

**EFFECT OF EXTRACTION TIMES ON DETERMINATION OF
MINERALS IN MULTIVITAMIN TABLETS BY ICP-OES**

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ABSTRACT

EFFECT OF EXTRACTION TIMES ON DETERMINATION OF MINERALS IN MULTIVITAMIN BY ICP-OES

Most minerals take part in all of the biochemical process of life. Although it is important to human body, but the excess intake of minerals may give negative health effect to consumer. Essential metals such as Ca, Cu, Fe, K, Mg and Zn should be taken in sufficient quantities as recommended by NIST. Research on determination of these metals in multivitamin tablets is done by ICP-OES. Multivitamin samples were extracted using diluted hydrochloric acid at different times. The whole metals concentrations were detected in the range of 0-200 ppm of multielements standard solution. For 1 hour extraction time, the order of concentration of metals for all the multivitamin samples is: Ca (40-120 mg/g) > K (5-34 mg/g) > Mg (2-34 mg/g) > Fe (1-7 mg/g) > Zn (1-10 mg/g) > Cu (0-1 mg/g). For 15 hours extraction time, the order of concentration of metals for all the multivitamin samples is: Ca (50-130 mg/g) > K (5-36 mg/g) > Mg (2-34 mg/g) > Fe (1-7 mg/g) > Zn (1-11 mg/g) > Cu (0-2 mg/g). For 24 hours extraction time, the order of concentration of metals for all the multivitamin samples is: Ca (50-140 mg/g) > K (5-36 mg/g) > Mg (2-36 mg/g) > Fe (1-8 mg/g) > Zn (1-11 mg/g) > Cu (0-2 mg/g). It can be concluded that the concentration of metals increased with extraction time.

CHAPTER 1

INTRODUCTION

1.1 Background and Problem Statement

Multivitamins form the largest supplement market. It has been estimated that approximately 40% of the United States population consumes multivitamin preparations. Multivitamin preparation consist several elements, vitamins and pro-vitamins in different concentrations from few to thousands of part per million (ppm) (Soriano et al., 2007).

According to Krejcová et al. (2006), the Reference Daily Intakes (RDIs) for 12 important elements have been established: calcium (1000 mg), chloride (3400 mg), chromium (120 µg), copper (2 mg), iron (18 mg), iodine (150 µg), potassium (3500 mg), magnesium (400 mg), manganese (2 mg), molybdenum (75 µg), sodium (2400 mg), phosphorus (1000 mg), selenium (70 µg) and zinc (15 mg).

Most minerals take part in all of the biochemical process of life but they can be toxic if ingested in excess quantities. The dietary supplement manufacturer is responsible to ensure that a dietary supplement is safe before it is marketed and product label information is exact and not misleading. Contamination of toxic element in multivitamin is an important topic associated to multivitamins preparation safety. An analytical method that is applicable to a large variety of food supplements and easy