Supplemental Information

1. **ICP-MS Parameters Of Operation**

Parameters of Operation	ELAN DRCII, Perkin Elmer	7500ce, Agilent
RF Power	1050 W	1500 W
Sample Depth	N/A	7.5 – 8.0 mm
Neb Flow	0.96-1.1 L/min	1.0 – 1.1 L/min
Make-up	1.25 L/min*	N/A
Sample Pump	0.3 rps	0.1 rps
Spray Chamber	N/A	2°C
Collision Gas	N/A	4.5 – 5.5 mL/min helium
Optional Gas	N/A	8% of a mixed gas (1% CO2 in argon)
Sample Preparation	Samples were digested in 2% Nitric Acid prior to the addition of internal standards	Samples were digested in nitric acid and 30% hydrogen peroxide on a block digestor, cooled, mixed with internal standards and then diluted with high-purity water
Internal Standards	Sc, Ge, In, Rh	In, Tb, Sc
Isotopes Measured	^{51}V ^{55}Mn ^{57}Fe ^{60}Ni ^{63}Cu ^{66}Zn ^{82}Se ^{88}Sr ^{98}Mo	^{63}Cu ^{65}Cu ^{66}Zn ^{68}Zn
Samples Studied	Reference standards made in L-glutamine	Nutrient powders

* Auxilliary Gas Flow

2. Effects of wavelet transformation on the overlap between the secondary Fe $K_{\beta 1}$ and dominant Co $K_{\alpha 1}$ transition.

Figure 1 examines the Fe-Co interference in liquid reference standards. The energy difference between the Fe $K\beta_1$ transition at 7.059 keV and the Co $K\alpha_1$ transition at 6.931 keV is 128 eV, which is less than the 160 eV resolution of the EDXRF.
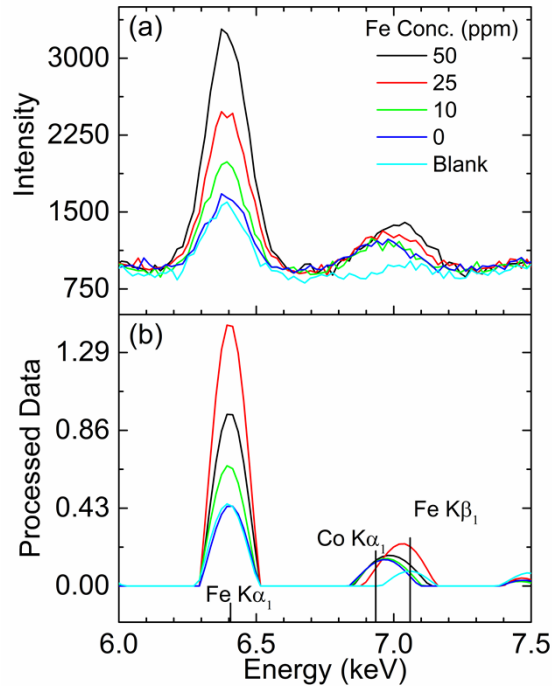

Fig. 1 (a) EDXRF spectra of liquid reference standards composed of Co and Fe. (b) Processed spectra from (a) using wavelet transformation.

The unprocessed spectra are shown in Fig. 1a. There are a couple things to note in the spectra. First, the spectra have an offset of 900. Next, the Fe $K\alpha_1$ at 6.405 keV and $K\beta_1$ at 7.059 keV in the cyan line labeled "blank" are x-rays emitted from the instrument which are backscattered from an ultra-pure water sample. Finally, the broad peak around 7 keV is the sum of the Co $K\alpha_1$ and Fe $K\beta_1$ intensities, where the Co concentration is maintained at 5 ppm and the Fe concentration varies from 0-50 ppm.

Fig. 1b shows the spectra processed using wavelet transformation. In contrast to Fig. 2a, the background offset and the high frequency noise are removed. In addition, while Co and Fe intensities are strictly additive in Fig. 2a, in the processed data, the Gaussian wavelet amplifies the larger signal and distorts the sum peak. Since Fe can be measured by the dominant $K\alpha_1$, only the Co concentrations are questionable. In this example, Co intensities for Fe concentrations greater than 25 ppm are erroneous. Moreover, Co concentrations from 1-5 ppm did not vary with the addition of 10 ppm Fe (data not shown). In nutrient powders measured to date, this Fe-Co interference has not been observed.