INTRODUCTION
The method enables fast quantitative determination of amino acids methionine, threonine, lysine, and cystine in feeds, mixed fodders, and raw materials.

MEASUREMENT METHOD
Capillary electrophoresis method for the determination of amino acids is based on the differential migration of ionic forms of amino acids in a quartz capillary under the influence of the applied electric field. Identification of amino acids is performed basing on their own absorbance in the UV range at 190–200 nm. Capillary electrophoresis is performed twice: first for the determination of lysine, threonine, and cystine in borate buffer at 20 °C and then for methionine in borate buffer with β-cyclodextrin at 40 °C. Hydrolysis of fodders is done according to the standard protocol in a close vessel with 6 M hydrochloric acid within 14–16 hours at 110 °C. Upon the removal of the excess of the acid, the sample solution is analyzed by capillary electrophoresis.

RANGES OF PERCENTAGE OF AMINO ACIDS

<table>
<thead>
<tr>
<th>Amino acids</th>
<th>Percentage of amino acids, % (w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lysine</td>
<td>0.25–10.0</td>
</tr>
<tr>
<td>Threonine</td>
<td>0.25–3.0</td>
</tr>
<tr>
<td>Methionine</td>
<td>0.3–3.0</td>
</tr>
<tr>
<td>Cystine</td>
<td>0.2–2.0</td>
</tr>
</tbody>
</table>

EQUIPMENT AND REAGENTS
The “CAPEL®-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.

EXAMPLES OF REAL ANALYSES
Buffer: borate (pH 9.2)
Capillary: \( \text{L}_{\text{eff}}/\text{L}_{\text{tot}} = 65 / 75 \text{ cm} \); ID 50 µm
Injection: 450 mbar x sec
Voltage: + 20 kV
Temperature: + 20 °C
Detection: 190 nm
Sample: fish flour (100 mg)
Measurement results:
1 – lysine (3.12%)
2 – threonine (2.24%)
3 – cystine (0.56%)
Buffer: borate (pH 9.2) with β-cyclodextrin
Capillary: L_{eff}/L_{tot} 65 / 75 cm; ID 50 µm
Injection: 450 mbar x sec
Voltage: + 20 kV
Temperature: + 40 °C
Wavelength: 190 nm
Sample: fish flour (100 mg)
Measurement results:
1 – methionine (1.35%)