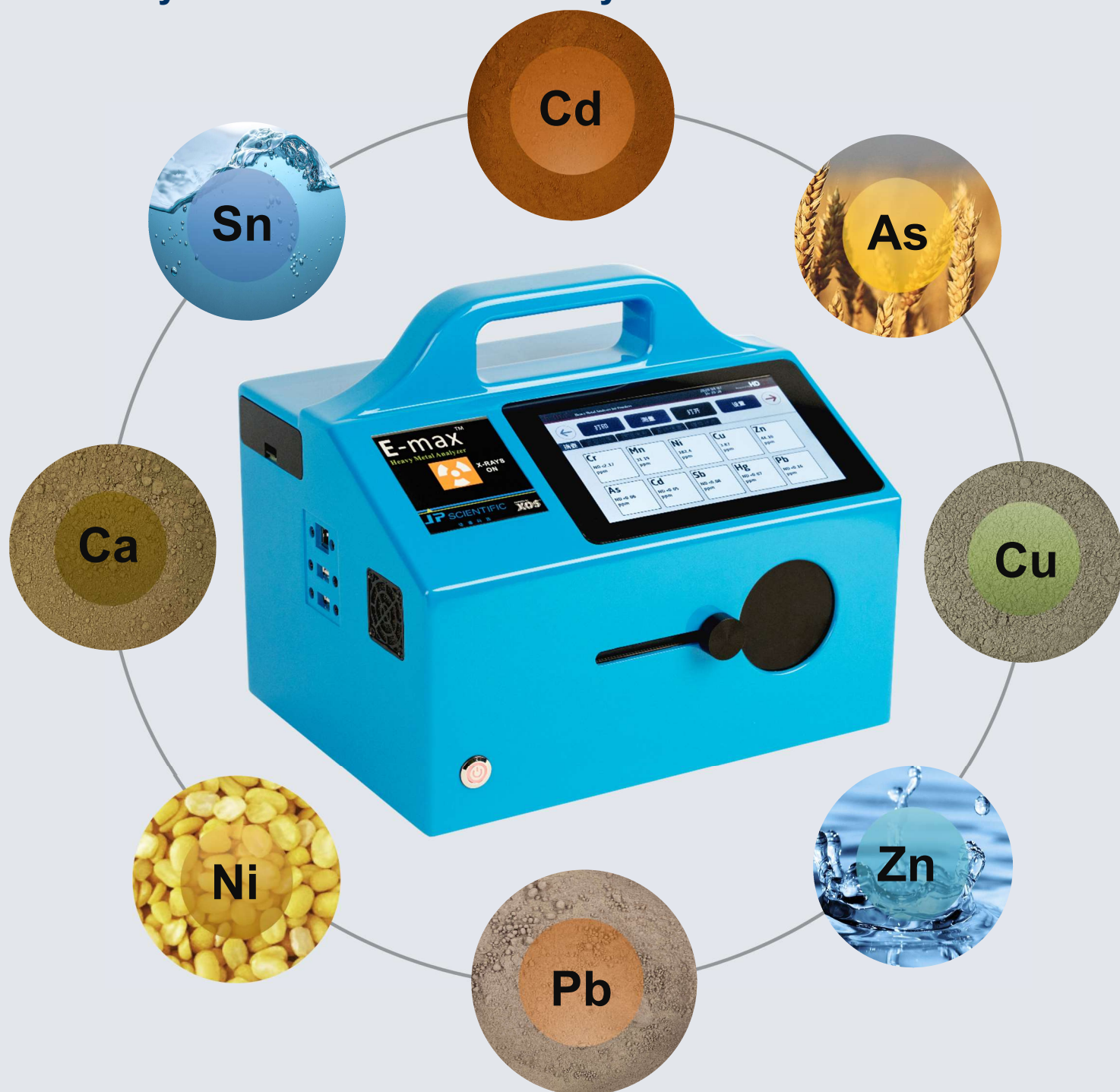


E-max™

A portable and robust analyzer

Quantify cadmium and other heavy metals in soil and food.





Quantify Cd at Unprecedented Low Level

Powered by low power Monochromatic X-Ray Fluorescence analysis technology, HDXRF® technology, E-max meets the challenge of measuring low level Cd in agriculture soil. In addition, Emax offers simultaneous measurement of other heavy metals like As, Pb, Cu, Ni, and Cr in soil and agricultural products such as rice and other agriculture products. Whether you are an agricultural inspector or environmental assessor, E-max enables you to run more samples in less time, allowing you to conduct a more thorough analysis for improved site remediation and land use decisions.

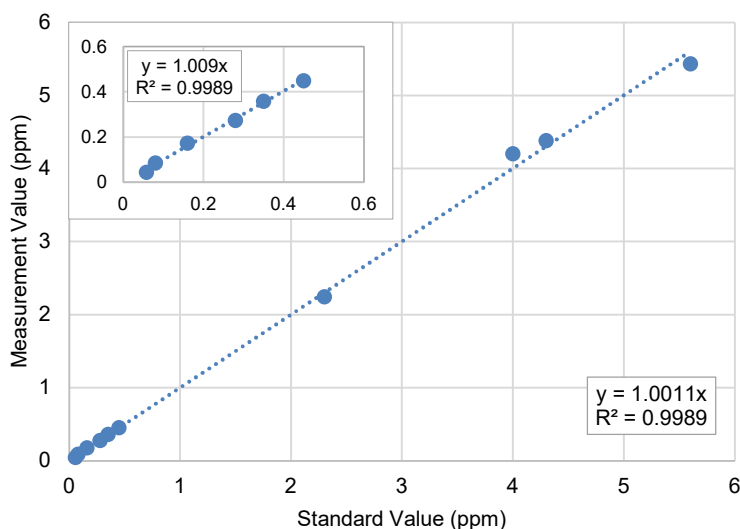


Accuracy

With complex matrices such as soil, it is essential to demonstrate accurate results that compare well with various standards. **Figure 1** shows that HDXRF can deliver accurate results across a wide range of Cd concentrations, including soils that have contamination below 0.3 ppm.

Figure 1:

Cd Concentration vs Certified Reference Standard



Features

1. Ultra-high signal-to-background ratio and ultra-low detection limit
2. Portable design: light weight and comfortable to carry
3. Minimum sample preparation enables on-site sampling and quantification



Repeatability

Reliable data is repeatable when following the same measurement process with well-prepared samples. **Table 1** depicts repeatable results for each of the reference standards with below-limit concentration of Cd in soil.

Table 1: Repeats of Reference Standard Concentration: 0.2 +/- 0.02 ppm Cd

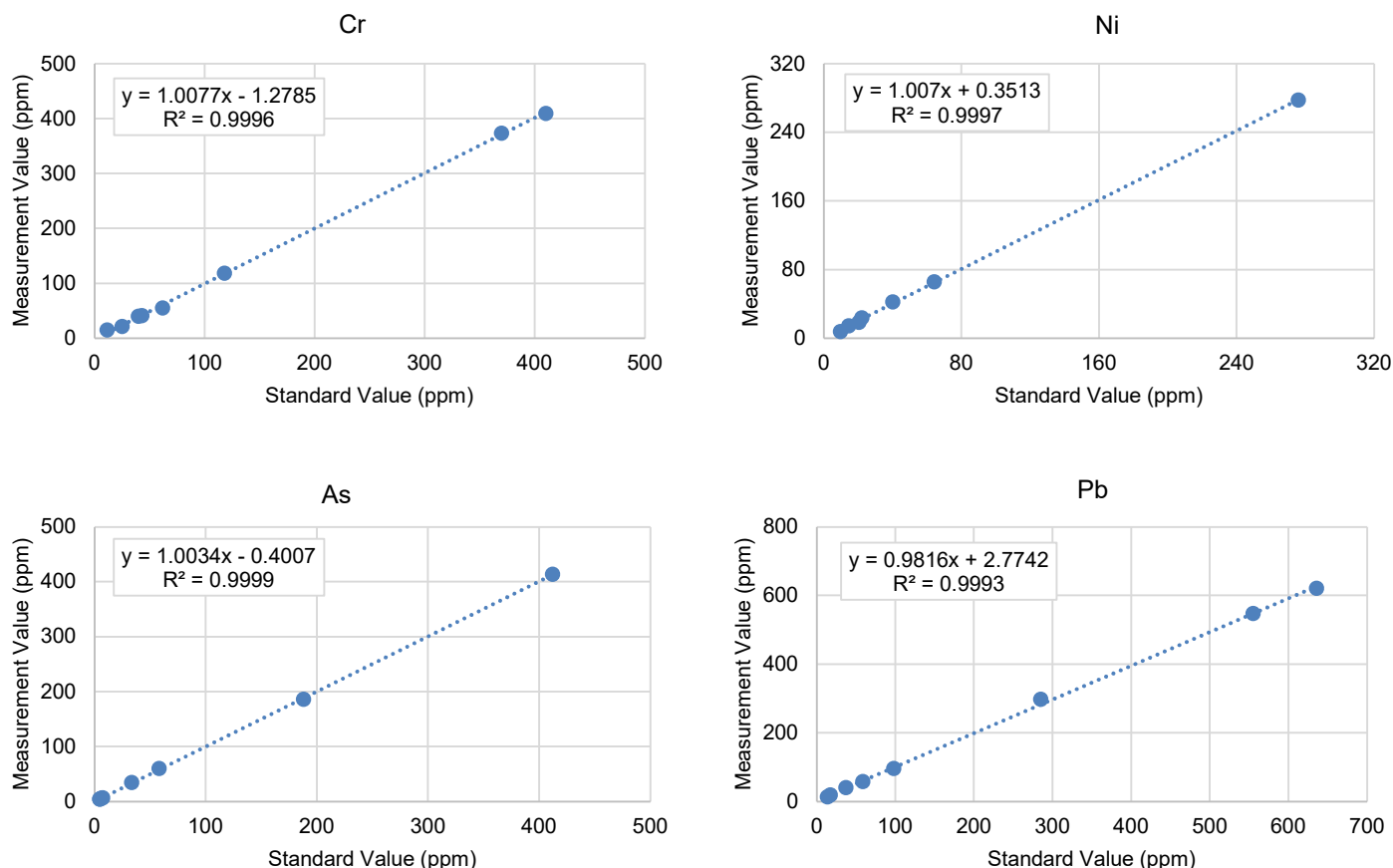
Repeat	Single Measurement (ppm)	Avg of 2 Measurements (ppm)
1	0.227	
2	0.286	0.256
3	0.218	0.252
4	0.280	0.249
5	0.205	0.243
6	0.206	0.205
7	0.251	0.228
8	0.219	0.235
9	0.218	0.219
10	0.200	0.209
11	0.293	0.246
12	0.217	0.255
13	0.232	0.225
14	0.263	0.248
Avg	0.235	
SD	0.032	0.017
RSD	17%	11%



Multi-elemental Analysis in Soil

E-max delivers multi-elemental analysis for other metal contaminants, including Cr, Mn, Ni, Cu, Zn, As, Hg, Pb, Sn, Sb, and other heavy metals. As shown in **Figure 2**, E-max gives accurate results for Cr, Ni, As and Pb for various types of soil standards.

Figure 2. Quantification of multi-elements in soil



Rice Applications

While E-max is excellent for quantifying contamination in complex matrices such as soil, it also delivers exceptional accuracy when measuring other powders such as rice as shown in **Figure 3**. As with soil, repeated measurements with E-max summarized in **Table 2** show the limit of quantification for rice is below 0.1 ppm, providing a level of consistency only rivaled by wet chemistry.

Figure 3. Cd in Rice

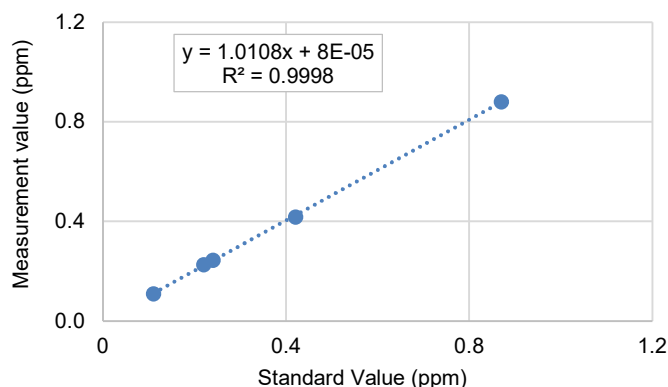


Table 2: Repeats of Reference Standards

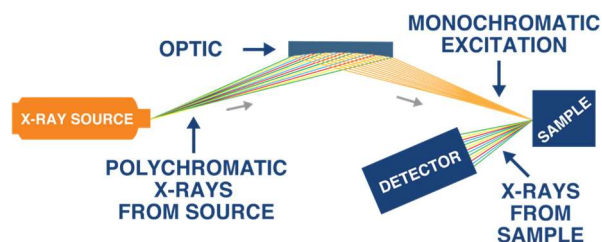
Repeat	Cd Concentration in Rice Standards		
	0.052 ppm	0.11 ppm	0.22 ppm
1	0.039	0.109	0.210
2	0.052	0.128	0.225
3	0.055	0.123	0.225
4	0.048	0.118	0.220
5	0.050	0.112	0.215
6	0.066	0.120	0.234
7	0.056	0.103	0.209
8	0.064	0.124	0.212
9	0.045	0.122	0.207
10	0.051	0.117	0.224
Avg	0.053	0.118	0.218
SD	0.0082	0.0072	0.0080
RSD	15.5%	6.1%	3.8%
LOD	0.025	0.022	0.024
LOQ	0.075	0.066	0.072



Quantifiable Cd Analysis with HDXRF

E-max is powered by High Definition X-ray Fluorescence (HDXRF®) technology: an elemental analysis technique offering significantly enhanced detection performance over traditional Energy Dispersive X-ray Fluorescence (EDXRF) technology. This technique applies state-of-the-art monochromating and focusing optics, enabling dramatically higher signal-to-background ratio compared to traditional polychromatic X-ray Fluorescence. Figure 4 shows the basic configuration of HDXRF and its use of focused monochromatic excitation.

Figure 4: HDXRF Technology




Technical Specifications

E-max - Limit of Detection (ppm) Application:
Trace Heavy Metals in Soil

Element	Cd	As	Hg	Pb	Cr	Cu	Ni	Zn	Mn	Co	Se	V	Sb	Tl	Mo
Screening	0.15	0.6	1.2	2	15	1.5	3	1.5	15	40	1.5	100	0.2	1.2	1.5
Quantification	0.05	0.2	0.4	0.8	5	0.5	1	0.5	5	16	0.5	40	0.07	0.4	0.5

E-max Specifications

Method Compliance	EPA 6200
Measurement Time	30-1800 seconds
Element Range	Up to 40 Elements from K - U
Data Storage & Output	Printout, Ethernet, USB, Internal Storage, USB Flash Drive
I/O Ports	Ethernet 10/100, USB
Power Supply	110-240 VAC \pm 10%, 50-60 Hz (hertz) Built in Battery: 12-24V 98mAh
Operating Temperature	5°C to 40°C
Operating Humidity	30 – 85 %
Weight	8kg
Dimensions	23 cm W x 30 cm L x 26 cm H 



Z-SPEC & XOS

Z-Spec is a fast-growing manufacturer of X-ray analyzers founded by the inventor of the HDXRF technique who formerly served as the chief-scientist and advanced director of R&D for XOS. Through a strategic partnership with XOS, Z-Spec offers accurate, efficient, and reliable element analysis solutions in areas of environmental protection and public safety, like soil, water, food, and agriculture products.