

PROMISCUOUS ACTIVITY OF HYDROLASES ON CHITOSAN IN WATER/DES MEDIA

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The enzymatic hydrolysis of chitosan to produce chitooligosaccharides (COSs), which displays a plethora of biological activities^[1], is mediated in nature by chitosanases^[2]. These enzymes, although very specific, are very expensive, so that the employ of other cheaper “promiscuous” hydrolases^[3] would be highly beneficial from an economic point of view, allowing the generation of a library of tailor-made COSs with different technological/biological activities^[4].

In this presentation, the use of different commercial hydrolases for hydrolysis of chitosan is presented. After a previous characterization of the commercial enzymes, their performance for the modifications of different chitosans was tested, both in aqueous media and in DESs (either reline (basic) and betaine/lactic acid (acidic)).

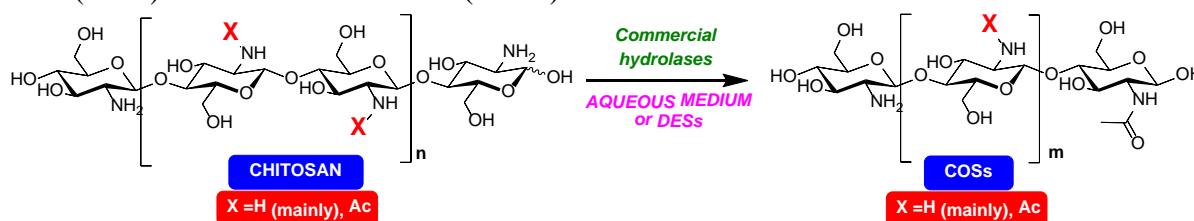


Figure 1: Hydrolase-catalysed depolymerization of chitosan in water/DESs media

According to the initial results obtained in aqueous solutions, these enzymes were capable to hydrolyse chitosan from different origins, with good recovery yields (up to 94%), and leading to different fractions possessing different Mw and acetylation degree; this fact could suggest that the enzymes can be also acting on the -NH-COCH₃ groups (Figure 1, X= Ac). Regarding DESs, enzyme activity is limited by the chitosan solubility in reline/water. Initial results are pointing towards a positive solubilization of starting material in betaine/lactic acid DESs, depending on the polymer properties. Activities are being tested in this DES for this non-previously reported enzymatic-based chitosan depolymerization.

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