UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2012/13/1
Course:	Pesticide chemistry and technology
Code:	VEMKOT4112N
Responsible department:	Department of Organic Chemistry
Department code:	MKOK
Responsible instructor:	Dt. József Bakos

Course objectives:

Educational Objectives: To give an overview of all chemical aspects of plant protection, discussion of some individual compound and type of compound. The aim is to cover synthetic, organic and biochemical aspects, metabolism, activity structure relationship, fields of application, and environmental and toxicological problems.

Course content:

Contents: Week 1. Reason for plant protection, definition of pesticide. Biotic factors: animal pests, microorganisms, and weeds. Classification of pesticides. Significant trends in research and development. 2. A general overview of pyrethroid insecticides. Composition of pyrethrum. Toxophore groups in pyrethrin. Insecticide synergistic: structural requirements, mechanism. 3. Synthesis and stereochemistry of chrysanthemic acid. 4. Retro synthetic analysis for the synthesis of (1R,3R)- chrysanthemic acid. Access to (1R,3R)-chrysanthemic acid and (4S)-allethrolone by resolution. Recovery of (1S, trans)-chrysanthemic acid 5. Recovery of (4S)-allethrolone. Photostable pyrethroids: industrial access to deltamethrin. Dynamic resolvation. 6. Structure - activity relationship. General routes for the synthesis of fenvalerate. 7. Synthesis of 3-fenoxybenzaldehyde. 8. Chlorinated hydrocarbons: DDT and related compounds, hexachlorocyclohexane, cyclodiene derivatives. 9. Organophosphorus compounds. Biological effect on warm blooded animals, mechanism of inhibition in the function of the enzyme of acetyl cholinesterase. Competitive inhibition, reactivation. 10. Phase-transfer catalysis. Application of PTC technique in organic synthesis. 11. Fungicides: organometallic compounds, phenol derivatives, dithiocarbonic acid derivatives. 12. Herbicides: phenoxyalkanoic acid derivatives. Structure and activity relationships. 13. Amides and diphenylether based herbicides. 14. Dithiocarbamate and triazine derivatives.

Requirements, evaluation and grading:

Examination Requirements and Questions: Reason for plant protection, definition of pesticide. Biotic factors: animal pests, micro-organisms, and weeds. Classification of pesticides. Significant trends in research and development. A general overview of pyrethroid insecticides. Composition of pyrethrum. Toxophore groups in pyrethrum. Insecticide synergistic: structural requirements, mechanism. Synthesis and stereochemistry of chrysanthemic acid. Retro synthetic analysis for the synthesis of (1R,3R)- chrysanthemic acid. Access to (1R,3R)- chrysanthemic acid and (4S)-allethrolone by resolution. Recovery of (1S, trans)-chrysanthemic acid. Recovery of (4S)-allethrolone. Photostable pyrethroids: industrial access to deltamethrin. Dynamic resolution. Structure - activity relationship. General routes for the synthesis of fenvalerate. Synthesis of 3-fenoxybenzaldehyde. Chlorinated hydrocarbons: DDT and related compounds, hexachlorocyclohexane, cyclodiene derivatives. Organophosphorus compounds. Biological effect on warm-blooded animals,

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Requirements, evaluation and grading:

mechanism of inhibition in the function of the enzyme of acetyl cholinesterase. Competitive inhibition, reactivation. Phase-transfer catalysis. Application of PTC technique in organic synthesis. Fungicides: organometallic compounds, phenol derivatives, dithiocarbonic acid derivatives. Herbicides: phenoxyalkanoic acid derivatives. Structure and activity relationships. Amides and diphenylether based herbicides. Dithiocarbamate and triazine derivatives. Grading is based on one written final examination: Points final mark 36-39 excellent (5) 30-35 good (4) 25-29 medium (3) 20-24 pass (2)

Required and recommended readings:

Matolcsy, Nádasy, Andriska: Pesticide Chemistry (1988).