NOTES

COMPARISON OF LUDLAM'S MEDIUM WITH STAPHYLOCOCCUS MEDIUM NUMBER 110 FOR THE ISOLATION OF STAPHYLOCOCCI THAT CLOT BLOOD

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Received for publication September 7, 1949

Ludlam (Monthly Bull. Ministry Health, **8**, 15, 1949) described a medium on which, with few exceptions, only *Staphylococcus aureus* strains that clot blood are able to grow, producing large black colonies. The following modification of that medium was used to compare the number of organisms grown on it with the number of similar organisms grown on staphylococcus medium number 110 (Chapman: Trans. N. Y. Acad. Sci., **9**, 52, 1946). Medium consisting of agar, 25 g; mannitol, 10 g; K_2HPO_4 , 5 g; LiCl, 5 g; yeast extract, 3 g; tryptone, 10 g; and water, 1,000 ml was adjusted to pH 9.2, sterilized by boiling, and cooled to 55 C. One ml of 5 per cent potassium tellurite was then added, and the cultures were incubated for 48 hours at 37 C.

Of 232 cultures plated on both media, there was complete agreement in 83 per cent; 5 per cent showed from 1 to 10 colonies on Ludlam's medium but none on no. 110; 6 per cent that did not clot blood showed growths on Ludlam's medium; and one colony on no. 110 belonged to the genus *Flavobacterium*.

Therefore, for the highest recovery of blood-coagulating staphylococci, cultures should be plated on both media. But if only one is to be used, staphylococcus medium no. 110 is preferable because of the several cultures containing a large number of organisms that failed to grow on Ludlam's medium. Also this medium, unlike no. 110, cannot be used for the direct application of confirmatory tests. Most of the instances in which Ludlam's medium alone showed from 1 to 10 colonies are of questionable significance.

BACTERIAL UTILIZATION OF ANIONIC SURFACE-ACTIVE AGENTS

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Received for publication September 16, 1949

A recent review by Glassman (Bact. Revs., **12**, 105, 1948) covers the extensive literature that deals with the applications in bacteriology of surface-active agents. These compounds have come into widespread use in recent years, especially as detergents and, in certain instances, as antibacterial agents. Migaki

and McCulloch (J. Bact., **58**, 161, 1949) have shown typical survivor curves for bacteria exposed to surface-active agents and state that the same survivor curve trend was observed in all trials with all types of agents tested and with each culture used.

It has been established that gram-positive bacteria are more sensitive to surface-active agents than are gram-negative forms and that the cationic types are more effective antibacterial agents than are the anionic types. Thus certain anionic agents have been incorporated in media to inhibit selectively gram-positive organisms. We are not familiar, however, with any report of the utilization as a source of material for growth of a surface-active agent by bacteria.

Chance observation of what appeared to be bacterial growth in a bottle of a commercial detergent shampoo led to culturing on solid medium and the recovery of a gram-negative rod with a single polar flagellum. Identification studies suggested that the organism is a member of the genus *Pseudomonas*, although it does not agree fully with any of the species of this genus described in *Bergey's Manual*. Of a number of common sugars tested, the organism fermented only glucose, and that feebly. It grew on solid media in which both carbon and nitrogen were supplied by sodium asparaginate or ammonium lactate, and also with ammonium phosphate as the nitrogen source and either glucose or citrate as the carbon source. No pigment is produced.

Good growth occurred on solid media prepared from distilled water, agar, and about 3 per cent shampoo, both with and without added ammonium phosphate. Inferior growth was obtained on 5 per cent sodium lauryl sulfate agar, either with or without added ammonium phosphate. Growth without added N may be explained by the utilization of atmospheric ammonia, or the presence of traces of the ammonia ion in the completed medium. Growth in liquid media has not been so luxuriant as on solid media.

Single strains from the stock cultures of a number of gram-negative organisms have been tested for growth on shampoo agar and on 1 and 5 per cent sodium lauryl sulfate agar. *Pseudomonas fluorescens* and *Pseudomonas aeruginosa* grew on each medium. *Proteus vulgaris*, *Aerobacter aerogenes*, *Serratia marcescens*, *Escherichia coli*, and *Proteus morganii* grew on the shampoo medium but not on the sodium lauryl sulfate medium. There was no growth on either medium by *Escherichia freundii*, *Alcaligenes faecalis*, *Achromobacter thalassius*, or *Achromobacter aquamarinus*.

The exact chemical composition of the shampoo is not known. The patent disclosure (U. S. Reissue no. 20,636) reveals that the active principle is an an-

ionic agent of the general type $\text{ROX} \left[\begin{array}{c} \text{O} \\ | \\ \text{O}-\text{S}-\text{O} \\ | \\ \text{O} \end{array} \right] \text{Y}$, in which R represents an

acyl radical of at least 4 carbon atoms, X represents a polyhydroxy substance, and Y is the cation.

The results show that at least two anionic surface-active agents will support growth of some types of bacteria.