Deacon's Challenge No. 60 Answer

The older literature is full of enzyme data expressed in units other than International units per litre (U/L).
For example, King-Armstrong (KA) units were used for many years to report alkaline phosphatase activity. One KA unit
is the amount of enzyme in 100 mL of serum that will split 1 mg of phenol from phenylphosphate in one hour.
Convert 200 KA units to U/L.

Since one KA unit is the amount of enzyme in 100 mL of serum that will split 1 mg of phenol from phenylphosphate in 1 hour:

> 1 KA unit   =   1 mg phenol/h/100 mL serum

To convert to activity expressed as international units (U/L) it is necessary to determine the number of μmol of phenol formed in 1 min by 1L of serum. The following steps are involved:

1. Multiply by 1,000 to convert mg to μg
2. Divide by the molecular weight of phenol (94) to convert from μg to μmol
3. Divide by 60 to convert reaction period from h to min
4. Multiply by 10 to convert from 100 mL serum to 1 L serum

The final result is: 1 KA unit   = $\dfrac{1{,}000 \times 10}{94 \times 60}$ =   1.77 U/L

Therefore:

> Alk phos (U/L)   =   Alk phos (KA units)   x   1.77

Substituting for 200 KA units:

> Alk phos (U/L)   =   200   x   1.77   =   **354 IU/L**

It is important to remember that even after converting enzyme activity from one unit to another, the numerical result will still depend on the reactions conditions used. ■

Question 61

A laboratory using a method with an analytical coefficient of variation of 5% at a concentration of 100 mmol/L for a serum constituent examined samples from a healthy population and found a Gaussian distribution with a 95% reference range of 74-126 mmol/L. If the method coefficient of variation had been 22%, what reference range would the laboratory have found?