1.8 Determination of magnesium ion in serum

Traditionally, magnesium concentration in serum can be analysed using three main methods; colorimetric, potentiometric and atomic-absorption spectrometry (AAS) methods(Touyz, 2004).

1.8.1 Atomic-Absorption Spectrometry Method

ASS method is the most commonly used technique for measuring total magnesium. The sensitivity, defined as the concentration required for 1 per cent absorbance, is about 0.01 µ /ml for flame AAS at the 285 nm resonance line, while electrothermal (graphite furnace) AAS(ET-AAS) has a sensitivity of 0.17 pg(Uemoto, 2011). The sensitivity of magnesium measurement by flame atomic absorption is sufficiently high that the graphite furnace instrument is infrequently required for biological determinations (Vahl *et al.*, 2010; Uemoto, 2011).

A large number of interferences with this method exists with the worst interferences being observed with metals that form stable acid oxides at high temperature, including lithium, sodium, potassium, rubidium, chromium, selenium, beryllium, iron, vanadium, molybdenum, caesium, strontium, calcium and barium (Millart *et al*., 1995 and Vahl *et al*., 2010). Despite the large number of existing interferences, most are easily overcome. Sodium, potassium, calcium, phosphate and iron interferences can be prevented easily using air-acetylene flame. Furthermore, the presence of 0.1-1% (w/v) lanthanum chloride or strontium chloride eliminates the remaining interferences, a well known exception are interferences caused by chromium and titanium (Millart *et al*., 1995 and Vahl *et al.*, 2010).