineering, The University of Melbourne, Australia.

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