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Analysis of the mineral content in dietary supplements for athletes*

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Abstract

Dietary supplements are becoming increasingly popular, yet these products are subject to less stringent quality regulations than pharmaceuticals. The present study employed the ICP-OES method to analyze a selection of elements (Ca, Mg, P, Al, and Zn) in dietary supplements. Commercially available products, purchased in Poland through online sales, were selected for the analysis. The study was conducted to assess compliance between the actual composition of the supplements and the manufacturers' declarations. Additionally, it was used to estimate daily exposure to metals at the recommended intake. A number of supplements exhibited discrepancies between their declared and actual composition, suggesting variability resulting from manufacturing processes and inadequate quality control. In the majority of the analyzed supplements, the concentrations of elements derived from excipients were found to be lower than the stated values on the product labels. Additionally, the presence of certain elements, such as calcium (Ca) in two products and phosphorus (P) in one, was not declared despite their substantial concentrations. An evaluation of product exposure indicated that the Recommended Daily Intake (RDI) for zinc was surpassed in merely two products, which could potentially pose health concerns with prolonged use. The most significant variability in composition was observed in multi-ingredient supplements, particularly those containing caffeine, while creatine supplements demonstrated greater consistency. These findings underscore the need for enhanced quality control in dietary supplements, particularly with respect to the composition of excipients and the consistency between the declared and actual composition of the products.

Keywords: metals, sport supplements, ICP-OES, creatine, caffeine

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