



Determination of **organic acids** in silage, haylage, and fermentates for biogas plants



INTRODUCTION

To ensure proper conditions for silage or haylage storage in agriculture, it is necessary to regularly monitor the formation of organic acids. For example, the formation of butyric acid may indicate spoilage. Formic or propionic acids can be artificially added to increase the nutritional value.

These same materials, as well as certain other biodegradable wastes (agricultural residues, sewage sludge, etc.) are also used in biogas plants, where the fermentation process must be carefully monitored, in particular by the determining the content of certain organic acids.

The method allows determination of the mass concentration of acetic, lactic, butyric, propionic, formic, oxalic, and fumaric acids in samples of silage, haylage and in various biodegradable materials of biogas plants.

MEASUREMENT METHOD

The measurement method is based on extraction of organic acids from a solid sample by water and their determination by capillary electrophoresis. Identification and quantification of the analyzed organic acids is performed by measuring their intrinsic UV absorption at 190 nm.

EQUIPMENT AND REAGENTS

The Capel capillary electrophoresis system is used in measurements. Data acquisition, collection, processing and output are performed using a personal computer running under Windows® operating system with Elforun software installed.

Lumex Instruments set, order **No. 0300001897**

EXAMPLES OF REAL ANALYSES

BGE: phosphate I with CTAB

Capillary: $L_{\text{eff}}/L_{\text{tot}}$ 40/50 cm, ID 50 μm

Injection: 300 mbar \times s

Voltage: -15 kV

Temperature: 20 °C

Detection: 190 nm

Sample: water extracts from two different silage samples

Found:

- 1 – formic acid
- 2 – acetic acid
- 3 – lactic acid

