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Determination of glucosamine and N-acetyl glucosamine in fungal cell walls.

Zamani A, Jeihanipour A, Edebo L, Niklasson C, Taherzadeh MJ.

Source

School of Engineering, University of Borås, Borås, Sweden. akram.zamani@hb.se

Abstract

A new method was developed to determine glucosamine (GlcN) and N-acetyl glucosamine (GlcNAc) in materials containing chitin and chitosan, such as fungal cell walls. It is based on two steps of hydrolysis with (i) concentrated sulfuric acid at low temperature and (ii) dilute sulfuric acid at high temperature, followed by one-step degradation with nitrous acid. In this process, chitin and chitosan are converted into anhydromannose and acetic acid. Anhydromannose represents the sum of GlcN and GlcNAc, whereas acetic acid is a marker for GlcNAc only. The method showed recovery of 90.1% of chitin and 85.7-92.4% of chitosan from commercial preparations. Furthermore, alkali insoluble material (AIM) from biomass of three strains of zygomycetes, Rhizopus oryzae, Mucor indicus, and Rhizomucor pusillus, was analyzed by this method. The glucosamine contents of AIM from R. oryzae and M. indicus were almost constant (41.7 +/- 2.2% and 42.0 +/- 1.7%, respectively), while in R. pusillus, it decreased from 40.0 to 30.0% during cultivation from 1 to 6 days. The GlcNAc content of AIM from R. oryzae and R. pusillus increased from 24.9 to 31.0% and from 36.3 to 50.8%, respectively, in 6 days, while it remained almost constant during the cultivation of M. indicus (23.5 +/- 0.8%).

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