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With 1 *plate*
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Isolation of salmonellas and *Shigella sonnei* from a laboratory bench

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SUMMARY

An area of the laboratory bench on which slide agglutinations were performed in the diagnosis of salmonella and shigella infection was examined for these organisms. Impression plates and broth-moistened swabs were used for sampling. Both techniques gave satisfactory results, but the contact plates provided positive results a day earlier than the swabs. Suitable precautions to minimize contamination of the bench surface are discussed.

INTRODUCTION

Harvey, Price & Joynson (1975) studied selected areas of the environment of a bacteriological laboratory. In this paper they recorded that slide agglutination tests for salmonella and shigella diagnosis were concentrated in a very small working area. This space was considered at risk and portions of inspissated colonies spurting from the sterilizing bunsen flame falling within this area were collected and examined. Over 1000 such samples were cultured. No viable salmonellas or shigellas were isolated. The dangers of slide agglutination have, nevertheless, been noted in a recent publication (Collins, Hartley & Pilsworth, 1974) and further investigation seemed necessary. This paper records findings in the course of routine examination of samples infected with salmonella species and with *Shigella sonnei*.

MATERIALS

A 76 × 76 mm. dark coloured square tile of 'Ferrolite' (a slate-like material) serves to support a microscope slide for slide agglutinations. Samples were taken with Sterilin 55 mm. contact plates (Code 504) and with broth moistened throat swabs. The Sterilin plate is a modified version of the impression plate described by Foster (1960) and is similar to the disposable plastic contact plate developed by Hall & Hartnett (1964). It was pressed on the upper surface of the tile, which was then wiped over with a broth-moistened throat swab. This procedure was performed at the beginning and end of each agglutinating session. At the end of the day an area of bench surrounding the tile 25 mm. from its edge was rubbed with a broth soaked swab. Fingers (thumb, index and middle finger of left hand) and spectacles of the worker were sampled in the same way. The left hand was chosen as it came

Table 1. *Salmonella isolations from personal and laboratory environment*

Surface sampled	Total samples	Positive samples	Serotypes isolated
Spectacles	24	0	*S. agona* *S. anatum* *S. bredeney* *S. cubana* *S. eimsbuettel* *S. hadar* *S. heidelberg* *S. litchfield* *S. typhimurium* *S. tennessee* *S. senftenberg*
Fingers	6	2	
Tile swabs	30	28	
Tile contact plate	27	17	
Bench surrounding tile	28	6	

Table 2. Shigella sonnei *isolations from personal and laboratory environment*

Surface sampled	Total samples	Positive samples
Fingers	22	0
Tile swabs	22	15
Tile contact plate	22	15
Tile surround	22	1

into contact with the tile when picking up the slide used for agglutinations. Surfaces were sterilized with spirit after swabbing. At each session 18–200 slide agglutinations were performed.

METHODS

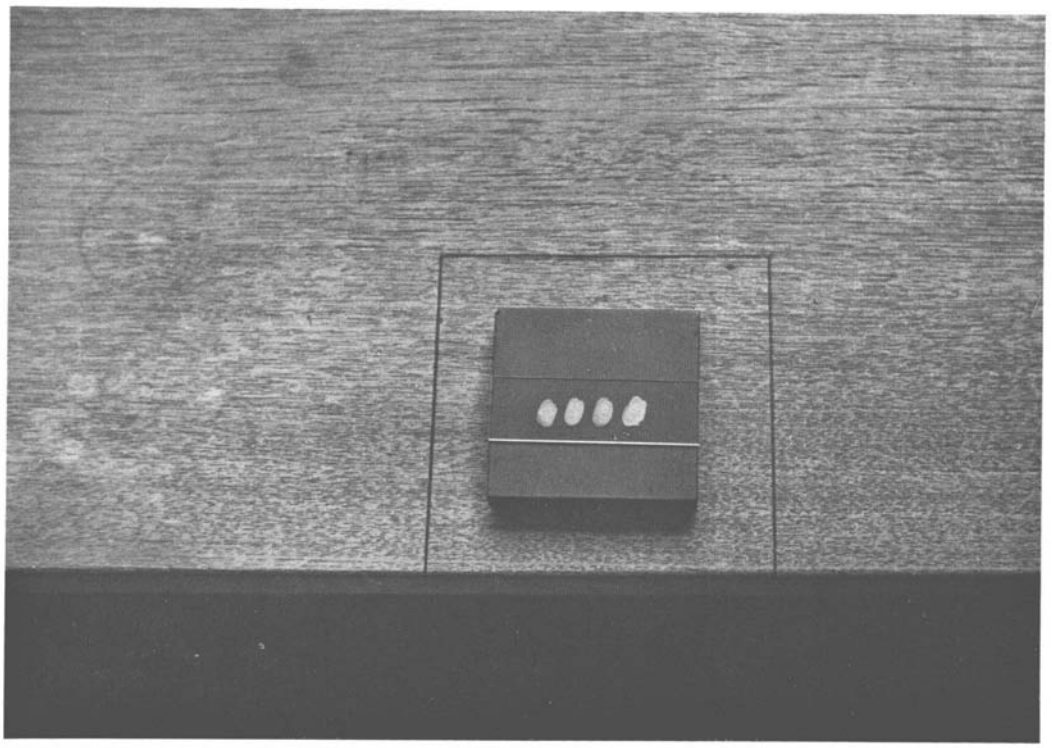
Contact plates were incubated at 37° C. for 24 hr. The medium used was based on Oxoid D.S.T. agar with added lecithin and Tween 80. Swabs placed in nutrient broth were incubated at 37° C. for 24 hr. Subcultures were made to brilliant green MacConkey agar and deoxycholate citrate agar. Selective agars were incubated at 37° C. for 24 hr. and examined for suspicious colonies.

RESULTS

Results of the salmonella study are given in Table 1, those of the shigella study in Table 2.

DISCUSSION

The ease of demonstrating contamination of the laboratory environment by salmonellas and shigellas in the process of slide agglutination is evident from the tables. Contact plates produced results 24 hr. before the swabs. When dealing with organisms of small infective dosage, care is obviously necessary. Gentle manipulation of the platinum loop is important and if it is kept nearly vertical during emulsification, danger of splashing is minimized. An alternative precaution suggested by Collins, Hartley & Pilsworth (1974) is to use saturated mercuric chloride



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solution to emulsify the cultures. This method was investigated with salmonella and *Shigella sonnei*, but considerable difficulty was experienced with auto-agglutination with both species and the technique was abandoned. Formol saline (10% formalin in normal saline) was tried in place of mercuric chloride and smooth suspensions of cultures were easily obtained. In tests conducted over a period of 15 days, 846 slide agglutinations were performed using formol saline for suspending salmonella cultures. On only one of these days was a salmonella isolated by contact plate and swab from the 'Ferrolite' tile. The area surrounding the tile and the operator's fingers were examined as before, but remained negative during this study. The technique is worth consideration as it seemed to diminish the number of positive isolations from the environment. The use of rubber gloves was tried during slide agglutination tests, but was cumbersome and could not be accepted as a good technique when dealing with large numbers of specimens of various sorts. It is felt that gloves might encourage a false sense of security in inexperienced workers. In a busy laboratory, working in a cabinet is not practicable as speed may be sacrificed for a doubtful increase in safety. It is probably advisable not to perform more than six agglutinations on one slide as the chance of environmental contamination will likely increase in proportion to the number of agglutinations done.

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REFERENCES

Collins, C. H., Hartley, E. G. & Pilsworth, R. (1974). The Prevention of Laboratory Acquired Infection. *Public Health Laboratory Service Monograph Series* No. 6. London: H.M.S.O.

Foster, W. D. (1960). Environmental staphylococcal contamination: a study by a new method. *Lancet* i, 670.

Hall, L. B. & Hartnett, Margaret J. (1964). Measurement of the bacterial contamination on surfaces in hospitals. *Public Health Reports* **79**, 1021.

Harvey, R. W. S., Price, T. H. & Joynson, D. H. M. (1976). Observations on environmental contamination in a microbiological laboratory. *Journal of Hygiene* **76**, 91.

EXPLANATION OF PLATE

Slide for agglutinations on tile. Surface of tile and 1 in surround on bench = area sampled for salmonellas.