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ASSESSMENT OF SOME MINERAL AND TRACE ELEMENTS IN  
WORKERS' DIETS FROM SÃO PAULO, BRAZIL, BY NEUTRON ACTIVATION  
ANALYSIS AND X-RAY FLUORESCENCE TECHNIQUES

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Many analytical techniques have been used in food and diet analysis in order to determine a great number of nutritional elements, ranging from percentage to  $\text{ng g}^{-1}$ , with high sensitivity and accuracy. Instrumental Neutron activation Analysis (INAA) has been applied in nutrition studies in our laboratory at IPEN since the 80 s. More recently, the X-Ray Fluorescence has been also used to determine some essential elements in food samples. In this study the concentrations of 9 elements (Ca, Cl, K, Fe, Mn, Mg, Na, Rb, Se and Zn) were determined simultaneously in 13 duplicate portion diets of a group of workers (19-56 years) from a steel industry in São Paulo city. The 3 day-diet samples were prepared by a freeze-drying process in an industrial freeze dryer and mixed and homogenized in a domestic blender. By using the INAA, about 100-200 mg of diets were irradiated in two conditions: 3 minutes and 8 hours in the IEA-R1 research reactor. By WD-XRFS technique, double layer pressed pellets with the polivinilic alcohol as blinding material were used for sample preparation. About 800 mg of diets were mixed with 1-2 drops of 10% PVA aqueous solution. A sequential automatic x-ray spectrometer from Rigaku Co., model RIX 3000 was used. For validation methodology for both techniques, SRM Typical Diet reference material was analysed and the detection limits were calculated and compared. The results between the two applied analytical techniques do not show statistical differences. The average daily intakes obtained were: 657 ( $\pm 279$ ) mg Ca/day; 8.3 ( $\pm 1.9$ ) g Cl/day; 13.9 ( $\pm 8.2$ ) mg Fe/day; 3.4 ( $\pm 1.1$ ) g K/day; 355 ( $\pm 82$ ) mg Mg/day; 3.2 ( $\pm 0.9$ ) mg Mn/day; 5.6 ( $\pm 1.4$ ) g Na/day; 5 ( $\pm 1$ ) mg Rb/day, 38 ( $\pm 9$ )  $\mu\text{g}$  Se/day and 12 ( $\pm 4$ ) mg Zn/day for workers' diets. According to the new recommendations set by Food and Nutrition Board/USA (2001), this group of individuals showed to be deficient for Ca and Se. The daily dietary intakes for the elements Fe, Mg and Zn were adequate and for Cl and Na, higher than recommendations for healthy individuals.

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