THE FREE AMINO NITROGEN CONTENT AS AN INDEX OF QUALITY OF ICE-STORED PRAWNS

By

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OBJECTIVE tests which are useful for assessing the number of days elapsed in ice storage and/or which reflect the early changes occurring in prawns before the onset of spoilage are essential for quality control in the prawn processing industry. Our earlier findings[1] that the free amino nitrogen content of the crustacean muscle is over 300 mg. N/100 g. of muscle whereas it is only about 1/10th of this value in the fishes suggested that the determination of amino nitrogen might be of use in studies on crustacean spoilage. Hence this determination was included among other chemical and bacteriologial tests in investigations on the quality of ice-stored prawns which are in progress at this Station. The results of one series of observations on prawns obtained at Mandapam and also on prawns landed at Cochin on the West Coast are shown in Figs. 1 and 2.

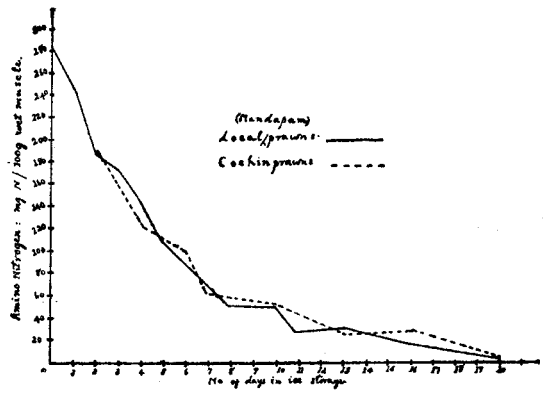

FIG. 1. Decrease in amino N during ice storage.

It is seen that the decrease in amino nitrogen is more regular than the decrease in the orthophosphate which shows some scattering. Also there is close agreement in the amino nitrogen values of the Mandapam prawns and Cochin prawns after equal periods of storage in ice. Bailey *et al.*[2] did not include amino N among the tests which show definite changes in the prime quality of ice-stored prawns but considered it among other tests for judging the relative quality. Our observations on prawns comprising of different species* and taken from different environs indicate that definite ranges of amino N values are associated with the number of days in ice storage. Values of over 200 mg. N/100 g. characterise the first two days, values between 100 and 200 mg. the next three or four days and values below 100 longer durations. According to Bailey *et al.* (*loc. cit.*) the prime quality phase of ice-stored prawns lasts for about six days. The rapid decrease in amino N is seen to be arrested about the sixth or seventh day (Fig. 1). It appears therefore that the amino N is also useful as the other tests mentioned by Bailey *et al.* The determination of amino N by the method employed[3] is simple, accurate and needs no special equipment or instruments.

Campbell and Williams[4] had reported an increase in the amino N in Gulf coast shrimps during ice storage; but Fieger and Friloux[5] observed a decrease in the amino N. Our observations are in agreement with those of the latter workers; however, the fall in amino N is more rapid and much lower values are reached after two weeks' storage in ice in our experiments. The reason for this is not clear at present. The initial amino N values for Gulf coast shrimps reported by Fieger and Friloux are of the same level as in Indian prawns, crabs and lobsters reported by us (*loc. cit.*).

Bailey *et al.* attributed the differences in their observations and those of Campbell and Williams to possible differences in the bacterial flora. The mechanism of the decrease in the amino N during ice storage is not clearly elucidated yet; but experiments carried out by us have shown that leaching by contact with melting ice is the most significant factor. Bacterial action is not probably involved since the bacterial population is low especially during the early days of storage when the decrease in

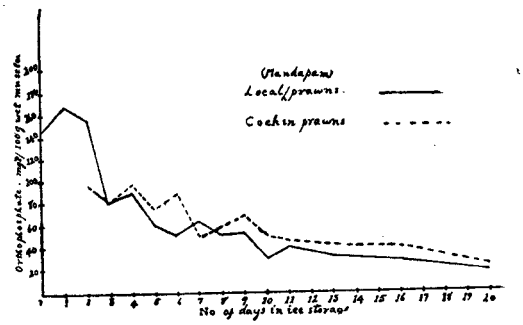

FIG. 2. Decrease in orthophosphate during ice storage.

amino N is most rapid. The loss of free amino acids by leaching may itself contribute to a lessening in the flavour of the prawn meat. The full investigations will be reported later.

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* The Mandapam prawns consisted entirely of *Penæus indicus* and the Cochin prawns of *Metapenæus dobsoni*, *M. affinis*, *M. monoceros* and *P. indicus*, the first being predominant.

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3. Pope, C. G. and Stevens, M. F., *Biochem. J.*, 1939 **33**, 1070.
4. Campbell, L. L. and Williams, O. B., *Food Technol.*, 1952, **6**, 125.
5. Fieger, E. A. and Friloux, J., *Ibid.*, 1954, **8**, 35.