DETERMINATION OF **AMINO ACIDS** IN FODDERS AND RAW MATERIALS BY CAPILLARY ELECTROPHORESIS

LUMEX Method M 04-38 (2009)

INTRODUCTION

The method enables fast quantitative determination in feeds, mixed fodders, and raw materials of the following amino acids: arginine, lysine, tyrosine, phenylalanine, histidine, leucine and *iso*-leucine (total), methionine, valine, proline, alanine, glycine, cystine, tryptophan, aspartic and glutamic acids. Since during the sample decomposition asparagine and glutamine are hydrolyzed to aspartic and glutamic acids, respectively, the content of these two acids represents the total content of both the acids and the amides.

MEASUREMENT METHOD

The determination of amino acids in the samples is made either after preliminary alkaline hydrolysis for tryptophan or after acidic hydrolysis for all the other amino acids. Free amino acids are transformed to phenylthiocarbamyl derivatives (PTC derivatives) by means of phenylisothiocyanate and their ionic forms are separated in the quartz capillary under the action of an electric field. The PTC derivatives are determined by measuring their own absorbance at 254 nm wavelength in a buffer solution.

RANGES OF PERCENTAGE OF AMINO ACIDS

Amino acid	Percentage of amino acid, % w/w *	Amino acid	Percentage of amino acid, % w/w *	Amino acid	Percentage of amino acid, % w/w *
Ala	0.25–10.0	His	0.5–10.0	Ser	0.25–10.0
Arg	0.5–10.0	Leu+Ile	0.25–10.0	Thr	0.5–10.0
Asp+Asn	0.5–10.0	Lys	0.25–20.0	Trp	0.1–10.0
Cys-Cys	0.1–10.0	Met	0.25–10.0	Tyr	0.25–10.0
Glu+Gln	0.5–10.0	Phe	0.25–10.0	Val	0.5–10.0
Gly	0.25–10.0	Pro	0.25–10.0		

* For 100 mg sample.

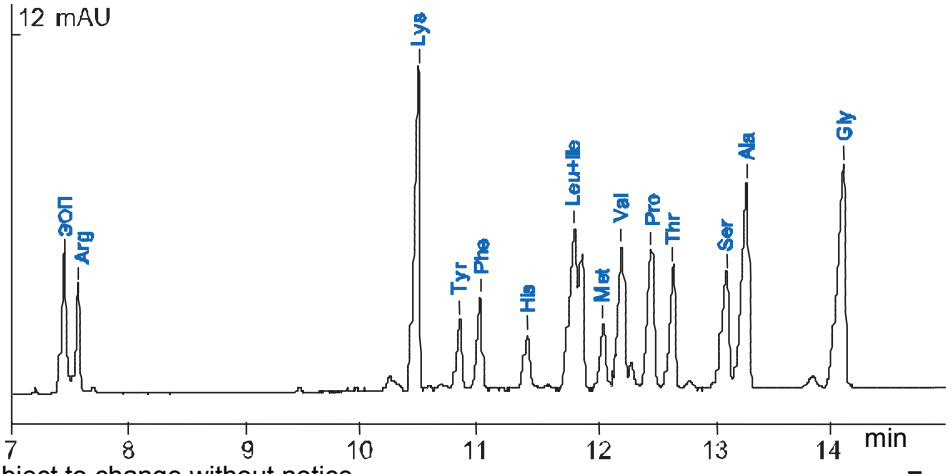
EQUIPMENT AND REAGENTS

The "CAPEL®-103RT/104T/105/105M" capillary electrophoresis system with a special capillary cassette for the amino acid analysis is used in measurements.
Data acquisition, collection, processing and output are performed using a personal computer running under "WINDOWS® 2000/XP" operating system with installed dedicated software package for acquisition and processing of chromatography data.
All reagents must be of analytical grade or higher.

EXAMPLE OF A REAL ANALYSIS

Buffer: phosphate, with β-cyclodextrin
Capillary: L_{eff}/L_{tot} 65/75 cm, ID 50 µm
Injection: 150 mbar x sec
Voltage: + 25 kV
Temperature: + 30 °C
Pressure: 0 mbar
Detection: 254 nm

Sample: fish meal (acid hydrolysis)
Results of the measurement, % w/w:
Arg – 3.3; **Lys** – 4.8; **Ty** – 1.8; **Phe** – 2.3; **His** – 1.1; **Leu+Ile** – 6.6; **Met** – 2.0; **Val** – 2.9; **Pro** – 3.3; **Thr** – 2.4; **Ser** – 2.9; **Ala** – 3.8; **Gly** – 5.2



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