

Sodium, Potassium, and Chloride

Sodium, potassium, and chloride were performed on a Hitachi Model 737 multichannel analyzer (Roche Diagnostics, Indianapolis, IN).

An ion-selective electrode (ISE) makes use of the unique properties of certain membrane materials to develop an electrical potential (electromotive force, EMF) for the measurement of ions in solution. The electrode has a selective membrane in contact with both the test solution and an internal filling solution. The internal filling solution contains the test ion at a fixed concentration. Because of the particular nature of the membrane, the test ions will closely associate with the membrane on each side. The membrane EMF is determined by the difference between the ion concentration in the test solution and that in the internal filling solution. The EMF develops according to the Nernst equation for a specific ion in solution:

$$[1] E = E_0 + \frac{RT}{nf} \ln (f \times C_t / f \times C_i)$$

Where:

E = electrode EMF

E₀ = standard EMF

R = constant

T = temperature

n = charge of ion

F = Faraday's constant

ln = natural logarithm (base e)

f = activity coefficient

C_t = ion concentration in test solution

C_i = ion concentration in internal filling solution

-from *Laboratory Procedures Used for the Third National Health and Nutrition Examination Survey (NHANES III) 1988-1994*
Elaine W. Gunter, Brenda G. Lewis, and Sharon M. Koncikowski, 1996