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A Quantitative Study of the Pettenkofer Reaction for Bile Salts.

RAYMOND GREGORY. (Introduced by J. F. McClendon.)

From the Laboratory of Physiological Chemistry, University of Minnesota.

As originally described this is a qualitative test for bile salts and is performed by dissolving a small amount of bile, or, the bile containing fluid, in concentrated H_2SO_4 and adding a few drops of a 10 per cent solution of cane sugar. In the presence of bile salts the solution assumes a red-purple color which approaches a violet within the course of a day. As shown by a number of investigators, the reaction may be satisfactorily carried out in a 50 per cent H_2SO_4 solution.

In attempting to use the Mylius modification of the Pettenkofer reaction quantitatively, which employs furfural instead of cane sugar, it was never possible to obtain color matches. It has been found that by performing the reaction in weaker concentrations of H_2SO_4 (30 to 40 per cent) a blue color is developed. This color is due to an absorption bond at 6200 A and seems suitable for quantitative colorimetric determinations. Color matches are easily obtained when the solution being tested contains twice as much bile salt as the standard. When the tested solution is within 50 per cent of the strength of the standard the error is never greater than 5 per cent. It is usually about 2 per cent. This error increases to 10 per cent when the tested solution differs from the standard by 100 per cent.

Glycocoll, taurine, cholesterol, a cholesterol ester (lanolin), lecithin, kephalin, and oleic acid do not give any color reaction in the weaker H_2SO_4 solution mentioned. Oleic acid and the phosphatides are known to give a red color when the reaction is carried out in higher concentrations of H_2SO_4. Isobutyl and amyl alcohol also give a red color reaction with furfural in 50 per cent H_2SO_4. The color produced by the alcohols in the strength of H_2SO_4 we use is likewise red. The blue color produced as described seems to be more specific for the bile salts than does the red-purple color. The blue color also seems to be much more suitable for quantitative colorimetric determinations.

This is a preliminary report.