# Exploring the Deacetylation of Chitin to Chitosan for Biomass Valorization

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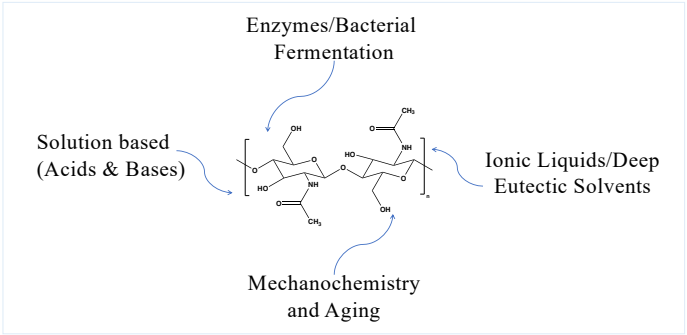
## Crustacean Shells

Minerals (20-50%)
- Medical industries, paper agriculture, and construction

Proteins (20-40%)
- Fertilizers, animal feeds, and food supplement

Chitin (5-40%)
- Cosmetics, textiles, water treatment, and medical industries


## Chitin Extraction

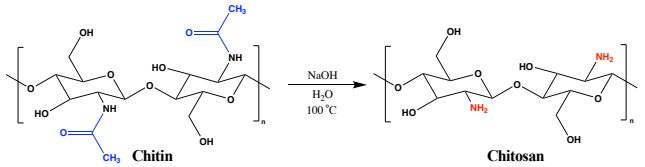



## Chitosan

The water-soluble derivative of chitin, chitosan, exhibits a wide range of applications within the biomedical, textile, food, and water treatment industries. This functional polymer is mucoadhesive, biodegradable, non-toxic, and biocompatible.

## Methods of Deacetylation

### Conventional Method

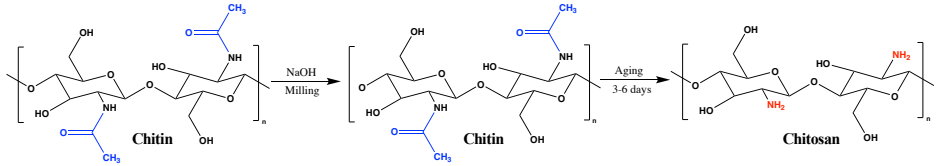



Harsh conditions
- Toxic 50% $NaOH_{(aq)}$

High quantities of solvent
- $H_2O$

Energy intensive
- reflux at 100 °C for prolonged time

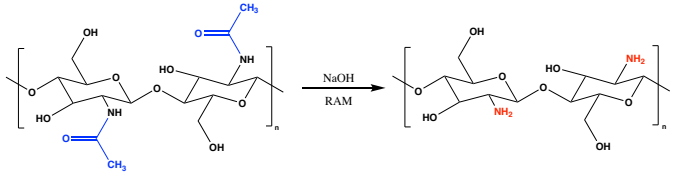
### Mechanochemistry & Aging




- Mild conditions with no solvent system and low energy consumption
- Prolonged reaction times – aging take three to six days

## Resonance Acoustic Mixing (RAM)

This technique is investigated as a viable alternative to effectively and sustainably deacetylate chitin. Comparative analysis of this method with traditional processes will be performed to evaluate the efficacy of RAM in achieving high degrees of deacetylation. This research aims to further the advancement of green processing methods for biopolymer modification, contributing to the sustainable production of high-performance biomaterials.


Parameters
- Time
- Temperature
- Reaction Conditions

## References

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