

PREPARATION OF GLUCOSAMINE HYDROCHLORIDE FROM THE CHITIN OF *PENAEUS MONODON*

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Chitin, which constitutes the exoskeleton of animals of the phylum Arthropoda, is a cellulose like bipolymer having 2-acetylamino glucose as its primary building unit. These units are joined by beta, 1-2 glucosidic linkages. Chitin has been recognized as biodegradable, non-toxic and a very stable polymer (Ornum, 1992). Chitin has so many derivatives and these derivatives have versatile uses as N-carboxibeutyle chitosan which may be used as a raw material for preparing soap, shampoo and face cream (Kor, 1991). Glucosamine hydrochloride consists of 2-amino-D-glucopyranose and one hydrochloride unit linked with amino (-NH₂) group. Glucosamine hydrochloride has application in medicine, because it is a potentiator of antibiotic action. Present work gives some information on use of shrimp wastes of processing industries of Bangladesh in preparation of valuable chitin products such as glucosamine hydrochloride.

Head shells of *Penaeus monodon* were collected from the Sea Resources Limited, Chittagong, Bangladesh. Collected shells were separated from muscles and thoroughly washed with fresh running tap water and finally washed with distilled water and then dried in the sun until it was completely dry.

Chitin was prepared using the following protocol (Sandford and Hutching, 1987) which first removed minerals such as calcium carbonate and calcium phosphate from head shells by treatment with 10% hydrochloric acid (HCl) and then removing proteins from shells by using 20% sodium hydroxide (NaOH).

Chitin was washed with sufficient amount of distilled water and dried under the sun. The dried chitin was cut into small pieces using a pair of scissors. Twenty five g of chitin chips were soaked in 36% hydrochloric acid solution (600 ml) in a conical flask (1 litre) for 24 hours. During this period, the entire conical flask was covered with carbon paper. After 24 hours, refluxing was done at 60°C until the chitin was dissolved. It took 15 hours to dissolve all the chitin chips. After dissolution of all the chitin chips, the excess acid was removed by evaporation in vacuum. Glucosamine hydrochloride solution thus obtained was concentrated under vacuum and then decolourised by using activated charcoal. Finally the solution was crystallised in methanol as crystals of glucosamine hydrochloride of acceptable purity.

After analysis, it was found that from 25 g chitin of *Penaeus monodon* 2.03 g glucosamine hydrochloride were obtained, this means that 8.12% of glucosamine hydrochloride could be prepared from 100 g of chitin.

Glucosamine hydrochloride is a potent amino sugar which is obtained in crystallized form. It potentiates the action of antibiotics in the blood through raising the activity level of antibiotics, like penicillin, ampicillin, etc. The amount of glucosamine hydrochloride obtained was 2.03 g per 25 g of chitin used, or a percentage composition of 8.12%. This

composition of glucosamine hydrochloride is comparable to Kamasastri and Prabhu (1961) who prepared 8.28% glucosamine hydrochloride from prawn shell waste. Nikolaeva et al (1967) estimated 8.50% glucosamine hydrochloride from shrimp shells. Large quantities of shell wastes are produced by different shellfish industries annually, these waste products may be utilized for the preparation of this valuable product.

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