



DETERMINATION OF ORGANIC ACIDS IN FEEDSTUFF, SILAGE, HAYLAGE, AND FERMENTATES FOR BIOGAS PLANTS

INTRODUCTION

To provide the proper conditions for silage or haylage storage in agriculture it is necessary to regularly monitor the formation of certain organic acids in it. For example, the formation of butyric acid can indicate spoiling of material. Formic or propionic acids can be artificially added to increase the nutritional quality. The same materials and some other biodegradable waists (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 certain organic acids.

The present method allows determination of some important organic acids like **acetic, lactic, butyric, propionic, and formic** in feedstuff additives, silage, haylage and in different biodegradable materials of biogas plants. Some other organic acids (**oxalic, fumaric**, etc.) can be also determined within this method.

MEASUREMENT METHOD

The capillary electrophoresis method for the determination of organic acids is based on their differential migration and separation in a fused silica capillary under the influence of electric field. Sample pretreatment includes either just water extraction or sample distillation with steam. CE separation is completed within 5 minutes.

Identification and quantification of the analyzed organic acids is performed by measuring their intrinsic UV absorption at 190 nm.

EQUIPMENT AND REAGENTS

The CAPEL®-105M capillary electrophoresis system with high-voltage negative polarity is used in measurements. Data acquisition, collection, processing and output are performed using a personal computer running under WINDOWS® XP/7 operating system with installed dedicated software package ELFORUN®. All reagents must be of analytical grade or better.

EXAMPLE OF A REAL ANALYSIS

Buffer: special with CTAB

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

Injection: 300 mbar*sec

Voltage: -15 kV

Temperature: +20°C

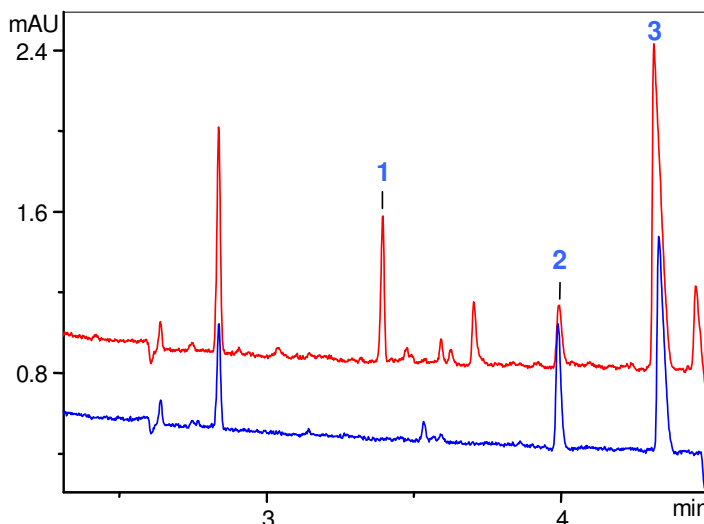
Detection: 190 nm, direct

Sample: water extracts from two different silage samples

1 – formic acid

2 – acetic acid

3 – lactic acid



The contents of this paper are subject to change without notice.

The information in this leaflet is supplemental. To get more specific information on this method, please contact the developer of this method Lumex Instruments Group.

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