

## **Leveraging XRF to Simplify Metals Analysis in Pharmaceuticals**

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Traditionally, metals analysis in pharmaceuticals is conducted using plasma-based techniques, including inductively coupled plasma mass spectrometry (ICP-MS) and inductively coupled plasma optical emission spectroscopy (ICP-OES). These techniques offer sensitivity, selectivity, and precision; however, they often require lengthy sample preparation and trained analysts. Time is an important consideration during the pharmaceutical development process, and often a quick estimate of metal concentration is all that is necessary when deciding the next step in the optimization of a synthetic process. X-ray fluorescence (XRF) provides an alternative approach to determine elemental content. While an XRF may not afford the same level of sensitivity as ICP-MS or ICP-OES, it is relatively inexpensive, easy for an untrained individual to use, and requires little to no sample preparation. Examples of the use of XRF as an alternative to traditional approaches for metals analysis in a pharmaceutical laboratory will be discussed, including XRF as an open-access tool for screening of effective metal catalyst scavengers during the pharmaceutical development process, and for metals analysis at an in-process control step during the synthesis of a pharmaceutical product.