Dividing of protein fractions by the method of electrophoresis

A.Y. Shironina, Y.A. Kuchina, S.R. Derkach, V.Y. Novikov
Murmansk state technical university, Sportivnaya st., 13, Murmansk, Russia
e-mail: nessy131@rambler.ru

The molecular-weight distribution of proteins is an important parameter which defines the process of enzymic hydrolysis in protein hydrolysates production. SDS PAGE electrophoresis method was used for investigation of protein fractions division. Gel works as molecular sieve which allows separating proteins in a wide range of molecular weights. This method is widely-used in colloid chemistry for investigation of dispersions’ electrokinetic properties.

For enzymic hydrolysis we used gelatin as a model system and fish (cod, poutassou) as a protein-containing raw material and pancreatin. The SDS PAGE electrophoresis was kept at 15°C, the voltage at 600 V, current strength at 50 mA, power at 30 watt. The Coumassi Blue method was used for staining. The molecular weights of protein fractions were defined with the help of calibration diagram, constructed of distribution of standard markers (Pharmacia Biotech) which are enzymes with known molecular weights from 14,4 to 94 kDa.

We also controlled accumulation of proteins with low molecular weight at different conditions of enzymic hydrolysis.

The photo of polyacrylamide gel with divided protein fractions: 1 – standard markers (Pharmacia Biotech); 2 – pancreatin enzyme; 3 – protein-containing raw material; 4-8 – hydrolysates, extracted at different periods of time of hydrolysis (from 15 to 75 min)

Combined analysis of containing of high molecular weight and low molecular weight protein fractions at different stages of hydrolysis and kinetic dependences of hydrolysis degree, accumulation of water-soluble protein fractions and rheological parameters has allowed to model the enzymic hydrolysis process and to find appropriate conditions under which the highest degree of hydrolysis is achieved in the minimum time.

Such type of hydrolysates can be used in agriculture as food supplement for animals, in microbiology as a basis for microbiological diagnostical mediums and in medicine as components of nutrient solutions.

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