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A Comparison of expanded uncertainties for measuring iodine levels in nutritional materials by pseudo-cyclic epithermal INAA-AC using single comparator and k0 methods

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A combination of different types of instrumental neutron activation analysis (INAA) technique was developed for the determination of iodine in various food items from Ghana [1]. The methods involved conventional INAA, epithermal INAA (EINAA), pseudo-cyclic INAA (PC-INAA) and pseudo-cyclic EINAA (PC-EINAA) in conjunction with conventional and anti-coincidence (AC) gamma-ray spectrometry using both single comparator and k0 standardization methods. The uncertainties associated with these methods were evaluated following ISO GUM procedures. The trueness of the methods were checked by analyzing several reference materials (RM) and standard reference materials (SRM) provided by the U.S. National Institute of Standards and Technology (NIST). Our results were in good agreement with the certified values. The expanded uncertainties associated with the measurement of iodine levels in NIST RM 8415 Whole Egg Powder by a PC-EINAA-AC method using the single comparator and k0 standardization procedures will be presented. The expanded uncertainty ($\kappa = 2$, ~95% CL) of 1.81 ±0.48 was obtained for the k0 procedure compared to that of 1.85 ±0.22 for the single comparator procedure. The value for the k0 procedure appears to be slightly influenced by the uncertainties in the nuclear constants and detector full photopeak efficiency determination.

Reference

1. B.J.B. Nyarko, Ph.D Thesis, University of Cape Coast, Cape Coast, Ghana (2007)

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