



ESCUELA AMBIENTAL DE VERANO, 2010

DOCTORADO EN CIENCIAS AMBIENTALES CON MENCION EN SISTEMAS ACUATICOS CONTINENTALES

FICHA DE ASIGNATURA

Nombre	:	PRESENCE OF ORGANIC MICRO-CONTAMINANTS IN WATER: CHARACTERIZATION, EFFECTS AND TREATMENT ALTERNATIVES
Créditos	:	3
Nº de Horas	:	32 Teóricas y 48 Seminariales
Clasificación	:	Teórico/Práctico
Carácter Del Curso	:	Especialidad
Fecha	:	04 al 12 de Enero, 2010
Lugar de Dictación	:	Sala Galletué, edificio Francesco Faranda, Centro de Ciencias Ambientales EULA-CHILE, Universidad de Concepción
Horario	:	Lunes a Viernes de 09:00 a 12:30 y de 14:30 a 18:30 horas
Dirigido a	:	Estudiantes de Postgrado y Profesionales relacionados con los temas ambientales
Profesor Coordinador	:	Dr. Oscar Parra B., Centro de Ciencias Ambientales EULA-Chile, Universidad de Concepción.
Costo	:	Estudiantes de la Universidad de Concepción: Libres de matrícula Profesionales, estudiantes de otras Universidades e Instituciones: US\$350.-

Profesores

- Dr. Godwin Ayoko, Queensland University of Technology, Australia.
- Dra. Carolina Baeza, Centro de Ciencias Ambientales EULA-CHILE, Universidad de Concepción.
- Dr. Ricardo Barra, Centro de Ciencias Ambientales EULA-CHILE, Universidad de Concepción.
- Dra. Pilar Fernández, Instituto de Diagnóstico Ambiental e Investigaciones del Agua, España.
- Dr. Silvano Focardi, Faculty of Sciences, University of Siena, Italia.
- Dr. Bernhard Karrasch, Umweltforschungszentrum (UFZ), Alemania.
- Dr. Detlef Knappe, North Carolina State University, EE.UU.
- Dr. Oscar Parra, Centro de Ciencias Ambientales EULA-CHILE, Universidad de Concepción, (Coordinador del Curso).
- Dr. Martin Pusch, Leibniz-Institut für Gewässerökologie und Binnenfischerei, Alemania.
- Dra. Gladys Vidal, Centro de Ciencias Ambientales EULA-CHILE, Universidad de Concepción.

PROGRAMA

Descripción

Current advances on analytical chemistry have allowed the detection of micro-contaminants in aquatic environments at trace levels. Apart from more traditional organic pollutants such as pesticides, organic solvents, and fuel hydrocarbons, a wide range of emerging organic contaminants are present in wastewater and wastewater-impacted surface and ground water. Among the emerging organic

contaminants, endocrine disrupting chemicals (EDCs) and pharmaceutically active compounds (PhACs) in aquatic environments are of concern because (1) EDCs can alter the endocrine system of humans and wildlife at very low concentrations and (2) the presence of antimicrobial compounds in water may accelerate the evolution of antimicrobial-resistant bacteria. Therefore, lately research efforts had been done to investigate effects of organic micro-contaminants in the aquatic environment and treatment alternatives that effectively remove them from wastewater treatment plant discharges and drinking water sources.

Objetivos

This course will provide students with an integrated view of the occurrence and effects of these compounds in aquatic environments, with a special emphasis in treatment alternatives including European and North American experiences lectured by visiting professors.

CONTENIDOS

Item	Profesor
<ul style="list-style-type: none"> • Introducción General 	Carolina Baeza/Oscar Parra/ Gladys Vidal
<ul style="list-style-type: none"> • Case Study: "The Biobío: a river with multiple uses" 	Oscar Parra
<ul style="list-style-type: none"> • Evaluación de los efectos de microcontaminantes provenientes de la industria forestal. • Potencialidad de los sistemas biológicos de eliminación de microcontaminantes 	Gladys Vidal
<ul style="list-style-type: none"> • Los contaminantes de interés emergente desde la perspectiva ecotoxicológica • Diagnóstico ambiental de contaminantes de interés emergente 	Ricardo Barra
<ul style="list-style-type: none"> • The case of Berlin city in Germany: Drinking water and environmental research 	Martin Pusch
<ul style="list-style-type: none"> • Environmental concerns in drinking waters and research focus in Italy 	Silvano Focardi
<ul style="list-style-type: none"> • Oxidation processes for the control of emerging contaminants - transformation rates, biochemical activity removal, and biodegradability of oxidation products • Activated carbon characteristics that matter for organic micropollutant removal from drinking water • Practical activity: Introduction to adsorption models - adsorption equilibria in single- and multi-solute systems, estimation of kinetic parameters, performance estimation for powdered and granular activated carbon adsorption processes 	Detlef Knappe

<ul style="list-style-type: none"> • Important processes for the biological conversion of substances (microcontaminants) and assimilative capacities in rivers waters • Impacts of municipal effluents on river water ecosystems and ascertainment of their effluent relevant carrying capacities. • Practical activity: Determination of physico-chemicals & microbiological water quality parameters in the Biobío river. 	Bernhard Karrasch,
<ul style="list-style-type: none"> • Emerging materials for the removal of water contaminants. • Application of multivariate data analysis methods to water quality data. 	Godwin Ayoko,
<p>Visitas y Otras Actividades</p> <ul style="list-style-type: none"> • Visita a instalaciones de la Planta de celulosa de Santa Fe y Planta de Tratamiento de Aguas Servidas de Nacimiento y Negrete • Visita a instalaciones de Plantas de Agua Potable y Tratamiento de ESSBIO, Concepción • Participación WORKSHOP EULA 2010: "Aspectos Emergentes Asociados a Fuentes de Abastecimiento de Agua Potable de Uso Múltiple" 	

ACTIVIDADES

Se realizarán clases participativas, con seminarios y discusión de casos específicos. Se realizarán salidas a terreno con toma de muestras y obtención de datos in situ.

EVALUACIÓN

La evaluación del curso consistirá en una evaluación escrita al final del curso en relación a los resultados obtenidos en el terreno (informe) y una exposición oral de un Seminario preparado por los estudiantes durante la dictación del curso.

BIBLIOGRAFÍA

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- Habit, E., O. Parra & C. Valdovinos. 2005. Ictiofauna de un Sistema Fluvial Receptor de Aguas Servidas: Respuestas a una Nueva Planta de Tratamiento (Río Quilque, Chile Central). Gayana 69(1): 94-103.
- Karrasch B., M. Mehrens, U. Link, H. Cid, R. Urrutia, C. Valdovinos & O. Parra. 2009. Ecotoxicological Assessments of Pulp and Paper Mill Effluents on River Plankton Systems in Chile.

Proceedings ISBN 978-981-08-2100-5 The International Conference of Science and Information Technologies for Sustainable management of Aquatic Ecosystems, January 12-16, Concepción, Chile, 10pp.

- Karrasch B., O. Parra, H. Cid, M. Mehrens, P. Pacheco, R. Urrutia, C. Valdovinos, C. Zaror. 2006. Effects of pulp and paper mills effluents on the microplankton and microbial self-purification capabilities of the Biobío River, Chile. *Science of the Total Environment* 359: 194-208.
- Kolpin, D.W., Furlong, E.T., Meyer, M.T., Thurman, E.M., Zaugg, S.D., Barber, L.B. and H.T. Buxton. 2002. Pharmaceuticals, hormones, and other organic wastewater contaminants in US streams, 1999-2000: A national reconnaissance. *Environmental Science & Technology* 36 (6): 1202-1211.
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- Parra O. & Meier C. 2003. The Biobío and Laja River: Fluvial systems under strong human pressure. www.cirf.org/kioto/biobio1.pdf
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- Xavier, C.R., Mosquera-Corral, A., Becerra, Hernández, J.V. and Vidal, G. 2009. Activated sludge versus aerated lagoon treatment of kraft mill effluents containing β -sitosterol and stigmasterol. *Journal of Environmental Science and Health, Part A –Toxic/Hazardous Substances & Environmental Engineering* 44 (4), 327-335.