Synopsis of Original Research Paper

Development of Novel Chitosan-based Surfactant with Controlled molecular weight and functional groups: Effect of N-Acetylation Degree on N-Acetylated Chitosan Hydrolysis with Commercially Available and Modified Pectinase

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Three types of N-acetylated chitosans (NACs) with different degree of acetylation (DA) were prepared and used as a substrate for enzymatic hydrolysis with a commercially available pectinase and a modified one. Pectinase modification was conducted using polyalkyleneoxide-maleic anhydride copolymer (PEO-MA copolymer). The effects of DA on enzymatic reaction with native and modified pectinases were investigated experimentally. Initial hydrolysis rate and Michaelis-Menten kinetic parameters were measured by analysis of reducing sugars. DA of NAC strongly affected the hydrolytic characteristics of native and modified pectinases. N-acetylation of chitosan increased the initial hydrolysis rate and the enzyme-substrate affinity with respect to both pectinases: NACs with DA over 0.3 showed high initial hydrolysis rate and strong affinity between enzyme and substrate. Especially when NAC with DA over 0.3 was treated with modified pectinase, the affinity became much stronger than the native pectinase.