T52 Validation of ED-XRF as a reliable method for determining the mineral composition of skim milk powders. S. Uson*, C. Immoos, and R. Jiménez-Flores, *California Polytechnic State University, San Luis Obispo*.

Milk powders are an efficient method of delivering such nutrients to areas of the world where fresh milk is not readily available or cost-efficient. Inductively Coupled Plasma Mass Spectroscopy (ICP-MS) is a well-established method for measuring mineral compositions. However, it is a more difficult and time-consuming process. Non-destructive Energy Dispersive X-ray fluoresence (ED-XRF) also measures mineral compositions, but requires very little preparation of the sample and results are obtained in a matter of minutes. This is an advantage in the analysis of large numbers of samples. The objective of this study was to validate the use of ED-XRF for the determination of minerals in skim milk powders (SMP). One hundred SMP samples were obtained from various sources. Standard values of mineral content and concentration were obtained using ICP-MS. Samples, placed in acid cleaned tubes, were allowed to dry at 60°C for 48 hours. They were treated with 70% HNO_3 and digested on a hotplate. Samples were brought to 5ml total volume with 2% HNO_3, I, S, Ga, Ti, In, and Y. They were analyzed for Al, K, Ca, Fe, Ti, Co, Ni, Sr, Cu, Zn, Mn, Cr, and Ba. Although unnecessary, samples for ED-XRF were formed into pellets of 4 g of powder under 20 tons of pressure. Triplicates were made for each sample. Spectra were recorded using a pin diode detector with a collection time of 92 s, tube current 26 µA, and tube voltage of 15kV. Results of ED-XRF, for the most part, proved to be comparable with those obtained by ICP-MS. While it was found that Pb is not detectable in the samples by ED-XRF, there was very good correlation between most of the elements in both methods (Variance ≤ 1%) ; with Al, Cr, and Cu having the greatest variation among samples and the lowest correlation coefficients. Thus, ED-XRF proved to be an acceptable method for the determination of mineral content and composition of SMP.

Key Words: X-ray fluorescence, Minerals, Skim milk powder