

A Survey of Process Hygiene in the Sri Lankan Prawn Industry

II. The Hygiene Status of Personnel

By

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Introduction

Man, in common with other warm-blooded animals, can carry bacteria of public health importance in the body. Apparently healthy individuals can carry pathogenic bacteria; the "Symptomless-carrier" of *Salmonella*, for example has been responsible for numerous, well-documented outbreaks of food-borne illness. Similarly, the healthy adult carrier rate for *Staphylococcus aureus* has been variously reported as between 30 per cent and 50 per cent (Eyles, 1976). Staphylococci are carried on the hands, hair, back and in the ears, nose and throat.

Because of the intimate physical handling which prawns undergo during processing, the level of *Staph. aureus* must be checked; although the level varies from country to country, most importing standards or specifications are in the range 100 — 1,000 *Staph. aureus* per gram of prawn product.

As part of a survey on process hygiene in the prawn industry it was considered desirable to monitor the incidence of *Staph. aureus* on the fingers of prawn processing personnel, and about 250 personnel were tested for the presence of *Staph. aureus*. In addition, the provision of protective clothing was monitored.

Materials and Methods

Personnel were requested to briefly interrupt their particular task and to lightly press the fingertips and thumb of one hand on the surface of a pre-poured plate of Baird-Parker Agar. After incubation of the "touch plate" at 37°C/24 h. the presence of typical colonies of *Staph. aureus* was noted.

Results and Discussion

The prevalence of *Staph. aureus* on the fingers of personnel is presented in Table 1; of 262 personnel tested, 137, or 52 per cent, carried *Staph. aureus*. Among particular companies the prevalence ranged from 22 per cent (Company No. 2) to 92 per cent (Company No. 1).

Of the fifteen companies surveyed, five provided a bath containing a sanitiser which was used as a hand-dip, ostensibly to sanitise the fingers and thereby limit contamination of the prawn product. The effectiveness of the sanitisers employed is questionable; both Companies No. 1 and 5 used the

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same type of sanitiser (active ingredients Chlorhexidine gluconate + Cetrimide) and the prevalence of *Staph. aureus* was 92 per cent and 80 per cent, respectively. Company No. 15 used a sanitiser in which the active ingredients were phenolic and terpenoid, and the prevalence of *Staph. aureus* was 71 per cent. Company No. 10, using an iodophore hand dip had a prevalence of 43 per cent positive for *Staph. aureus*.

Although the present survey constitutes only a cursory examination of the effectiveness of hand sanitisers it raises, nonetheless, the disturbing possibility that the use of hand sanitisers may actually increase the prevalence of *Staph. aureus*. The use of iodophores as hand sanitisers is well-known in the dairy industries of several countries. The sanitisers used by Companies No. 1, 5, 8 and 15, however, appear to be ineffective against *Staph. aureus*; further, if these sanitisers are lethal to the "normal", harmless microflora of the fingers they could enhance colonisation by *Staph. aureus* by reducing competition. This is a possible explanation for the extremely high prevalence of *Staph. aureus* on the fingers of personnel at Companies No. 1, 5 and 15.

Under the circumstances prevailing, namely, over 50 per cent of prawn handlers carrying *Staph. aureus*, the provision of protective clothing becomes extremely important. However, as indicated in Table 2, many companies failed to provide overalls and hats to all their employees. Masks were worn at two companies, but their effectiveness appeared questionable as they were worn incorrectly (sometimes covering neither nose nor mouth) and appeared dirty. Only one company (Company No. 3) provided any hand covering (in the form of polythene bags) and only at the final processing stage.

There is a growing trend away from the use of sanitiser hand-dips because, firstly, some are not lethal for *Staph. aureus* and, secondly, they may allow the build-up of staphs by eliminating harmless competing bacteria from the fingers. Facilities for hand-washing, however, are considered vital, and it was disturbing to note that, in none of the Companies surveyed were there adequate facilities for hand-washing; in fact, in one company, two wash-hand basins were in use for washing prawns. As well, toilet and rest-room facilities were both rudimentary and, in some cases, unclean.

This latter, coupled with the inadequacy of hand-washing facilities and of provision of protective clothing underscored a particularly weak hygiene phase for the Sri Lankan prawn industry

SUMMARY

Of 262 personnel tested, 137 (52%) were found to be positive for *Staph. aureus*. Among individual companies the prevalence of *Staph. aureus* ranged from 92% (Company No. 1) to 22% (Company No. 2). Although five companies provided a sanitiser hand-dip, this was found to be ineffective for the control of *Staph. aureus*. Provision of hand-washing facilities, of protective clothing and of toilet facilities was found to be inadequate for an export food industry.

REFERENCE

EYLES, M. J. (1976)

Staphylococcus aureus, in "Food-Borne Micro-organisms of Public Health Significance" Vol. 1, Ed. R. A. Edwards Univ. N. S. W., Australia.

TABLE 1
PREVALENCE OF *STAPH. AUREUS* ON THE HANDS OF PRAWN PERSONNEL,
AND THE PROVISION OF SANITISER HAND-DIPS

Company No.	Prevalence of <i>Staph. Aureus</i>	Provision of Sanitiser Hand-Dip	Active Ingredient of Sanitiser
1 ..	24/26 (92%) ..	Yes ..	Chlorhexidine gluconate + Cetrimide
5 ..	8/10 (80%) ..	Yes ..	Chlorhexidine gluconate + Cetrimide
8 ..	5/11 (45%) ..	Yes ..	Chlorhexidine gluconate + Cetrimide
10 ..	13/30 (43%) ..	Yes ..	Iodophore ..
15 ..	10/14 (71%) ..	Yes ..	Phenol/Terpineol
2 ..	6/27 (22%) ..	No ..	—
3 ..	7/26 (26%) ..	No ..	—
4 ..	6/10 (60%) ..	No ..	—
6 ..	3/10 (30%) ..	No ..	—
7 ..	8/16 (50%) ..	No ..	—
9 ..	2/8 (25%) ..	No ..	—
11 ..	11/17 (64%) ..	No ..	—
12 ..	17/30 (56%) ..	No ..	—
13 ..	11/17 (64%) ..	No ..	—
14 ..	6/10 (60%) ..	No ..	—
Total ..	137/262 (52%) ..	No ..	—

TABLE 2

PROVISION OF PROTECTIVE CLOTHING FOR PERSONNEL

Company No. :	Grading Area		Processing Area				Packing Area					
	Uniforms	Hats	Uniforms	Hats	Gloves	Masks	Uniforms	Hats	Gloves	Masks		
1 ..	+	+	..	—	—	—	..	+	+	—	—	
2 ..	±	±	..	±	—	—	+	..	+	+	—	+
3 ..	+	+	..	+	+	—	—	..	+	+	+	—
4 ..	+	+	..	—	—	—	—	..	+	+	—	—
5 ..	+	+	..	+	+	—	—	..	+	+	—	—
6 ..	+	+	..	+	+	—	—	..	+	+	—	—
7 ..	±	±	..	+	+	—	—	..	+	+	—	—
8 ..	—	—	..	+	+	—	—	..	+	+	—	—
9 ..	+	+	..	±	±	—	—	..	±	±	—	—
10 ..	—	—	..	+	+	—	—	..	+	+	—	+
11 ..	—	—	..	—	—	—	—	..	—	—	—	—
12 ..	+	+	..	+	+	—	—	..	+	+	—	—
13 ..	+	+	..	+	+	—	—	..	+	+	—	—
14 ..	±	±	..	±	±	—	—	..	±	±	—	—
15 ..	±	+	..	+	+	—	—	..	+	+	—	—

+ = provided.
— = not provided.
± = provided for only some personnel.