[ Reprinted from the *Journal of Scientific & Industrial Research*, 1957, Vol. 16A, No. 3, pp. 141, 142 ]

## PROTEIN HYDROLYSATE FROM FISH

EDIBLE FERMENTED FISHERY PRODUCTS, particularly liquid preparations, are practically unknown in India. Such preparations are very popular in the South-east Asian countries, and products of a more or less similar nature are also used in some Western countries. The *maggi sauce* used in some European countries is analogous in its preparation and properties to the *nam-pla* of Thailand, *patis* of the Philippines and the *nuoc-mam* of Indo-China, the only difference being that in the European preparation meat instead of fish is used as the raw material[1]. Analysis of some samples of *nam-pla* has shown that it is essentially a protein hydrolysate[2]. The preparation of a similar product on an experimental scale was attempted in this laboratory and the results are reported here.

The process employed was as follows: local sardines (mainly *Sardinella dayi* Regan) were washed with tap water and 100 lb. were mixed with 35 lb. common salt and placed in a specially constructed wooden barrel. Another 50 lb. of the washed fish were mixed with salt in the proportion 2:1 and placed in the same barrel over the first lot. The surface of the piled fish was covered with a thin layer of salt and a wooden cover which just fits in was placed over the fish. After three days the fluid collecting at the bottom was drained through a tap provided at the bottom of the barrel and returned to the top of the barrel. Heavy stones were then placed on the wooden cover resting on the fish so that the latter was subjected to pressure. The liquid collecting at the bottom of the barrel was tapped at monthly intervals and examined for total, formol and volatile nitrogen contents; the chloride content and acidity of the samples and their bacterial count were also determined.

The total, formol and volatile nitrogen contents of the product increased progressively during the five-month period (Fig. 1). At the end of five months the volatile nitrogen content of the liquid was nearly one-third of the formol nitrogen; a further increase in the volatile nitrogen relative to the formol nitrogen resulted in deterioration of the quality of the product. The liquid collected was, therefore, drained off at the end of five months.

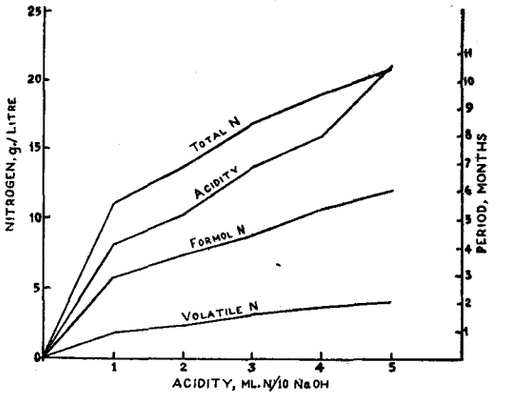


FIG. 1 — PARTITION OF NITROGEN AND ACIDITY IN THE EXPERIMENTAL PRODUCT

TABLE 1 — ANALYSES OF *NAM-PLA* SAMPLES

| | Experimental product obtained at the end of five months | *Nam-pla* manufactured in Thailand | | | |
|---|---|---|---|---|---|
| | | Grade I | Grade II | Grade III | Grade IV |
| Total nitrogen, g./litre | 20·94 | 21·00 | 13·50 | 4·50 | 1·40 |
| Formol nitrogen, g./litre | 12·04 | 10·25 | 8·30 | 2·92 | 0·42 |
| Volatile nitrogen, g./litre | 4·08 | 3·20 | 2·40 | 0·72 | 0·16 |
| Acidity, ml. of N/10 NaOH required to neutralize 10 ml. of the product | 10·50 | 10·10 | 8·50 | 7·80 | 0·90 |
| Chloride, as % NaCl | 29·80 | 27·60 | 27·90 | 30·00 | 30·07 |
| Bacterial count, No. of colonies per ml. | 57 | 32 | 61 | 164 | 52 |

The nitrogen partition data for the product and of *nam-pla* samples (Table 1) show the product to be comparable with the highest grade of *nam-pla*.

The sample obtained at the end of the first month gave a bacterial count of about 500 colonies per ml. and the dominant organisms

present were two *Micrococci* and one *Bacillus* spp. The count decreased rapidly in subsequent samples and *Bacillus* alone was found in the last sample.

About 50 lb. of a clear, amber-coloured liquid, having no fishy or unpleasant odour, were obtained at the end of five months. In appearance the product was indistinguishable from Thailand *nam-pla*. It kept well at room temperature for several months.

Further work is being carried out in order to explore the possibility of applying this procedure for manufacturing fish sauce on a cottage industry scale.

The author is grateful to the Chief Research Officer, Central Marine Fisheries Research Station, Mandapam Camp, for permission to publish this note.

N. K. VELANKAR

*Central Marine Fisheries Research Station*
*Mandapam Camp*
12 *November* 1956

1. WESTENBERG, J., *Proceedings, Indo-Pacific Fisheries Council*, (1951), 2/14, 1-27.
2. VELANKAR, N. K., *J. sci. industr. Res.*, **11B** (1952), 310.