Univerza v *Ljubljani*
Fakulteta *za kemijo in kemijsko tehnologijo*

VABILO NA PREDAVANJE

v okviru seminarjev raziskovalne skupine za mikroprocesno inženirstvo
Katedre za kemijsko procesno, okoljsko in biokemijsko inženirstvo

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z naslovom

Understanding enzyme catalytic and conformational properties for mastering immobilized biocatalysts complexity,

ki bo v **torek, 1.12.2015, ob 12. uri**

v predavalnici 4.

Vljudno vabljeni!

The multidisciplinary nature of biocatalysis determines the quite common practice of developing processes in discrete steps, each one involving different and specific expertise and know how. However, even if each process step may work well, it may not be the case for the complete system. The lack of integration of these multi-disciplinary processes is one of the major causes of failure in the transition from conventional chemical processes to biocatalysis. This objective can be achieved with the contribution of computational and statistical methods that are able to manage the amazing complexity of the systems under study. [1,2,3]

I will report on the efforts towards the development of integrated strategies for making feasible and scalable the application of robust immobilized lipases in large-scale biotransformations. Lipases have a wide industrial impact in the food, pharma and cosmetic sectors but there is an enormous catalytic potential waiting to be exploited for biomass transformations. In order to make such bulk productions feasible, efficient biocatalysts at affordable costs are needed. Nowadays, the scientific knowledge on lipases structural and functional properties are so advanced that tailored solutions can be provided for formulating and immobilising lipases for specific applications.

The study of structural and conformational properties of lipases allowed the development of tailored immobilization protocols in non-aqueous media, which were integrated in thin-film processes to overcome viscosity and prevent biocatalyst damage.[4,5,6] This integrated solution was successfully applied to in-vitro enzymatic polycondensations, that are normally hampered by insufficient mass transfer as well as limited recyclability of the biocatalyst. Indeed, data show how classical approaches for enzyme immobilization combined with batch reactor configuration are inadequate for solvent-free and viscous processes.

The results obtained using the innovative integrated processes open new perspectives for enlarging the applicability of biocatalysts in other viscous and solvent-free synthesis. There is an enormous potential for synthesizing novel bio-based functionalized polyesters under environmentally benign conditions by exploiting the catalytic efficiency and selectivity of enzymes.

References:

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