Major Applications

1. Controlled release and drug delivery
2. Scaffolds for biomedical applications like stents, organs
3. Tissue engineering, wound healing and regenerative medicine
4. Food supplements and natural preservatives
5. Anti-viral and anti-tumor applications
6. Bio-composite materials with functional properties

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Chitosan Derivatives And their Applications

Advantages of Chitosan derivatives

1. They are biodegradable and biocompatible
2. They are non-toxic and water soluble
3. They can be modified to impart special properties

DERIVATIVES

1. **N-Trimethylene Chloride Chitosan**: N-Trimethylene chloride Chitosan (TMC) is a quaternary derivative of Chitosan and it has a superior aqueous solubility, intestinal permeability as well as higher absorption over a wide pH range.

2. **Chitosan Esters**: Esters of chitosan with glutamate, succinate and phthalate have a differential solubility profile. These esteric forms are insoluble in acidic condition and provide sustained release of drugs in basic condition.

3. **Chitosan Conjugates**: Chitosan can be conjugated with a bioactive excepients for delivery of active ingredients such as Calcitonin. Chitosan conjugates such as 5-methylpyrrolidinone chitosan, chitosan-4-thiobutylamidine conjugate have shown enhanced absorption as well as mucoadhesives properties.

4. **Carboxymethyl chitosan (CM-Chitosan)**: CM-Chitosan is prepared by reacting monochloroacetic acid with Chitosan. The derivative is soluble in water and gives viscous solutions. A specil property of these solutions are thermo-stable compared to similar carboxymethyl cellulose.

Process of making water-soluble chitosan

Crustacean Shell

Deproteinization (NaOH with heating)

Decalcification(HCl at room temperature)

Chitin

Deacetylation(conc NaOH with heating)

Add soluble chitosan

Chemical Modification

Water Soluble Chitosan