



Trace Element Analysis for Waste Solutions

Rigaku/MSC, Inc.

Test for Pb, Cr, Cd, As and Se in River Water JAC0032 (Japanese standard of river water).

The influence of trace heavy elements — such as Cd, Pb, As, Cr and Se — in water is a serious environmental problem. Rigaku has developed a method for testing samples in order to control this problem by monitoring wastewater quality. The method is simple, rapid reproducible, and easily traceable to certified water standards.

Method

This method uses a standard X-ray fluorescence (XRF) spectrometer, such as the Rigaku ZSX Primus, to provide results comparable to those of trace elements analyses performed by ICP-OES and AA. Solution standards available for use by AA or ICP were used in the calibrations.

500 μ L of sample was deposited and dried on an ULTRA CARRY filter. The sample was pre-concentrated from 50 mL to 500 μ L (10 PPB to 1 PPM). Calibration curves were created using diluted AA standard samples. Standard LPC-1 was also prepared 5X and analyzed to test reproducibility of the method. Results are presented below in tables 1 and 2.

Conclusion

This method of analysis indicates that XRF may be used to determine concentrations in wastewater at ppb levels. Accuracy and reproducibility results are agreeable for this test method.

Element	Pb	Cr	Cd	Se	As
Quantitative results	13.7	11.8	1.6	4.0	9.7
Standard value	9.7	10.1	1.0	5.2	5.5

Table 1. JAC0032 results (ppb)

Elements	Pb	Cr	Cd	Se	As
<i>n</i> = 1	230	225	195	187	160
2	267	185	166	174	145
3	246	185	184	172	148
4	261	202	217	192	170
5	208	209	140	165	177
Average	242	201	180	178	160
Range	59.0	40.0	77.0	27.0	32.0
Standard deviation	24.0	17.0	29.2	11.2	13.8
SD using blank(10 times)	8.9	16.9	40.6	3.2	7.3

Table 2. Reproducibility tests using standard LPC-1:1/100 dilution (200 ppb)

Rigaku/MSC, Inc.

9009 New Trails Drive, The Woodlands, TX 77381
Tel. (281) 363-1033, Fax (281) 364-3628
info@RigakuMSC.com, www.RigakuMSC.com

For More Information Circle 14