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Dietary exposure estimates to fifteen trace elements in an adult population of Emilia Romagna region, Northern Italy

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The health effects and the exposure levels of trace elements in humans are important public health topics. Assessing their dietary intake is fundamental to evaluate the long-term risks for public health and for food safety assessment. Since a priority of food safety regulatory agencies is to ensure the protection of consumers and to assess the health risks for the general population, to estimate the actual dietary intake of trace elements for comparison with the upper and lower tolerable levels is very important. In this study, we aimed to evaluate the dietary intake of several trace elements in an Italian community, namely of antimony, barium, beryllium, boron, cobalt, lithium, molybdenum, nickel, silver, strontium, tellurium, thallium, titanium, uranium, and vanadium. To do that, in 2016-2017 we collected a total of 908 food samples available in Italian markets and groceries from two Northern Italy provinces (Modena and Reggio Emilia), and we measured their trace element content through inductively-coupled plasma mass spectrometry. We also administered a validated semi-quantitative food frequency questionnaire to 708 residents (300 men and 48 women) in the Emilia-Romagna Region, to assess their dietary habits and eventually to estimate their dietary intake of the aforementioned trace elements. Overall, study results showed that in our population the dietary exposure levels to selected trace elements could be considered similar to that observed in other European and non-European populations. Though we cannot rule out the possibility that the dietary exposure estimates in the present study may not be representative of the population as a whole, our results provide a good and updated assessment of trace elements far frequently evaluated in a sample of Italian adult consumers from the Emilia Romagna region. Our findings finally suggest that our population should not be at risk of adverse health effects in relation to excess or deficiency of the investigated trace elements since the estimated dietary intake generally point out exposure levels within the safe range as far as indicated by recommendations of international agencies.