

DIRECT AA MERCURY DETERMINATION IN FOODSTUFF

Direct atomic absorption mercury determination (without any pre-treatment procedures) in food is complicated by the presence of organic compounds. When such samples are atomized, much smoke is produced and practically in all cases the total absorption in the measuring cell occurs beyond the working range of the spectrometer. In this case, using a spectrometer with a background correction, namely, Zeeman AA mercury analyser **RA-915+** and a two-chamber pyrolytic catalyst atomizer (**PYRO-915**) developed by LUMEX Ltd., solves the problem of direct mercury determination.

The pyrolysis method significantly simplifies the quantification of the mercury in the samples. The sample is placed in a boat, and then is inserted in the atomizer, and in a minute the mercury concentration is measured, whereas the sample wet chemical pre-treatment takes more that 2 hours in the conventional cold vapor method.



The validity of the method is proved by the agreement between the measured and certified concentrations in various standard complex-matrix samples. Note the excellent consistency of the method: the discrepancies between concurrent measurements do not exceed 15% for different sample weights.

Reference material	Mass, mg	Measured value, ppb	Certificate value, ppb	Deviation, %
BCR-150 (Dry milk)	52	8.4	9.4±1.7	-14
	96	7.9		
	109	7.9		
DOLT-2 (Fish liver)	50	1860	2140±240	-8
	110	2070		
DORM-1 (Fish)	50	860	798±74	+4
	100	780		
BCR-184 (Beef)	29	2.3	2.6±0.6	0
	59	2.5		
	100	3.1		

This method allows efficient testing of foodstuff for the compliance with Ultimate Tolerable Concentrations. In this case, a representative sample weight of more than 100 mg is ensured. The method is especially convenient for testing fish and seafood – in each sample we found appreciable mercury content. This Method has also a wide dynamic range from 0.5 to 50000 ppb

Sample	Ultimate Tolerable Concentrations, ppb	Maximum sample weight, mg	Detection limit, ppb
Fish	300–700	300	0.5
Bread	10	>300	0.5
Cheese	30	120	2
Sausages	30	300	0.5
Tea	100	100	2
Sugar	10	40	5
Chocolate	100	100	2
Vegetables, (fruits)	20	>300	0.5

Mercury determination in a cheese sample

- 1 – Reference material SORT2 (HgO in quartz sand (31 ppb). Sample weight 70 mg.
- 2 – Cheese. Sample weight 25 mg (Measured value – 8.4 ppb).
- 3 – Cheese. Sample weight 100 mg (Measured value – 8.2 ppb).

