ANALYTICAL EQUIPMENT

DIRECT AA **MERCURY** DETERMINATION IN MILK, MILK POWDER, INFANT FORMULAE & RELATED FOODSTUFF

LUMEX Method M 04-46:2007

INTRODUCTION

Direct atomic absorption (AAS) mercury determination (**without any pre-treatment procedures**) in milk, milk powder, infant formulae and other food samples is complicated by their organic matrix. That is the reason why almost all AAS methods of mercury determination in foodstuff include sample digestion by acids. This stage extends analysis time, increases detection limit and becomes the main source of errors. Using a **RA-915M mercury analyzer** with Zeeman background correction and a **PYRO-915+ pyrolytic attachment** allows direct mercury determination in foodstuff at ppb level that saves time due to elimination of the sample preparation stage.

Russian National Standard (GOST R 54639-2011) was adopted in 2012 based on the LUMEX Method M 04-46:2007.

ANALYSIS FEATURES

- Sample homogenization and weighting is enough as sample preparation
- Control of non-selective absorption during the measurement process allows optimizing of sample weight and reduces analysis errors
- Rapid analysis (< 2 min)
- SRMs with any matrix (both liquid and solid) can be used for calibration
- Low running cost (no needs for chemical reagents)

MEASUREMENT RANGE

The measurement range of the mass concentration of total mercury is **2.5–5000 µg/kg (ppb)**.
This method allows efficient testing of foodstuff for the compliance with Ultimate Tolerable Concentrations (UTC). In this case, a representative sample weight of more than 100 mg is ensured.

Sample	UTC (Russia), ppb	Detection limit, ppb
Dry milk and Evaporated milk formula	40	1
Milk	5 (Russia); 10 (China)	0.5
Bread	10	0.4
Sugar	10	5
Vegetables, fruits	20	0.3
Fish	300–700	0.5
Tea	100	2

The validity of the LUMEX method is proved by the agreement between the measured and certified concentrations in various standard complex-matrix samples.

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