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## Immobilization and application of laccase preparation

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The application of the white rot basidiomycetes (WRB) and especially their lignin-modifying enzymes in various industrial biotechnologies and in bioremediation of wastewater and soil polluted with the emerging organic pollutants (EOP) requires their huge production and stabilization. In this study, production of laccase by two most promising enzyme producers (*Trametes versicolor* and *Cerrena unicolor*), isolated and identified from the Georgian forest, was optimized in submerged fermentation conditions and laccase preparations were isolated from the culture liquids by ammonium sulfate precipitation. Two obtained laccase preparations and, for comparison, commercial laccase from *Trametes versicolor* were immobilized on the fumed silica nanoparticles (fsNP) with APTES modification in order to increase their stability and to provide their separation from the reaction mixture and reusability. The coupling procedure for fsNP–laccase conjugates was optimized to bind as much as possible of the initially applied laccase and to obtain the highest loads of laccase activity on

the fsNP. Among the enzyme preparations, immobilization of *T. versicolor* laccase was the most effective - 4.0 U g<sup>-1</sup> fsNP, with immobilization yield of 121% and the washing loss of 3.1%. Immobilization yield of *C. unicolor* laccase achieved 133% with the least washing loss - 0.9%; however, enzyme load was only 2 U g<sup>-1</sup>. Finally, the immobilization yield for commercial laccase preparation was the highest (172%), but the washing loss was 3.2% and enzyme load was 2.5 U g<sup>-1</sup>. We have tested laccase preparations for degradation of micropollutants of wastewater. There was shown that immobilized laccase preparations appeared to be appropriate tools for elimination of diclofenac and Bisphenol A.

### Speaker Biography

Aza Kobakhidze has completed her PhD at the age of 28 years from Georgian Technical University, Georgia. She is the researcher scientist of Agricultural University of Georgia, Tbilisi, Georgia. She has over 14 publications that have been cited over 30 times.

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