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### **Basidiomycetes as a multi-purpose cell factory: Current status and perspectives**

Recently, extensive research on higher basidiomycetous fungi has markedly increased, mainly due to their potential use in a variety of biotechnological applications, particularly for the production of food, enzymes, dietary supplements, and pharmaceutical compounds. This presentation integrates recent literature and our own data on the physiology of bioactive compounds production, focusing on the common characteristics and unique properties of individual fungi as well as on several approaches providing enhanced yields of target products. Among basidiomycetes, so called medicinal mushrooms constitute a rich source of bioactive compounds exhibiting antitumor, antidiabetic, immunomodulating, antioxidant, antimicrobial and many other properties. However, the production of antioxidants, lectins and exo-polysaccharides is species- and even strain-dependent and some nutrient supplements regulate bioactive compounds synthesis although their effect is very specific depending on fungi physiological peculiarities.

An overview of available data underlines that the regulation of lignocellulose-deconstructing enzymes production appears to be subject to complex interplay of nutritional, environmental, and genetic factors. To correctly evaluate the fungi biosynthetic potential and to maximally express cellulase, laccase, lignin

and manganese peroxidase activities a fungus specific carbon source/lignocellulosic substrate, an appropriate enzyme synthesis inducer, other required factors should be elucidated. Data received indicate that lignocellulosic growth substrates, some of which contain significant concentrations of soluble carbohydrates and inducers, play a crucial role in enzyme production. Moreover, co-culture of compatible fungi may be an appropriate approach to enhance their biosynthetic activity and yield of target products.

Finally, a brief outline of efforts to exploit the whiterot fungi potential for the bioremediation of polluted areas and for sustainable processing of renewable biomass into spectrum of marketable products and energy is also presented.

#### Speaker Biography

Vladimir Elisashvili is a director of the Animal Husbandry and Feed Production Institute of the Agricultural University of Georgia. In 1974, he obtained his PhD in microbiology at the Saint Petersburg (Leningrad) State University. Then, he continued his work at the chair of microbiology as a scientist and assistant professor. In 1983, he joined the Durmishidze Institute of Biochemistry and Biotechnology, Tbilisi, Georgia and in 1993, he obtained the Doctor of biological sciences degree in biochemistry. In 1976/77, he obtained a postdoc position at the Institute of Molecular Biology, Paris VII, France. In 2001-2006, he worked at the Free University of Brussels and in two biotechnological companies in Israel. He has over 190 publications and supervised 21 PhD theses. He is serving as an editorial board member of three reputed Journals.

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