Bioconversion of chitinous compounds using chitin deacetylase

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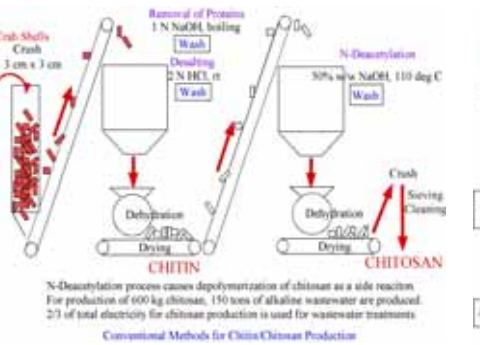
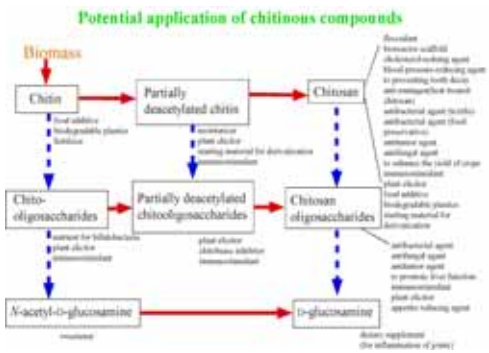
Backgrounds: Deacetylation of chitinous compounds is important for their utilization.



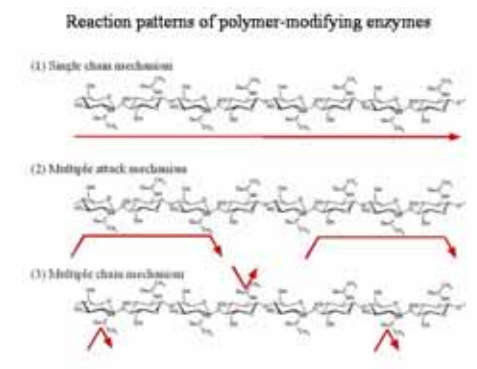


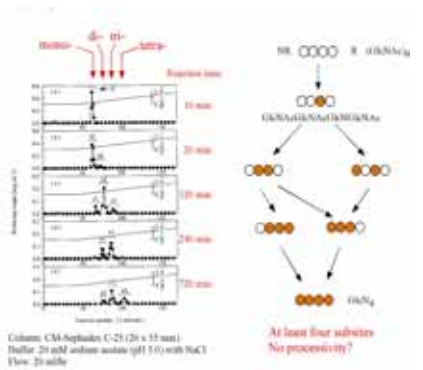
Colletotrichum lindemuthianum ATCC 56676: a Deuteromycete Pathogenic Fungus of Beans

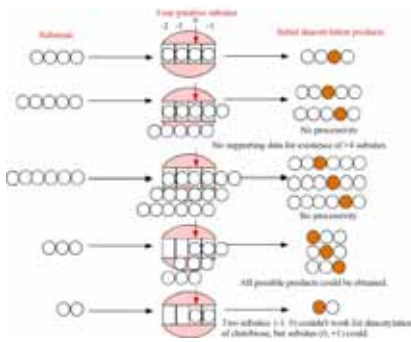
Chitin deacetylase:
- Secreted in culture media
- Known to be induced during penetration into host plants
- Highly active at neutral/alkaline pHs
- Highly stable below 40 deg C
- Active toward oligosaccharides of dp ≥2 and polymer chitin
- No inhibition by acetate
- In the presence of 3 M acetate, it catalyzes a reverse hydrolysis reaction as a "chitosan acetylase"
- Molecular mass of 24 kDa, monomeric enzyme
- No glycosylation
- N-terminus: pyroglutamated (highly blocked after acid treatments)

Chitin deacetylase gene:
- ORF of 753 bases (251 aa)
- Mature chitin deacetylase: 663 bases (221 aa)
- No multi-domain structures found in the deduced amino acid sequence
- Some conserved domains among CE fam4 (Nod B homologs) exist.
- Expression system of the gene in *Escherichia coli* with the aid of a signal sequence of *Streptomyces lividans* chitinase gene was established to produce recombinant CDAs with high specific activities

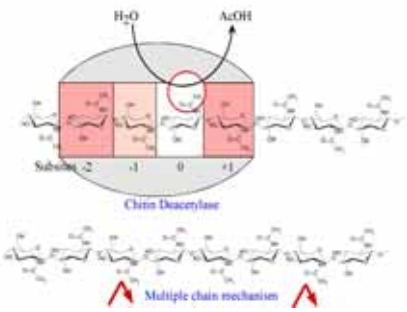
Reaction patterns of CDA: Characterization of CDA is important for its application.



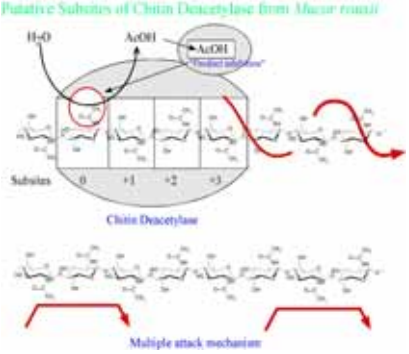




Putative Subsites of Chitin Deacetylase from *Colletotrichum lindemuthianum*



Putative Subsites of Chitin Deacetylase from *Mucor rouxii*



Reverse reaction of CDA: The reaction pattern of CDA can be used for the application.