DETERMINATION OF RARE EARTH ELEMENTS (REES) AND PLATINUM GROUP METALS (PGM) IN FOODSTUFFS AT ULTRA-TRACE LEVELS BY ICP-MS/MS USING A HIGH EFFICIENCY SAMPLE INTRODUCTION SYSTEM.

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In the last decades, the use of rare earth elements and platinum group metals increased in different fields such us agriculture, medical technologies and in the manufacturing of hi-tech products. This may lead to an accumulation of these emergent contaminants in the food chain, which may have adverse effects on human health upon consumption of foodstuffs contaminated with these hazards. This work addresses the development of a multi-elemental method based on inductively coupled plasma-tandem mass spectrometry (ICP-MS/MS) using a high efficiency sample introduction system (APEXTM) for the determination of REEs and PGM at ultra-trace levels in food. For this purpose, the use of the mass shift detection mode (O2 reaction gas) was compared to the standard mode (no gas) to assess the optimum detection mode (high sensitivity and free of spectral interferences) for each analyte. In order to enhance the sensitivity for REEs and PGM ultra-trace determination, an APEXTM Ω was used. This sample introduction system provides significantly low limits of quantification compared to the conventional system. The method was validated and then applied to the determination of various REEs and PGM such us ruthenium, rhodium, palladium, osmium, platinum, thallium, lanthanum, cerium, gadolinium, neodymium etc. in a selection of foodstuffs.