Comparative Microbiology of Commercial and Laboratory Prepared Prawn Pickles

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Pickles prepared from finfishes, crustaceans, gastropods and bivalves in various styles are gaining acceptance in recent days. Preparation of such pickles in small cottage industry level is fast catching up since it is economical and does not involve much investment. Pickled products generally have a pH around 4.5 and contain salt, spices and vinegar which contribute to its preservative quality. A perusal of literature indicates a lack of information on microorganisms associated with fish and prawn pickles, except the one reported for spoiled prawn pickle (Karunasagar *et al.*, 1988). In the present study, the microbial flora of the commercial and laboratory prepared prawn pickles was compared.

In the laboratory, prawn pickle was prepared as per the recipe developed by Fisheries College and Research Institute, Tuticorin and sealed in glass bottles. Commercial prawn pickles in sealed glass bottles were collected from the production centre. Samples were drawn aseptically from these bottles and analysed microbiologically as described by APHA (1976) and Corry *et al.* (1982). Bacterial isolates chosen at random were identified upto generic level as per the scheme of Surendran & Gopakumar (1981). Titrable acidity and salt content were determined as per AOAC (1975). The pH was determined by using a digital pH meter.

The results of the microbiological and other parameters of the prawn pickles are presented in Table 1. The pH value of commerical pickle was slightly higher and the titrable acidity was slightly lower than the laboratory prepared pickle. Both samples had almost equal concentration of sodium

Table 1. *Characteristics of prawn pickle*

Parameters	Commercial prawn pickle	Laboratory prawn pickle
pH value	4.76	4.62
Titrable acidity as % acetic acid	0.37	0.43
Sodium chloride, %	4.40	4.23
Total plate count. g^{-1}	5.25×10^5	1.40×10^3
Aerobic spore formers. g^{-1}	5.25×10^4	3.50×10^2
Proteolytic bacterial count. g^{-1}	1.00×10^5	1.50×10^2
Lipolytic bacterial count. g^{-1}	1.50×10^5	2.50×10^2
Halophilic bacterial count in 12% salt medium.g^{-1}	1.50×10^4	1.00×10^2
Lactic acid bacterial count. g^{-1}	$<1.00 \times 10^1$	$<1.00 \times 10^1$
Staphylococcal count. g^{-1}	2.45×10^2	0.50×10^1
Mold and yeast count. g^{-1}	$<1.00 \times 10^1$	$<1.00 \times 10^1$
Anaerobic gas producers MPN. g^{-1}	<1800	<2.00
Anaerobic spore formers, MPB. g^{-1}	1600	<2.00

chloride. There was 2 log difference in bacterial population between laboratory and commercial pickles. Commercial pickles were found to have higher counts of Staphylococci, anaerobic gas producers and anaerobic spore formers. No lactic acid bacteria, mold and yeasts were encountered in both the samples. There were no faecal coliforms, coagulase positive *Staphylococcus aureus, Clostridium perfringens, Salmonella*-like organisms and *Vibrio*- like organisms in both the samples. These organisms are inhibited in high salt and at low pH. The absence of pathogens confirms the safety of the commercial pickle inspite of higher bacterial count. The analysis of bacterial isolates showed that *Bacillus* dominated in the flora and the remaining belonged to Micrococcaceae group comprising *Micrococcus* sp. and *Staphylococcus* sp. These bacteria were acid and salt tolerant and were responsible for spoilage of prawn pickles (Karunasagar *et al.*, 1988). The higher counts of bacterial population in commercial prawn pickle might be due to unhygienic handling.

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