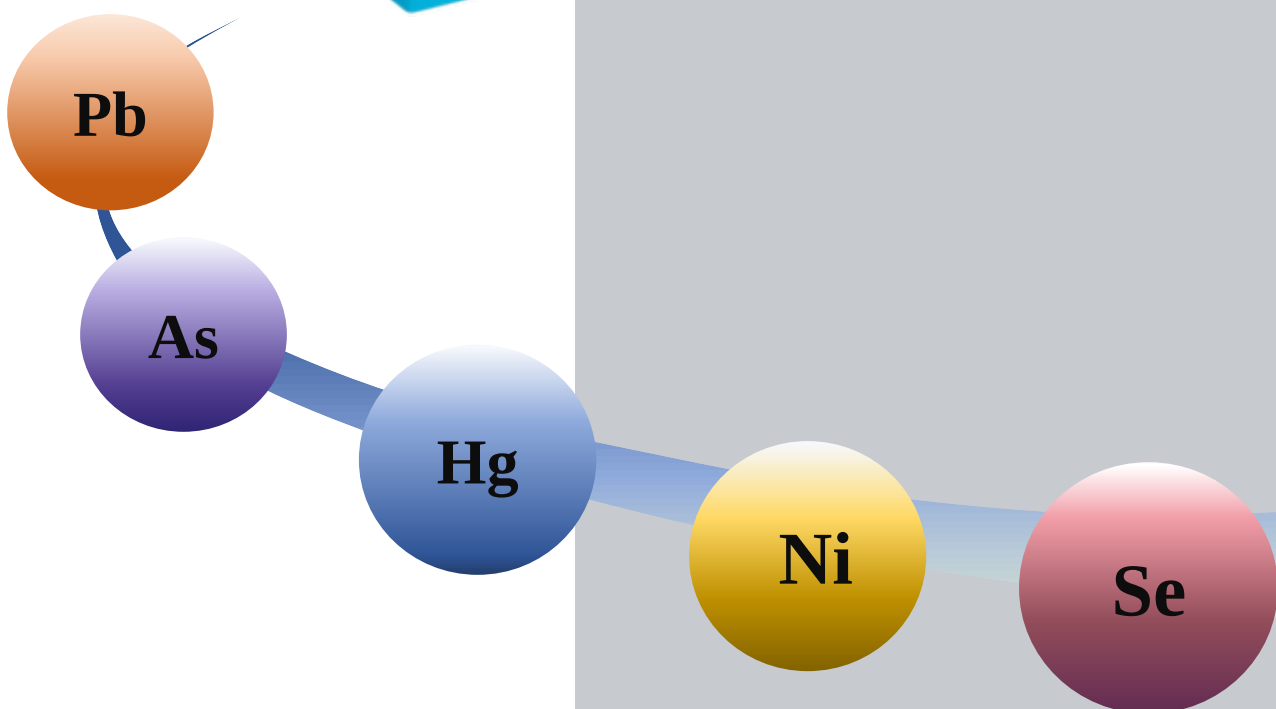


ATFD500

A Portable and Robust Analyzer
Quantify Heavy Metals in Food

Optimized for Pb, As, Hg, Cu, Zn, and Se





Heavy Metal Testing

Powered by Monochromatic X-Ray Fluorescence analysis, HDRXF® technology, ATFD500 can rapidly and precisely quantify heavy-metal elements in food. Its excellent performance meets the challenge of reliably measuring extremely low-level Pb, As, and Hg, referring to the action levels for As and Pb 0.1 ppm by FDA regulations. Testing more samples in a shorter period with accurate, reliable analysis, ATFD500 is a powerful tool for risk assessments of heavy-metal contamination in food and it enables customers to monitor and reduce the health risks from heavy-metal exposure.



Features

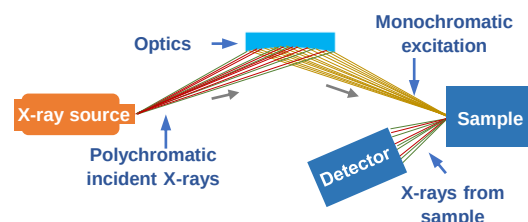
1. Ultra-high signal-to-background ratio and ultra-low detection limit.
2. Portable design, light-weight and comfortable to carry;
3. Minimum sample preparation enables on-site sampling and quantification;



HDRXF Innovative Technology

ATFD500 is powered by High-Definition X-ray Fluorescence (HDRXF®) 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 1 shows the basic configuration of HDRXF and its use of focused monochromatic excitation.

Figure 1. HDRXF Technology



Accuracy

Excellent linearity of measurement and standard values was used to verify the accuracy of the instrument, as shown below.

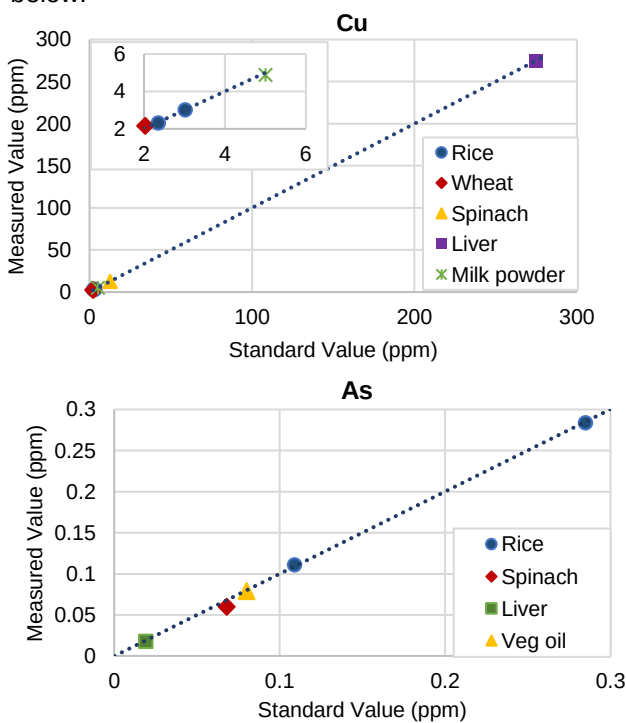


Table 1 shows the results of repeated measurements on different standard samples to verify the stability and the accuracy.

Table 1: Repeatability Test												
Element	Cu		Ni		As		Pb		Se		Hg	
Sample	NIST1567 Wheat	BD151 Milk powder	Veg oil	NMIJ7502 Rice	Veg oil	NMIJ7502 Rice	NIST1577 Liver	BD151 Milk powder	NIST1570 Spinach	NIST1568 Rice	NIST1570 Spinach	BD151 Milk powder
1	2.27	4.88	0.115	0.406	0.075	0.110	0.072	0.197	0.117	0.356	0.049	0.474
2	2.28	4.87	0.111	0.408	0.086	0.115	0.049	0.181	0.113	0.359	0.032	0.512
3	2.26	4.90	0.093	0.416	0.076	0.118	0.064	0.215	0.107	0.358	0.036	0.480
4	2.29	4.84	0.102	0.418	0.080	0.114	0.063	0.207	0.106	0.352	0.036	0.473
5	2.27	4.84	0.112	0.418	0.086	0.110	0.048	0.230	0.111	0.358	0.046	0.483
6	2.24	4.86	0.110	0.407	0.082	0.099	0.078	0.213	0.110	0.353	0.029	0.486
7	2.28	4.85	0.102	0.398	0.075	0.115	0.059	0.214	0.121	0.348	0.030	0.496
Average	2.27	4.86	0.106	0.410	0.080	0.111	0.062	0.208	0.112	0.355	0.037	0.486
Standard	2.03	5.00	0.100	0.390	0.100	0.109	0.062	0.207	0.110	0.365	0.030	0.520
SD	0.016	0.022	0.008	0.007	0.005	0.006	0.011	0.015	0.005	0.004	0.008	0.014
RSD (%)	0.7	0.5	7.2	1.8	5.9	5.4	17.9	7.3	4.7	1.1	21.1	2.9
Accuracy (%)	11.8	2.8	6.0	5.2	19.9	2.3	0.1	0.5	1.9	2.7	22.5	6.5

Realistic Sample Analysis

Table 2 shows the results for heavy metal analysis using ATFD500 for different kinds of food on the market, proving its capability of quantifying trace heavy metals in food.

Table 2: Element Test in Food Sample							
Sample							
	Cereal	Orzo pasta	Dark Chocolate	Wine	Fresh tuna	Fresh spinach	Lolli pop
Cr	1.85	12.21	ND	0.203	0.142	2.18	0.200
Mn	25.24	10.84	7.58	1.61	0.085	2.30	ND
Fe	187.3	64.76	27.85	3.25	3.29	36.55	2.28
Ni	1.38	1.92	2.39	ND	0.211	0.532	0.108
Cu	2.51	3.53	8.09	0.134	1.39	1.25	0.181
Zn	18.90	14.36	16.69	1.41	4.29	12.91	0.134
As	0.015	0.022	0.031	0.018	0.613	0.017	ND
Se	0.127	0.559	0.050	ND	0.917	0.016	ND
Hg	ND	ND	ND	ND	0.362	ND	ND
Pb	0.042	0.070	ND	ND	0.087	0.137	ND

Table 3: ATFD500 –Limit of Detection (ppm) Application: Trace Heavy Metals in Food												
Element	As	Hg	Pb	Cr	Cu	Ni	Zn	Mn	Co	Se	Tl	Bi
Scan mode (100s)	0.035	0.035	0.07	0.25	0.06	0.07	0.06	0.25	0.07	0.02	0.035	0.07
Quantitative mode (600s)	0.015	0.015	0.03	0.10	0.025	0.03	0.025	0.10	0.03	0.009	0.015	0.015

