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Multi-elementary analysis of insects by inductively coupled plasma-tandem mass spectrometry

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According to the FAO, the world's population is expected to reach 9 billion by 2050. To accommodate this increase, current food production should be doubled. One alternative is the consumption of insect, which are nutritious alternative to animal proteins and which production is more environmentally friendly.

As insects are a high nutrient source of fat, protein, vitamins and minerals, and their production is more environmentally friendly, entomophagy is as a good alternative to mainstream staples such as chicken, pork, beef and even fish. Although insects contain essential mineral (as P, Fe, Zn, Cu, and Mn), the presence of potentially toxic elements should be explore to ensure that insect consumption does not represent any risk for human nutrition.

This study reports a rapid and reliable multi-elemental (35) analysis method of insects analysis using triple quadrupole inductively coupled plasma mass spectrometry (QQQ-ICP-MS) following acid microwave digestion has been developed and validated.

Three insects' based certified reference materials form the National Research Council Canada (NRC) (BFLY-1/black soldier fly meal; KRIK-1/cricket flour and VORM-1/mealworm powder) were used to assess the trueness of the method.

The method was applied to the analysis of a selection of insect samples (crickets, worms, ants, etc.) purchased from the French market.

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