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## Dielectric Characterization of Neutralized and Nonneutralized Chitosan upon Drying

**Abstract:** Isothermal dielectric loss spectra of neutralized and nonneutralized chitosan were acquired in successive runs from  $-130^{\circ}\text{C}$  up to increasing final temperatures, in a frequency range between 20 Hz and 1 MHz. Essentially, three relaxation processes were detected in the temperature range covered: (i) a  $\beta$ -wet process, detected when the sample has a higher water content that vanishes after heating to  $150^{\circ}\text{C}$ ; (ii) a  $\beta$  process, which is located at temperatures below  $0^{\circ}\text{C}$ , becoming better defined and maintaining its location after annealing at  $150^{\circ}\text{C}$  independently of the protonation state of the amino side group; and (iii) a  $\sigma$  process that deviates to higher temperatures with drying, being more mobile in the nonneutralized form. Moreover, in dried neutralized chitosan, a fourth process was detected in the low frequency side of the secondary  $\beta$  process that diminishes after annealing. Whether this process is a distinct relaxation of the dried polymer or a deviated  $\beta$ -wet process due to the loss of water residues achieved by annealing is not straightforward. Only  $\beta$  and  $\sigma$  processes persist after annealing at  $150^{\circ}\text{C}$ . The changes in molecular mobility upon drying of these two relaxation processes were evaluated. © 2005 Wiley Periodicals, Inc. *Biopolymers* 81: 149–159, 2006

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