# PART III

## NOTES AND ABSTRACTS

## NOTES:

### QUALITY TOLERANCES FOR WATER FOR USE IN FISH PROCESSING

A recent survey on the sources and quality of water used in prawn processing factories revealed much nonuniformity in the chemical quality. (Mathen, 1971). This has necessitated a thorough study on the influence of variations in the chemical quality of water on the final quality of the product. Such information is also necessary while recommending the suitability or otherwise of a particular source of water for fish processing. Standards are available for the quality of water used for ice manufacture. (ISI, 1966). The requiremnts on the quality of water may change with the type of product processed. Very little data are available on this aspect though much has been discussed both in India (Pillai, *et. al.* 1965; Iyer, *et. al*; 1966 and 1969; Choudhuri, *et. al.* 1970) and in foreign countries (Brownlee. 1971) on the sanitary aspects of water supplies for fish processing plants. An attempt has been made to study the effect of varying concentrations of chemical constituents in the water used for prawn freezing and its influence on the quality of the prawn after freezing and during cold storage. The results of the study is reported in this communication, together with recommendations on the quality tolerances for water used in fish processing industry.

Prawns used in this study were collected locally in the meat form and were washed four times in water containing varying amounts of the chemical constituents and frozen after adding the required quantity of water to the prawns to form a block and to have a proper glaze. The treatments with results are shown in Table I. Samples processed with distilled water served as controls. The prawns were frozen in blocks to -40°C and stored at -23°C. Samples were examined immediately after freezing and during frozen storage at definite intervals after thawing at 4°C for overnight. Organoleptic, chemical and bacterial aspects were looked into.

The results presented in the above table show that alkalinity above 100ppm expressed as $CaCO_3$ adversely affect the quality of the finished product, the defect being bleaching on cooking. Presence of organic matter affects the organoleptic quality. Though chloride levels up to 1000ppm has been tried its effect on the quality of the finished product immediately after processing and during storage is insignificant. Sulphate above 200 ppm imparts whitish appearance to the product on cooking. No significant difference in bacterial and biochemical quality has been observed between any of the treated and control samples. Based on these observations and those of others (Nandakumaran, *et. al.* 1970), it appears that the tolerances for water to be used in fish processing can be the same as that for ice manufacture (IS. 3957 - 1966) with slight modifications. The level of chlorides can be upto 1000 ppm and consequently,

Table I

| | Chemical constituent | Concentration (in ppm) used | | Remarks |
|---|---|---|---|---|
| 1. | Chloride (Sodium chloride expressed in terms of chloride) | 250; 750; | 500 1,000 | Moisture content decreases with increasing concentration and it decreases by 0.3% when the concentration is 1000 ppm over control. |
| 2. | Sulphate (Sodium sulphate expressed in terms of sulphate) | 50; 200; | 100 300 | Whitening of the cooked muscle above 200 ppm. |
| 3. | Calcium hardness (Calcium chloride expressed in terms of $CaCo_3$). | 50; 250; | 100 500 | No significant effect. |
| 4. | Megnesium hardness (Magnesium sulphate expressed in terms of $CaCo_3$). | 25; 100; | 50 200 | No Significant effect. |
| 5. | Carbonate alkalinity (Sodium carbonate expressed in terms of $CaCo_3$). | 50; 200; | 100 500 | Slight bleaching on cooking above 100 ppm level. |
| 6. | Bicarbonate alkalinity (Sodium bicarbonate expressed in terms of $CaCo_3$). | 50; 200; | 100 500 | Slight bleaching on cooking above 100 ppm level. |
| 7. | Organic matter | | 180 | Flavour and odour are adversely affected. |

the tolerance for total dissolved solids has to be higher. Though the quality of the finished product is not adversely affected by hardness level upto 500 ppm., water with lower hardness level, say 100 ppm is preferable, since hard water may reduce the efficiency of detergents used in plant washing operations. Two more factors viz., free and saline ammonia and albuminoid ammonia may be estimated for water meant for fish processing use and limits of 0.01 ppm and 0.05 ppm may be considered as the maximum. Higher amounts may be due to pollution. The presence of organic matter may increase the chlorine demand and may produce off odours due to organochlorine compounds. The pH should be between 6.5 and 7.5 since higher pH may cause bleaching and lower pH may cause corrosion.

When meant for canning operations, the copper level should be less than 0.1 ppm as higher amounts may cause blackening of canned shrimp. Also water of high chloride and sulphate contents and lower pH may cause corrosion of cans cooled in them. Hygroscopic salts absorbed on the can body from the cooling water may also create corrosion problem. These remarks point to the necessity of interpreting the data on water analysis intelligently with the use for which it is put in mind.

REFERENCES

Brownlee, W. J. 1971 *Fish Inspection and Quality Control.*, Editor, R. Kruezer, 241.

Choudhuri, D. R., Iyer, T. S. G. and Pillai, V. K. 1970 *Fish. Technol., VII* (1), 73.

IS : 3957 1966 Indian Standard: Quality Tolerances for water for ice manufacture, 5p.

Iyer, T. S. G., Choudhuri, D. R. and Pillai, V. K. 1966 *Fish. Technol. III* (1), 44.

Iyer, T. S. G. and Choudhuri, D. R. 1966 *Ibid, III* (2), 113.

Iyer, T. S. G., Choudhuri, D. R. and Pillai, V. K. 1969 *Ibid VI* (1), 59.

Mathen Cyriac 1971 *Fish. Technol. VIII* (1), 109.

Nandakumaran, M , Choudhuri, D. R. and Pillai, V. K. 1970 *Ibid., VII* (2), 120.

Pillai, V. K., Lekshmy. A., Gyvindan, T.K., Mathen Cyriac and Krishna Iyer, H. 1965 *Ibid., II* (1), 115.

Central Institute of Fisheries Technology,
Cochin-11.

Francis Thomas &
Cyriac Mathen