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Water Soluble Nitrogenous Component from Squilla *(Orato squilla nepa)**

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A water soluble hygroscopic powder has been isolated from squilla in good yield, ranging from 3.5 to 5.0 per cent of the fresh raw material, by a simple direct method. The process consists of homogenising squilla with an equal quantity of water, removal of chitinous matter from the slurry by filtration, heating the filtrate at 0.7 kg/sq.cm steam pressure for 15–20 minutes, removal of the precipitated protein by filtration and concentration and final drying in vacuum of the filtered cooled liquor. The pale brown powder so obtained consists mainly of peptones and proteoses and has been found to be comparable to BDH peptone for growth of bacteria, ability to serve as source for tryptophan for indole production and to provide substrate for the production of hydrogen sulphide. Comparative studies have been made on similar water soluble fractions from two species of prawns, namely, *Metapenaeus affinis* and *Parapenaeopsis stylifera.*

Squilla *(Orato squilla nepa)* is available in plenty throughout the west coast of India and is caught along with prawn in trawl catches. Although exact data on the total landings of squilla is not available, it is present as a by-catch in sufficiently large quantity to warrant development of suitable methods for its utilisation. Since it does not contain appreciable amount of meat and great difficulty is encountered in separating the meat from the shell, the squilla available in India has not been put to any commercial use. Recently, attempts have been made for development of methods for better utilisation of squilla. Madhavan & Nair (1975) have described a method for preparation of chitosan from squilla. A simple method for the isolation of protein from squilla without any chemical treatment has been reported by Garg *et al.* (1977). During earlier studies on squilla, it was observed that a major portion of the nitrogen present in squilla came out in water soluble fraction during the precipitation and separation of squilla protein. The present paper reports the yield and composition of the water soluble nitrogenous fraction of squilla. A comparative evaluation has also been carried out between the water soluble nitrogenous components of squilla and two species of prawns, *Metapenaeus affinis* and *Parapenaeopsis stylifera.*

Materials and Methods

Squilla caught by the Central Institute of Fisheries Technology fishing boats from the sea off Cochin was washed, iced immediately and brought to the laboratory. It was stored in crushed ice and used the next day or was frozen and stored at –20°C until taken out for further processing. The prawns used in the experiments were purchased fresh from the local market and kept heavily iced for about a day before taking for experiments the next day. All the samples used were in organoleptically good condition.

Isolation of the chitinous matter and protein from the samples was done according to the method described earlier (Garg *et al.*, 1977). The water soluble portion obtained after separation of the precipitated protein was concentrated on a water bath and finally dried under vaccum (750 mm of Hg at 45–50° C). A pale brown hygroscopic powder was obtained. Decolourisation of the cooled filtrate with activated

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charcoal was also attempted to improve the colour of the final product, with little success. Total nitrogen and chitin nitrogen of raw material were estimated by the method of Garg *et al.* (1977). Coagulable nitrogen, proteose nitrogen and peptone nitrogen present in the water soluble fraction were determined according to Winton & Winton (1958).

The samples prepared from squilla were incorporated into various bacteriological media, both liquid and solid and their growth promoting properties were studied using selected bacterial strains.

Results and Discussion

Results of a few typical trials on the isolation of water soluble nitrogenous component from squilla and prawn are summarised in Table 1. Yield of the total water soluble fraction from squilla varied between 3.5 and 5% of the fresh raw material and that from the two prawns between 1.8 and 2% respectively. Table 2 presents

Table 1. *Yield of water soluble nitrogen fraction from squilla and prawn*

Raw material	Wt. of fresh material	Wt. of vacuum dried powder from water soluble fraction	Yield
	g	g	%
Squilla Batch 1	1000	50.0	5.0
Squilla Batch 2	1000	35.0	3.5
Squilla Batch 3	1000	42.0	4.2
Squilla Batch 4	1000	40.0	4.0
Squilla Batch 5	1000	35.0	3.5
Squilla Batch 6	1000	38.0	3.8
Prawns *(P. stylifera)*	1000	18.8	1.9
Prawns *(M. affinis)*	1000	21.0	2.1

Table 2. *Yield and distribution of different nitrogen components in the water soluble nitrogen fraction from squilla and prawns*

Raw material	Nitrogen present in raw material			Nitrogen recovered in the water soluble fraction	Percentage of nitrogen recovered in the water soluble fraction	Percentage yield in the water soluble fraction of		
	Total TN A	Chitin CN B	TN–CN A–B			Coagulable nitrogen	Proteose nitrogen	Proteose peptone nitrogen
	mg	mg	mg	mg				
Squilla	1530	180	1350	640	47.4	Not detectable	13.0	67.7
Squilla	1730	210	1520	640	42.1	Not detectable	17.6	60.7
Squilla	1310	200	1110	580	52.3	Traces	15.0	70.0
Squilla	1710	200	1510	730	48.3	Not detectable	14.1	69.5
Prawns *(P. stylifera)*	1730	100	1630	550	33.7	16.5	2.0	40.3
Prawns *(M. affinis)*	2150	100	2050	550	26.8	16.2	8.6	29.9

the relationship of nitrogen recovered in the water soluble fraction to the total nitrogen present in the raw material excluding the chitin nitrogen. Distribution of the individual nitrogenous components in the aqueous extract after removal of protein is shown in Table 2. Recovery as water soluble nitrogen fraction varied between 42–52% in the squilla and between 26.8 and 33.8% in prawns. It is seen from Table 2 that the water soluble fraction from squilla consists mainly of peptones and proteoses and that coagulable protein nitrogen was not detectable in this fraction. In the case of prawns appreciable amounts of coagulable proteins are present and peptones and proteoses are available to a limited extent.

Studies on the growth promoting properties of the samples from squilla have shown that these compared very favourably with Difco and BDH peptones (Iyer, K.M. & Rao, C.C.P., personal communication) in their ability to promote bacterial growth, to serve as source for tryptophan for indole production and to provide a substrate for the production of hydrogen sulphide. The investigations on the effectiveness of the squilla product for incorporation in bacteriological media is not yet completed and the results reported here should be regarded as preliminary.

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