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# APPLICATION OF CHITOSAN DERIVATIVES AS SIZING AIDS IN PAPERMAKING

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Chitosan is an important polysaccharide, derived from an abundant organic renewable resource – chitin - and is a polymer with a high variability in its physico-chemical properties due to its natural origin. Its reactive amino groups and primary and secondary hydroxyl groups confer it interesting properties for papermaking applications, such as cationic polyelectrolyte behavior and high affinity for cellulose fiber surface. Recently, there has been a growing interest in the chemical modification of chitosan in order to improve its solubility and widen its applications.
This paper summarized our work on the characterization and application in papermaking of water soluble chitosan derivative obtained by introducing alkyl groups along chitosan chain, for confer it hydrophobic nature without affecting its cationic character. The chitosan derivative was obtained in our laboratory by reductive amination procedure, was characterized by spectroscopic techniques (FT-IR, $H^1$-NMR, MS), solubility in water and ionic charge density and was tested in papermaking as sizing and dry strength aid for internal and surface application. The results have shown that chitosan derivative was successfully obtained, proved by spectroscopic analysis, it is complete soluble in water at room temperature and have a cationic character under neutral pH medium. The applications of chitosan derivative in papermaking could be supported by its cationic polyelectrolyte properties and hydrophobic character due to the presence of alkyl groups along polymer chain. The chitosan derivative effects were compared with those of unmodified chitosan (chitosan acetate) and cationic starch, which is currently used for this type of application. The results have shown that chitosan derivative can be optimally applied as sizing aid leading to water absorption index and paper tensile strength values better than cationic starch. Moreover, chitosan derivative has the advantage to have a good solubility in water within a large pH range and a lower viscosity than cationic starch, proved by the slighter grammage of paper sheets after the surface treatment.