



Preparation and characterization of immobilized lipases on microspheres

Sergei Yu. Zaitsev

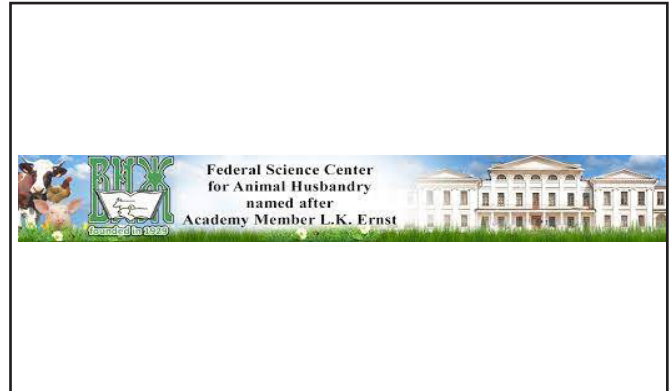
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Abstract:

Investigation of the colloid and catalytic properties of lipolytic enzymes, including lipases, is an important area of colloid and biological chemistry. Immobilization of lipase on different carriers is the current line of research that can increase the enzyme activity, stability, etc. The goal of our work was to prepare and characterize the particular complexes of lipases from different sources and polymeric microspheres. We used three type lipases from different sources: porcine pancreatic lipase, lipase from *Candida Cylindracea*, lipase from Wheat Germ. Polyacrolein and polystyrene microspheres were used for lipases immobilization. The first stage was to determine individual properties of enzymes and microspheres using physical and chemical methods (dynamic light scattering, IR-spectroscopy, absorption spectroscopy, etc.) also lipases activity were measured to compare with immobilized ones. All lipase activities were found in comparison with porcine pancreatic lipase. Lipase immobilization was performed by two methods: physical adsorption and covalent binding to latex microspheres. One of our work tasks was to determine the active aldehyde groups on microspheres surface using reaction with nitrophenylhydrazine. After that the covalent lipase immobilization to three microsphere types using borate buffer was performed. Such complexes were characterized with IR-spectroscopy that showed structural features of these conjugates. Furthermore, the immobilized lipases in such complexes were investigated by dynamic light scattering and their catalytic activity was measured. Thus, different lipase-microsphere complexes were obtained and characterized by catalytic activity, size parameters and IR-spectroscopy for further applications of the optimal complex.

Biography:

Sergei Yu. Zaitsev graduated from the Moscow State University in 1980; Ph.D. in 1986. In 1995 and 2007 S.Yu. Zaitsev received Doctor of Science degrees in Chemistry and Biology; a full professorship - in 2005. 1980-1999 he worked at different research positions (from junior to senior scientist) in Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry (Russian Academy of Sciences). 1999-2019 he worked as head of the



Chemistry Department in Moscow State Academy of Veterinary Medicine and Biotechnology named after K.I. Scryabin (Moscow SAVMB). Since 2019 he is a Leading Researcher in L.K. Ernst Federal Science Center for Animal Husbandry. Zaitsev has authored over 500 scientific and teaching publications, including 15 monographs and handbooks; over 250 articles; 11 patents. Prof. Zaitsev supervised 21 Ph.D-students, about 100 Magister and Bachelor students. In 1991–1993 Zaitsev worked in some universities and research institutes in the United States and Germany. Zaitsev is now a member of the Board of Experts in Chemistry, Biology and Agricultural Sciences in various Russian Science Foundations and the Russian Ministry of Science and Education.

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