



Analysis of an OTC Multivitamin Tablet Using X-ray Fluorescence Spectroscopy and Atomic Absorption Spectroscopy

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Abstract: Three tablets of the branded OTC multivitamin tablet were randomly chosen from the same batch and were analyzed for their elemental composition in terms of Ca, Cu and Fe. The quantitative analysis was performed using the following instrumentation techniques: the standard addition method for AAS, the semi quantitative standard-less EQUA-ALL method for S2 Ranger EDXRF and a standard-less method for S8 Tiger WDXRF. Results obtained using AAS showed that the tablet contains $257.9\text{mg} \pm 5.5$ for Ca, $1.972\text{ mg} \pm 0.090$ for Cu and $64.46\text{ mg} \pm 1.73$ for Fe. The analysis of the composition of the same tablet measured using EDXRF and WDXRF was reported in terms of % oxide. EDXRF measurements showed that one tablet contains 28.2%, 7.52% and 0.134% of CaO, Fe₂O₃ and CuO respectively for the loose powder form while 33.7%, 9.27% and 0.179% respectively for the pressed pellet form. For WDXRF, 26.46% CaO, 6.236% Fe₂O₃ and 0.0455% CuO were obtained from the analysis of the loose powder form and 27.87%, 6.741% and 0.0494% respectively for the pressed pellet form. Although the use of XRF is simple and boasts of the use of the standardless method, it gave inferior results compared to those obtained from the AAS standard addition method as far as reproducibility is concerned. The reproducibility of the results gathered from XRFs, as represented by the related methods of EDXRF and WDXRF were inferior compared to the results obtained using AAS.

Key Words: AAS; XRF; standardless method; EDXRF; WDXRF; analysis of multivitamin tablet