

NEW PROPERTIES OF THE MODIFIED LYSOZYME AND THE POSSIBILITY OF ITS PRACTICAL USE

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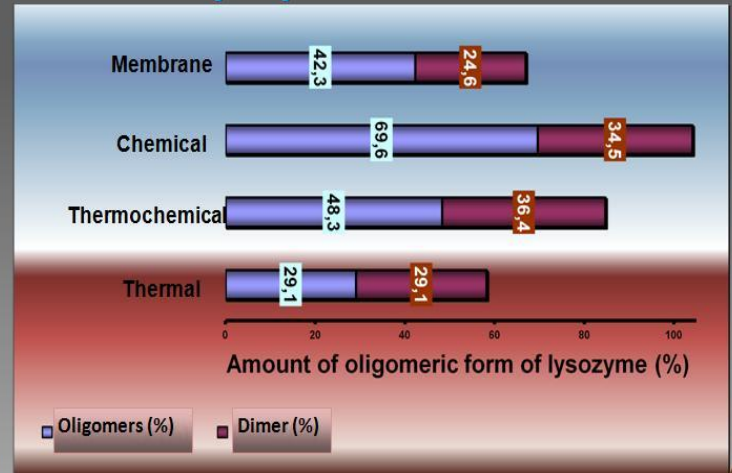
Introduction

- Lysozyme, takes a stand in many biological fluids and tissues of a large number of living organisms
- Hen egg white is it's a rich source and from this source enzyme can be obtained on a commercial scale as a preparation of biological activity
- Monomer of lysozyme is a hydrolase cutting the β -1-4 glycosidic bond in he cell wall of bacteria
- Enzyme demonstrates a, bacteriolytic and bacteriocidal activity, particularly against Gram-negative bacteria [1]

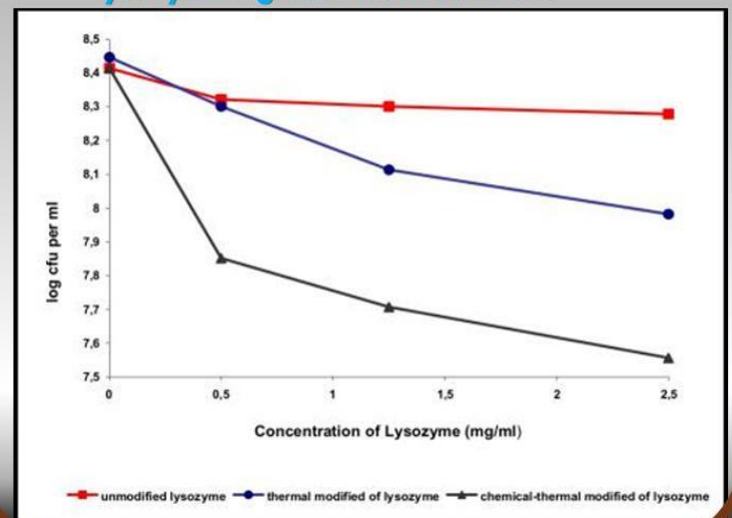
Lysozyme modification

- Modified lysozyme exhibits quite new properties and quite a novel antimicrobial activity [2]
- A number of different modifications of lysozyme have been undertaken to increase its efficacy as an antimicrobial agent [3]
- Beside action against Gram-positive bacteria, enzyme demonstrates bacteriostatic activity against Gram-negative bacteria, among them a number of food pathogens
- Each of the modification leads to changes in the enzyme structure including the dimerization and oligomerization [2]
- It has been shown that the new antimicrobial activity of lysozyme depends mainly on the amount of the dimer and higher oligomers [2-3]

Results of lysozyme modification



The antibacterial effect of the modified lysozyme against *Escherichia coli*



Lysozyme modifications developed in our laboratory

- Thermal modification
- Chemical modification
- Thermochemical modification
- Membrane modification

Potential use of the modified lysozyme

- In the food technology and food processing:
 - as a preservative of fruits and vegetables, meats and dairy products
 - in beverage technology especially for the clarification of juices, wines and beer production
- In the medicine and veterinary in treatment of some diseases as the only drug and as an agent which significantly increases efficacy of antibiotics

Conclusions

The polymerized lysozyme has a very valuable properties and as substance of natural origin it can be practically used in various applications. To obtain a completely new enzyme, first natural lysozyme (e.g. from egg white) must be modified. Our research has shown that a good effect of the modification can be achieved by using such methods as thermal, chemical, thermochemical or membrane.

[1] P.J.W. Schreur *et. al.* PLOS ONE. Available at: <http://www.plosone.org> Vol.4, issue 1, e36281.

[2] H.R. Ibrahim, Nahrung 42 (1998) 187-193.

[3] G. Lesniewski, Handbook of eggs in human function / Ed. by Ronald Ross Watson, Fabien de Meester., Wageningen Academic Publisher, (2015) 483-495