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Comparison of Resistance of Bacteria and Embryonic Tissue to Germicidal Substances. IV. Hexylresorcinol.

A. J. SALLE AND A. S. LAZARUS.

From the Department of Bacteriology, University of California, Berkeley.

Leonard[1, 2] in his studies on some alkyl derivatives of resorcinol reported excellent results from hexylresorcinol when used as a urinary disinfectant. He stated that, "Hexylresorcinol, a stable organic substance of known chemical constitution, is the most powerful germicide ever described as a non-toxic substance. Hexylresorcinol is non-toxic by mouth and is administered in repeated doses for indefinite periods." Leonard and Wood,[3] Leonard and Frobisher,[4] Frobisher[5] and Leonard and Feirer[6] found that hexylresorcinol was a powerful surface tension depressant and that its remarkable germicidal property was probably dependent upon this physical property.

In previous papers of this series[7, 8, 9] comparisons were made of the resistance of *Staphylococcus aureus* and embryonic chick heart tissue to Merthiolate, Metaphen, Mercurochrome and phenol. A *Staphylococcus aureus* phenol coefficient and a toxicity index were determined for each germicide. The methods followed were the same as those described in the first communication.[7]

The highest dilution of phenol required to kill *Staphylococcus aureus* in 10 minutes but not in 5 minutes was 1:65. For Hexylresorcinol it was 1:7,000. This gave Hexylresorcinol a *Staphylococcus aureus* phenol coefficient of 108.

Leonard,[1, 2] Leonard and Wood[3] and Leonard and Feirer[6] reported *Staphylococcus aureus* phenol coefficients ranging from 46 to 72 when tested by other methods. Leonard[1, 2] stated that in an acid urine (pH 6.0-6.4) Hexylresorcinol in a dilution of 1:60,000

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1 Leonard, V., *J. Urol.*, 1924, **12**, 585.

2 Leonard, V., *J. A. M. A.*, 1924, **83**, 2005

3 Leonard, V., and Wood, A., *J. A. M. A.*, 1925, **85**, 1855.

4 Leonard, V., and Frobisher, M., *J. Urol.*, 1926, 15, 1.

5 Frobisher, Jr., M., *J. Bact.*, 1927, **13**, 163.

6 Leonard, V., and Feirer, W. A., *Bull. Johns Hopkins Hosp.*, 1927, **41**, 21.

7 Salle, A. J., and Lazarus, A. S., PROC. SOC. EXP. BIOL. AND MED., 1935, **32**, 665.

8 Salle, A. J., and Lazarus, A. S., PROC. SOC. EXP. BIOL. AND MED., 1935, **32**, 937.

9 Salle, A. J., and Lazarus, A. S., PROC. SOC. EXP. BIOL. AND MED. (In press.)

killed *Staphylococcus aureus* in 1 hour and a 1:70,000 dilution killed in 24 hours. In an alkaline urine (pH 7.6-8.2) a 1:18,000 dilution of the germicide killed *Staphylococcus aureus* in 1 hour; a 1:60,000 dilution killed in 24 hours. Leonard and Feirer[6] found that a 30% solution of glycerin in water, containing 1 mg. of Hexylresorcinol per cc. was a very effective germicidal solution. A 1:8,000 dilution of this preparation killed *Staphylococcus aureus* in 15 seconds; a 1:9,000 dilution killed in 30 seconds. From our results it is concluded that Hexylresorcinol is a powerful germicide, having a *Staphylococcus aureus* phenol coefficient of 108 when tested by the method of Reddish.

The tissue culture results are summarized in Table I.

TABLE I.

Germicide	Highest Dilution Showing No Tissue Growth = A	Highest Dilution Showing No Growth of *Staphyl. aureus* = B	Toxicity Index = A/B	*Staphylococcus aureus* phenol coefficient
Phenol	1-840	1-65	12.9	
Hexylresorcinol	1-21000	1-7000	3.0	108

It is seen that the Hexylresorcinol is relatively very non-toxic and that it rated considerably higher than any of the germicides so far studied when tested by the tissue culture method. Also it gave a higher *Staphylococcus aureus* phenol coefficient. The germicides may now be placed in the following order on the basis of their toxicity indices: Hexylresorcinol 3.0; Metaphen 12.7; phenol 12.9; Merthiolate 35.3; and Mercurochrome 262.0.