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New Kinetic Approach to the Enzymatic Hydrolysis of Proteins: A Case of Thermolysin-Catalyzed Albumin

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Abstract : Using an enzyme of known specificity the hydrolysis of protein was carried out in a controlled manner. The aim was to obtain oligopeptides being the so-called active peptides or their direct precursors. An original way of expression of the protein hydrolysis kinetics was introduced. Peptide bonds contained in the protein were recognized as a diverse-quality substrate for hydrolysis by the applied protease. This assumption was positively verified taking as an example the hydrolysis of albumin by thermolysin. Peptide linkages for this system should be divided into at least four groups. One of them is a group of bonds non-hydrolyzable by this enzyme. These that are broken are hydrolyzed at a rate that differs even by tens of thousands of times. Designated kinetic constants were k'F = 10991.4 L/g.h, k'M = 14.83L/g.h, k'S about 10-1 L/g.h for fast, medium and slow bonds, respectively. Moreover, a procedure for unfolding of the protein, conducive to the improved susceptibility to enzymatic hydrolysis (approximately three-fold increase in the rate) was proposed.

Keywords : peptide bond hydrolysis, kinetics, enzyme specificity, biologically active peptides
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