

## A BIOMETRIC STUDY OF THE STREPTOCOCCI FROM MILK AND FROM THE HUMAN THROAT.\*

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Two hundred and forty-two pure strains of streptococci isolated from milk and from the human throat have been compared as to their morphology, Gram stain and gentian violet reaction by the plate method, and their quantitative acid production in seven carbohydrate and related organic media. Hemolysis was studied with 92 strains.

We have been able to make no correlation between the length of chain or the relation to violet stain with any other character.

Seventeen out of 92 cultures gave hemolysis when streaked on blood agar plates. Five of these cultures came from normal milk, five—the most vigorous hemolizers—were from milk where udder trouble was indicated in the cow, and seven were normal throat forms.

The seven substances tested showed a definite order of availability for acid production. This order ("metabolic gradient") and the per cent. of cultures yielding 1.2% or more of acid when grown at 37 C for three days is shown in the following table:

Glucose (Monosaccharide) .....	98.0%
Lactose (Disaccharide) .....	76.0%
Saccharose (Disaccharide) .....	65.5%
Salicin (Glucoside) .....	42.7%
Raffinose (Trisaccharide) .....	37.5%
Inulin (Starch) .....	9.0%
Mannite (Hexahydric alcohol) .....	1.5%

It will be noted that the degree of availability is closely associated with the size and complexity of the substance.

According to the positive reaction—over 1.2% acid—in the test substances, 88% of the cultures may be placed in eight groups.

The following features separate milk from throat streptococci: (1) Milk organisms yield over 2.5% acid in lactose and saccharose at 37 C. (2) They seldom ferment a substance higher in the metabolic series

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\*Full Report in Jour. Ind. Dis. Vol. XII, No. 2.

than saccharose. (3) They readily ferment dextrose, lactose, and saccharose at 20 C. On the other hand, throat streptococci (1) seldom yield over 2.5% acid in any substance. (2) Over 40% of the cultures yield over 1.2% acid in either salicin or raffinose. (3) At 20 C they almost never attack any of the seven test substances.