

One to three c.c. of clear serum²⁴ or of blood is run, by means of a blunt pointed pipet, into a dialyzing sac which has been washed inside and outside with salt solution and which has been tested for leaks by filling with the salt solution.²⁵ The sac is lowered into a small test tube (100 by 10 mm., inside measurements) containing 3 c.c. of the salt solution, until the fluid on the outside of the sac is as high as on the inside. From five to ten minutes are allowed for dialysis.²⁶ The collodion sac is removed and 5 drops of the indicator are thoroughly mixed with the dialysate. The tube is then compared with the series of standards until the corresponding color is found, which indicates the hydrogen-ion concentration present in the dialysate.

These tests have been carried out with 3 c.c. of blood or serum. The same results are obtained with 1 c.c. of blood or serum on the inside of the sac, and with this amount it is immaterial whether there is 1 or 3 c.c. of salt solution on the outside.

COMPARISON OF TUBES WITH STANDARDS

For this, a good light (natural or artificial) and a white background are requisites. Readings must be made immediately. The tube matching²⁷ most closely is selected and also the tubes on either side of it. These are critically inspected against a white background. Changing the order of the tubes often makes differences more apparent.²⁸

CONTROLS OF THE METHOD

Repeated duplicate determinations on the same samples of blood and of serum have convinced us that the limits of error are very slight: for example, the serum from a case of mild acidosis (using quantities of serum varying from 1 to 3 c.c. and dialyzing for from five to fifteen minutes) gave the following series of readings: 7.55, 7.55, 7.55, 7.55, 7.6, 7.55, 7.55, 7.55, 7.55, 7.55. The oxalated whole blood from the same case gave the following readings under similar conditions: 7.25, 7.25, 7.25, 7.25, 7.2, 7.25, 7.25, 7.3, 7.25, 7.25, 7.25, 7.25, 7.25.

24. Hemolysis tends to increase the acidity and must be avoided.

25. A sac may be used more than once for serum, provided it is thoroughly washed.

26. The alkalinity of the dialysate increases rapidly during the first five minutes. There is no appreciable change during the next ten minutes. Proteins may make their appearance in the dialysate in from ten to twenty minutes.

27. It must be borne in mind that one is here matching the quality of color and not intensity as in ordinary colorimetry.

28. A color falling between two of the standards may be read, by interpolation, to another decimal place. No effort was ever made to read closer than 0.05. Duplicate determinations should be made in all cases when sufficient material is available.