



## EXPRESS DETERMINATION OF MELAMINE IN MILK AND MILK PRODUCTS

### INTRODUCTION

Recently it was found that an organic compound melamine which consists of about 66% nitrogen by mass has been added to the milk products (milk, baby milk, baby milk mixtures, yogurts, etc) of certain unfair manufacturers. Seemingly it was done to artificially inflate the readings of protein level. Added in significant amounts melamine was appeared to be toxic, especially for babies, and caused acute kidney failure with several fatalities. Several thousands of babies in China are now seriously ill. Milk products, contaminated with melamine were also found on the markets of Singapore, New Zealand and in S. Korea.

To provide an express analysis of this contaminant, Lumex has recently developed a method of melamine determination in milk, milk products and milk products based biologically active substances by capillary electrophoresis on "CAPEL<sup>®</sup>-105/105M" instrument.

### MEASUREMENT METHOD

Generally the method is based on milk protein precipitation with trifluoroacetic acid, followed by centrifugation and direct supernatant analysis with capillary zone electrophoresis.

The CZE method for determination of melamine concentrations is based on electrophoretic migration and separation of melamine in the electric field; an acetate buffer is used as a background electrolyte.

Detection of melamine is performed based on its own absorbance at 205 nm.

### MEASUREMENT RANGE

Range of measurable weight fractions for melamine is **0.1–3000 mg/kg**.

### ADVANTAGES OF THE CAPILLARY ELECTROPHORESIS METHOD

Compared with HPLC method, capillary electrophoresis has several important advantages:

- Very low influence of hampering sample components
- Short analysis time
- Low analysis cost

### EQUIPMENT AND REAGENTS

The "CAPEL<sup>®</sup>-105/105M" capillary electrophoresis system is used in all measurements.

All reagents must be of analytical grade or higher.

Data acquisition and integration is accomplished with a PC with "Windows<sup>®</sup> 2000/XP", using chromatographic software "Chrom&Spec<sup>®</sup>" (for "CAPEL<sup>®</sup>-105") or "ELFORUN<sup>®</sup>" software package ("LUMEX<sup>®</sup>") for "CAPEL<sup>®</sup>-105M".

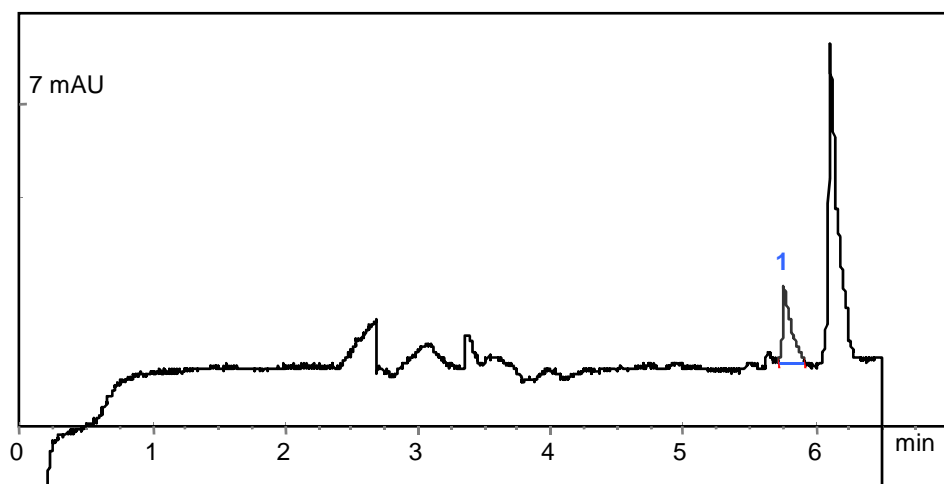
### EXAMPLE OF A REAL ANALYSIS

**Buffer:** acetate (pH 4.7)  
**Capillary:**  $L_{\text{eff}}/L_{\text{tot}}$  50/60 cm; ID 75  $\mu\text{m}$   
**Injection:** 150  
mbar\*s  
**Voltage:** + 25 kV  
**Detection:** 205 nm

**Sample:** whole milk with  
melamine added  
(1.10 mg/kg)

#### Measurement results:

**1** – melamine  
(1.06 mg/kg)



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