

LATEX FLOCCULATION USING CHITOSAN

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Whilst chemically chitosan is poly[β -(1 \rightarrow 4) amino-2-deoxy D glucose] and chitin is poly[β -(1 \rightarrow 4)-2-acetamido-2-deoxy D glucose] the term 'CHITOSAN' is commonly used to describe a continuum of copolymers of the two structural units.

In weakly acidic media, typically 0.1M acetic acid, the amine groups on the chitosan units become protonated to give a soluble, cationic polyelectrolyte and as such finds use as a flocculant and in sludge de-watering processes. Such a naturally derived polyelectrolyte is an attractive alternative to synthetic flocculants for reasons such as biodegradability and absence of toxic monomers.

Although chitosan does occur naturally in some fungi, its main industrial source is from the alkaline deacetylation of chitin. Chitin is the second most abundant polysaccharide on earth after cellulose and is present in the shells of crustacea and so has a potentially huge source from the fish processing industries.

The linear charge density of the protonated chitosan may be varied relatively simply by the reacylation of pure chitosan, for example by reaction acetic anhydride. In the present work, the starting material consisted of 98% chitosan/ 2% chitin. Two further degrees of deacetylation (80% and 60%) were also prepared as indicated above in order to study the effects of charge density upon flocculating efficiency. Chitosan may also be derivatized relatively simply to produce other potential flocculants.

Polystyrene latex, prepared by emulsion polymerization, was used as a model colloidal system, with techniques such as photon correlation spectroscopy and turbidimetry used to study the effects of variables such as linear charge density and ionic strength of the solution on the flocculation behaviour of chitosan in comparison with a charge neutralizing cationic surfactant, CTAB.