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New properties of the modified lysozyme and the possibility of its practical use

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Lysozyme (E.C.3.2.17) is an enzyme widespread in nature, it is found in many biological fluids and tissues of a large number of living organisms but hen egg white is its one of the richest sources. It is a relatively small secretory protein and is known as hydrolase cutting the β -1-4 glycosidic bond in the cell walls mainly of gram-positive bacteria. Studies indicate that the range of lysozyme activity may be extended due to the chemical or physical modifications leading to changes in the conformation of enzyme molecules and as a consequence; the production of its dimer or higher oligomeric forms. In our laboratory, we have developed several methods for the modification of lysozyme such as thermal, thermochemical, chemical and membrane method. The enzyme obtained using such processes as heating, oxidation or high-pressure exhibits different and quite new valuable properties. Beside action against gram-positive bacteria, it demonstrates bacteriostatic activity against Gram-negative bacteria, among them a number of food pathogens. Additionally, lysozyme modified to oligomeric forms shows many other useful properties i.e., it can modulate the synthesis of tumor necrosis factor (TNF α) and stimulate the production and release of interferon alpha and gamma (INF α , INF γ) as well as interleukin-2 (IL-2) and interleukin-6 (IL-6) by human lymphocytes. Thanks to such valuable properties of modified lysozyme which has already found practical applications in veterinary medicine. Now, it is particularly useful in treatment of some animal diseases as the only drug and as an agent which significantly increases efficacy of antibiotics. It is likely that soon the modified lysozyme may also turn out to be an invaluable drug in human medicine.

Biography

Grzegorz Lesniewski has completed his PhD in 1998 from Agriculture University of Poznan and Postdoctoral studies in 2008 from Poznan University of Life Sciences. He has published more than 100 papers. His principal research topics include: The technology, chemistry, hygiene and microbiology of manufacturing processes and product derived from eggs, poultry meat and other poultry raw materials; derivation of components of high utility value from egg white and yolk for food preservation, pharmacy and veterinary purposes; lysozyme modifications for widening the spectrum of its antibacterial activity and application of lysozyme antibacterial activity to food industry.

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