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# **Czech J. Food Sci.**

**Ruan Ch.-Q., Chi Y.-J.,  
Zhang R.-D.:**

# Kinetics of hydrolysis of egg white protein by pepsin

Czech J. Food Sci., 28 (2010): 355-363

Taking into account the enzyme inactivation and substrate inhibition, the bioreaction mechanism and kinetics characteristic of egg white protein (EWP) enzymatic hydrolysis by pepsin were investigated. A logarithmic equation  $h = (1/b) \ln(1 + abt)$  indicating the relationship between the degree of hydrolysis (DH) and time was established. For EWP-pepsin system, the reaction mechanism could be deduced from a series of experimental results at different temperatures, pH values, substrate concentrations, and enzyme concentrations. The reaction kinetics and thermodynamic constants ( $K_S = 3916.5$  g/l,  $k_2 = 17\ 202.86$  min<sup>-1</sup>,  $k_d = 21\ 962.03$ ,  $E_a = 56.89$  kJ/mol,  $E_d = 51.99$  kJ/mol) were responsible for the empirical equations. The results of nonlinear regression of the proposed kinetic model

agreed with the experimental data, i.e. the average relative error was less than 5%. As a conclusion, the kinetic equations can be used to fit the enzymatic hydrolysis process of egg white protein and to optimise the operating parameters of bioactive peptides preparation for the bioreactor design.

### **Keywords:**

egg white protein; pepsin; enzymatic hydrolysis; kinetics; bioactive peptides

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