

PROTEOLYTIC SYSTEM OF LACTIC ACID BACTERIA

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Lactic acid bacteria are fastidious microorganisms that require an exogenous source of amino acids or peptides provided by the proteolysis of casein. Therefore, their proteolytic system plays the crucial role as it enables these bacteria to grow protein rich substrates such as milk. This process has also industrial importance due to its contribution to the development of the organoleptic properties of fermented milk products. Growth of lactic acid bacteria in milk depends on the ability of these cells to metabolize proteins in milk. These microorganisms have a very sophisticated proteolytic system that includes a cell envelop proteinase (PrtP), several membrane-located peptide transport systems (DtpT, Dpp and Opp), and an array of intracellular peptidases. Degradation of large casein molecules by lactic acid bacteria into their component amino acids consists of four main steps: Hydrolysis of casein is initiated by a PrtP. DtpT is a secondary transporter that catalysis the uptake of hydrophilic di- and tripeptides, oligopeptides across the cytoplasmic membrane and into the cell. Casein-derived peptides produced by PrtP can only be transported by the Opp or Dpp systems that are members of the ATP-binding cassette transporter family. Third step is intracellular hydrolysis of accumulated peptides. The oligopeptides are hydrolyzed by various peptidases, including PepA, PepN and PepX, and the di- and tripeptides are also hydrolyzed. The last step is metabolizing free amino acids or using them for protein biosynthesis.

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