

PORTABLE XRF FOR FDA FIELD INVESTIGATORS: A REVIEW OF SOME RECENT INVESTIGATIONS AND APPLICATIONS

Peter E. Baker, Richard R. Jacobs, U.S. Food and Drug Administration
Peter T. Palmer, San Francisco State University

Field portable ED-XRF instruments have greatly reduced the time and effort required it takes to screen environmental samples for ppm and higher levels of various toxic elements. These instruments have proved valuable for a variety of elemental analysis applications in industries such as mining and agriculture, but have not yet been widely used for regulatory applications. This could partly be due to the fact that XRF limits of detection (LODs) for many toxic elements are in the range of 1-10 ppm at best, whereas regulatory limits for toxic elements in food samples are often well below these LODs. Nevertheless, some imported goods such as herbal supplements, Ayurvedic medicines, and cosmetics have concentrations of toxic elements that are detectable via XRF, and hence can be rapidly screened using hand-held XRF analyzers prior to introduction into U.S. commerce, thus reducing the number of samples for subsequent lab-based analysis via techniques such as ICP-MS, reducing operating costs and/or enabling the screening of larger numbers of products.

This presentation will describe some current applications of portable ED-XRF in the San Francisco district of the Food & Drug Administration. FDA consumer safety officers (CSOs) have begun using portable XRF analyzers in routine inspections, product screenings, and to aid in the investigation of toxic element poisoning cases. Some example applications to be described include the screening of dietary supplements for heavy metals, the investigation of a child lead poisoning case related to religious cosmetic items, and screening incoming pharmaceuticals for counterfeits at the port of entry using elemental profile comparisons. We will discuss how we have used the portable XRF to uncover criminal activity, including the substitution of violative products by the importer in order to pass inspection. We will also discuss some of the obstacles we have encountered when trying to implement large scale training, including some common false results interpretation, and why as a result we have emphasized spectral interpretation of the results in addition to the instrument algorithms.