



COURSE DATASHEET

Semester:	2012/13/2
Course:	Non-aqueous enzyme technology
Code:	VEMKBMM454E
Responsible department:	Research Institute on Bioengineering, Membrane Technology and Energetics
Department code:	MKBME
Responsible instructor:	Dr. László Gubicza

Course objectives:

To introduce the importance, nomenclature, characteristics, application possibilities of non-aqueous enzyme technology for students.

Course content:

- Enzymes in Organic Solvents
- Advantages of Biocatalysts in Organic Media I.
 - a) Enhancement of Solubility of Reactants
 - b) Shift of Equilibria in Organic Media
 - c) Easier Separation
- Advantages of Biocatalysts in Organic Media II.
 - a) Enhanced Stability of Enzymes in Organic Solvents
 - b) Altered Selectivity of Enzymes in Organic Solvents
- The Importance of Water in Enzyme Reactions in Organic Solvents
- Optimal Handling of Enzymes in Organic Solvents
 - a) Enzyme Memory in Organic Solvents
 - b) Low Activity in Organic Solvents Compared to Water
 - c) Enhancement of Selectivity of Enzymes in Organic Solvents
- Enzymatic Esterifications in Organic Solvents
- Production of natural flavour esters
- Enzymes in Supercritical Solvents



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Course content:

- Enzymes in Ionic Liquids
- Enzymatic reactions in gaseous phase
- Solvent as a Parameter for Reaction Optimization ("Medium Engineering")
- Change of Substrate Specificity with Change of Reaction Medium
- Production of Lactic Acid Esters in Non-Conventional Media
- Comparison of the Different Media: Production of Ethyl Acetate.

Requirements, evaluation and grading:

After a half an hour's preparation the examinee gives an oral presentation on the topic for about 20-25 minutes.

Fail (1) when the examinee is unable to prove either the definition of the basic notions or the short scheme of things connected with the topic.

Pass (2) when the examinee is able to interpret the basic notions of the topic.

Satisfactory (3) when the examinee is well-versed in the basic notions of the topic and is able to present their logic connections - with the help of the examiner.

Good (4) when the examinee provides a logic, well-structured presentation with all the important facts and connections but he does not know or partly knows the required reading material connected with the topic.

Very good (5) when the examinee gives a logic, excellent, well-structured, perfect in details oral presentation that completely reveals the connection of the concepts within the topic.

Required and recommended readings:

Bomarius, A. S., Riebel, B. R.: Biocatalysis, Wiley-VCH Verlag GmbH and Co. KGaA, Weinheim, 2004