

## NOTE II

### BACTERIAL ASPECTS OF QUALITY OF PHOSPHATE TREATED FROZEN PRAWNS

Changes in physical, organoleptic and biochemical characteristics of phosphate treated prawns and froglegs during storage have been studied in detail by Mathen and Pillai, (1970)<sup>1</sup>. Adoption of the recommended method by the industry in the freezing of prawns made it necessary to assess the influence of such treatment on the bacterial quality. This aspect assumes more importance in view of the proposed compulsory bacterial standards for raw frozen prawns. This note gives an account of the results on the influence of phosphate treatment on the bacterial quality of raw frozen shrimp meat.

The controlled experiments were carried out with shrimp meat (*M. dobsoni*,

*P. indicus*, and *M. monoceros*) treated with phosphate solution prepared in tap water containing 10 ppm available chlorine. The treated shrimps were frozen in blocks of 450g. and were stored at -18°C for six months. Shrimp meat frozen with added chlorinated water (10 ppm) served as control. Samples were examined at monthly intervals for total bacterial count, *E. coli*, faecal *streptococci* and coagulase positive *staphylococci*. Samples of commercial frozen prawns were collected from the prawn freezing factories at Cochin. The diluent used was phosphate buffer and temperature of incubation was 37°C. The media, technique of inoculation and time of incubation were as follows:—

Test	Media	Inoculation technique	Incubation time (hours)
Total bacterial count	Tryptone Glucose Agar	Pourplate	48
<i>E. coli</i> .	Tergitol 7 Agar	Surface streaking	18-24
Faecal <i>streptococci</i>	K. F. Agar	Pourplate	48
Coagulase positive <i>Staphylococci</i>	Baird Parker medium	Surface streaking	24-36

Results obtained under controlled conditions are presented in the accompanying Table. These results indicate that in the phosphate treated samples, the reduction in total bacterial count during storage is more than that in control samples. There is no difference between the two sets of

results on faecal *streptococci* while the numbers of *staphylococci* are lower in treated samples though in both cases they disappear in the 4th month of storage. No data on the survival of *E. coli* during frozen storage could be collected because *E. coli* disappeared after freezing. The ba-

Changes in bacterial counts\* of phosphate treated and nontreated raw frozen prawn meat during storage at -18°C.

Storage time (months)	Total bacterial count (X 10 <sup>4</sup> )		Faecal streptococci		Coagulase positive staphylococci		<i>E. coli.</i>	
	C	T	C	T	C	T	C	T
Before freezing	18.46	17.7	674	521	209	149	55	16
After freezing	12.08	12.2	710	570	194	122	Nil	Nil
1.	13.6	7.3	556	493	160	114	"	"
2.	7.3	4.8	585	478	109	64	"	"
3.	7.4	3.6	514	477	16	8	"	"
4.	5.9	4.0	564	519	Nil	Nil	"	"
5.	4.4	3.3	345	330	"	"	"	"
6.	4.1	2.6	248	221	"	"	"	"

\*1. Counts are expressed as number per gram.

2. Each value is the average result on six blocks, each block being tested in duplicate.

C nontreated.

T treated.

acterial quality of commercial samples of phosphate treated and nontreated frozen prawns was found to be comparable. The percentage of samples with higher numbers of faecal *streptococci* (more than 1,000/g) was six times higher than that based on *E. coli* (more than 20/g.) in both cases. This may be due to the wider distribution and greater resistance of faecal *streptococci* to adverse conditions. Examination of commercially used phosphate solutions showed bacterial count varying between 30 to 5,500/ml. with almost complete freedom from faecal and pathogenic organisms.

Reports on the effect of phosphate treatment on bacterial quality of the finished product are rare. Sutton and Anderson (1959)<sup>2</sup> inferred from their studies that phosphate dipping is not likely to in-

troduce any serious bacteriological problems into the factory. If such is the case with dip treatments, the present method is more safe. This is clearly evidenced by the study.

It is concluded that phosphate treatment does not add to bacterial counts of treated and frozen prawns if the solution is prepared in water chlorinated to a level of 10 ppm available chlorine and usual sanitary precautions are taken during treatment, freezing and storage.

#### REFERENCES

- Mathen, C. and Pillai, V. K. 1790 Weight losses in foodstuffs, p. 251, International Institute of Refrigeration, Paris.
- Sutton, H. A. and J. I. W. Anderson. 1969 *Freezing and Irradiation of fish.* p. 176, Fishing News (Books Ltd.)

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