

**A STUDY ON THE DETERMINATION OF HARDNESS OF
NATURAL WATERS BY EDTA TITRIMETRY**

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ABSTRACT

Ethylenediaminetetraacetic acid (EDTA) is widely employed in complexometric titrations to analyse calcium in samples of water containing heavy metal ions such as manganese, copper, cobalt, nickel, barium, magnesium and aluminum and anions such as chlorides, sulfates and phosphates. The effect of these cations and anions on the determination of calcium was investigated by varying their concentrations. Whenever interference was observed new procedures have been developed to eliminate them.

The investigation showed that there was no interference in the determination of calcium from chlorides, sulfates, phosphates, barium or nickel(II) in the samples.

Interferences were observed in the case of manganese(II), cobalt(II), copper(II) magnesium, and aluminum for concentrations above 0.10 ppm, 0.50 ppm, 0.50 ppm, 1.30 ppm, and 6.30 ppm respectively when the titration was carried out under standard conditions.

Suitable methods to eliminate the interference from aluminum, manganese(II), cobalt(II) and copper(II) reported in the literature include the addition of sodium tartrate, hydroxylamine, sodium cyanide and sodium diethyldithiocarbamate respectively to the sample(s).

In the present study, it has been found that the interference from aluminum could be eliminated by the addition of Mg-EDTA complex while the interference from manganese(II) could be eliminated by the addition of a minimum amount of NH_4OH solution (0.5 ml) of specific gravity 0.98. In the case of cobalt (II) the addition of a minimum amount (1.0 ml) of H_2O_2 of the concentration 40% by volume resulted the elimination of the interference.