

Abstract Submitted
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Dynamical and physical changes of chitosan solutions during storage NIR KAMPF, ELLEN J. WACHTEL, ANTON ZILMAN, JACOB KLEIN, NOAH BEN-SHALOM, DEPARTMENT OF MATERIALS AND INTERFACES, WEIZMANN INSTITUTE OF SCIENCE, REHOVOT 76100, ISRAEL. COLLABORATION, DEPARTMENT OF FOOD SCIENCE, VOLCANI CENTER, ISRAEL. COLLABORATION, CHEMICAL RESEARCH INFRASTRUCT. UNIT, WEIZMANN INSTITUTE OF SCIENCE. COLLABORATION — Considerable attention has been paid to the biological properties and potential uses of chitosan and its derivatives in medical applications, industrial food processing, and agriculture. Whereas industrial users of chitosan do not usually further purify and manipulate the chitosan prior to use, in many scientific reports further cleaning as well as size fractionation of chitosan solutions do take place in order to meet the requirements of the analytical procedures and instrumentation. In the scientific publications concerning chemical or physical characteristics of chitosan, the so called "steady state" of the free polymeric solution is assumed to be achieved rapidly. In our study, we found that even up to 500 h the hydrodynamic properties continue to change. It was observed using both capillary and cone and plate viscometers, that the viscosity of unfractionated and fractionated chitosan at various polymer concentrations, molecular weights and degrees of deacetylation, decreased significantly during the storage period. These changes were also confirmed by dynamic light scattering measurements, which could be interpreted in terms of a decrease in the average hydrodynamic radius of the chitosan particles. The addition of salt to the chitosan solution was also studied. We supported our findings by theoretical modelling based on the transition from rigid rods into flexible polymeric chains. Our findings are of importance not only as a fundamental phenomenon but also to a large variety of applications, as the conformational state is known to affect chitosan reactivity, efficiency and shelf-life.

Kampf Nir

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