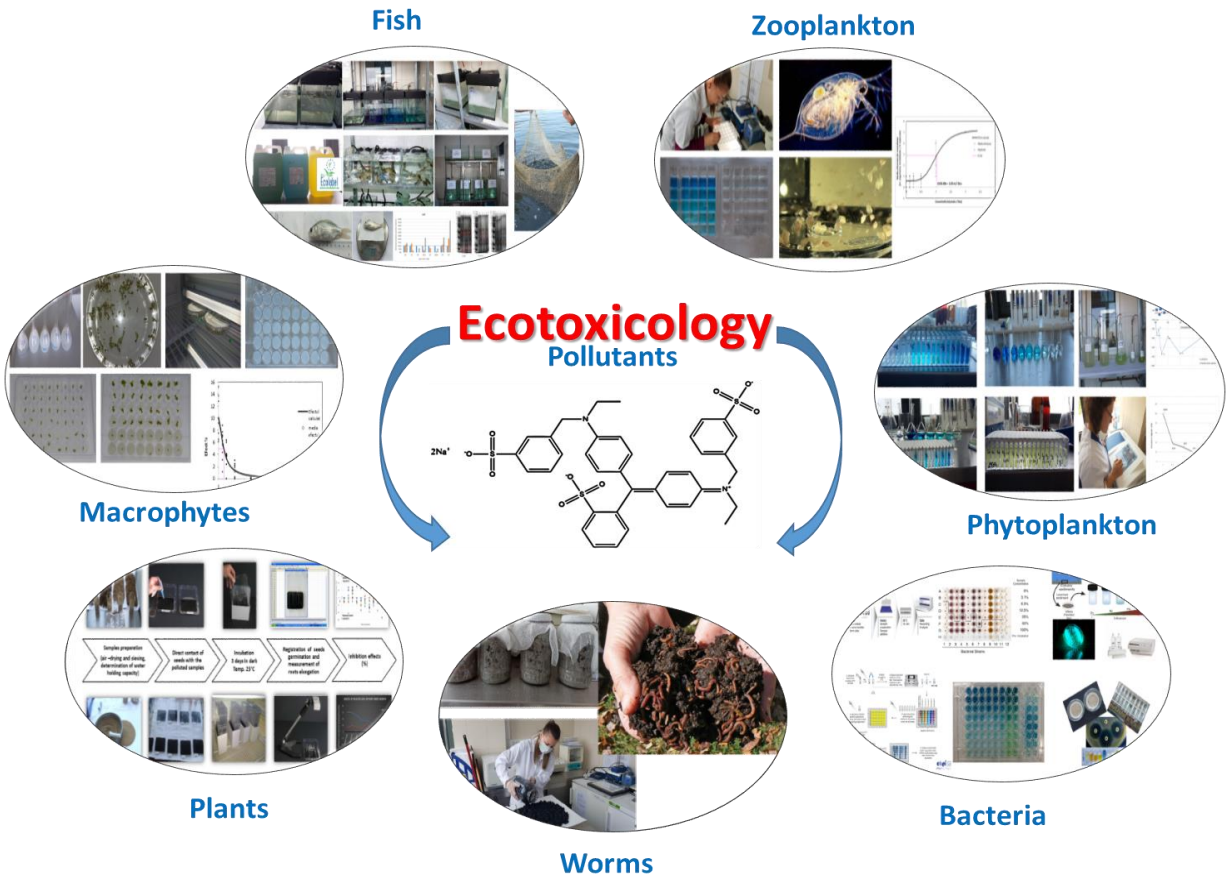
Editorial

ECOTOXICOLOGICAL ASSESSMENT

Bioassays and Biological Analysis Laboratory - INCD ECOIND Bucharest has expertise in evaluation, interpretation and communication of ecological risk associated with chemical and physical factors starting from problem formulation *in situ* analyses, pollution exposure and effects assessment, risk characterization, risk management and mitigation.

- Implementing ecotoxicological methods, on various biological models, to assess lethal toxicity concentrations (LC/EC/IC50%), MATC (Maximal Acceptable Toxicant Concentration), NOEC (No Observed Effect Concentration), LOEC (Lowest Observed Effect Concentration) of chemicals / pollutants;
- Designing of laboratory experiments to evaluate the toxic effect of specific pollutants/ wastewater/ groundwater / surface water/ leachate / waste/ sediment upon aquatic and terrestrial (micro)organisms;
- Evaluation of organic substances/ chemical products and/or waste waters biodegradability potential;
- Chemicals classification according to REACH / CLP Regulation;
- Assessment of the pollutants environmental impact by biochemical experiments based on modulation of the enzymatic activity from intoxicated fish organs;
- Development of the new and modern testing strategies for environmental risk assessments;

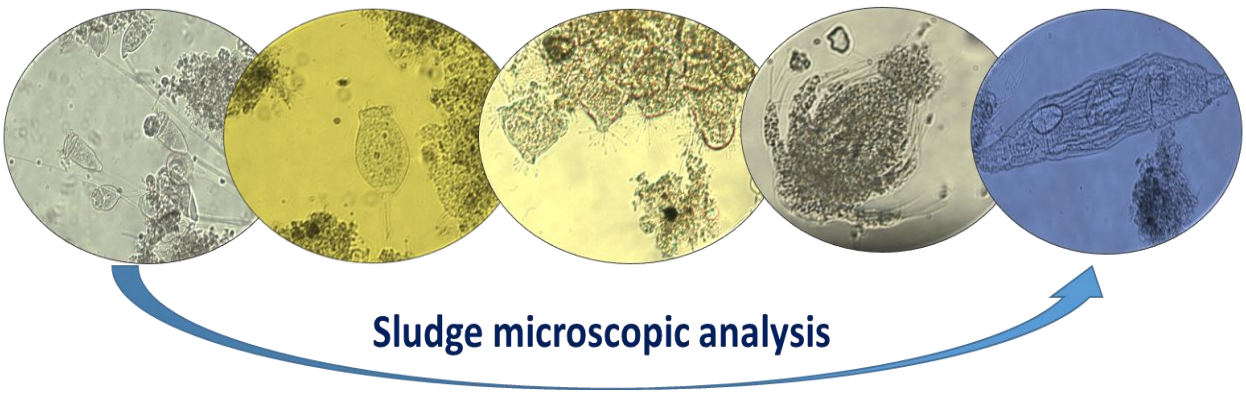


BIOLOGICAL MODELS USED IN ECOTOXICOLOGY

AQUATIC TOXICITY			
Aquatic organism	**Test /References**	**Matrix**	**Parameter / End point**
Freshwater fish *Cyprinus carpio (common carp)* *Carassius auratus gibelio (prussian carp)*	**Acute toxicity** OECD 203 / SR EN ISO 7346-1 [*]	Chemicals Wastewater / surface / sediment	Mortality / acute lethal conc. ($LC_{50\text{-}96h}$)
	Chronic toxicity Internal procedure	Chemicals	Biological and biochemical indices / maximal acceptable toxicant concentration in water (MATC) / NOEC / LOEC – minimum 3 months
	Bioaccumulation / OECD 305	Chemicals	Bioconcentration Factor (BCF) – minimum 3 months
Plankton crustaceans			
Daphnia magna	**Acute toxicity** OECD 202/ SR EN ISO 6341:2013 [*]	Chemicals Wastewater / groundwater /surface/ leachate /waste	Mortality /immobilization / effective conc. for 50% of organisms after 48h ($EC_{50\text{-}48h}$)
Ciliated protozoa			
Tetrahymena thermophilea	**Chronic toxicity** Protoxkıt F	Chemicals Wastewater / groundwater /surface/ sediments	Reproductive inhibition/ effective conc. for 50% of organisms after 24h ($EC_{50\text{-}24h}$)
Rotifers			
Branchhionus calyciflorus	**Acute toxicity** ASTM Standard E1440-9	Chemicals Wastewater / groundwater /surface/ sediments	Mortality / lethal conc. for 50% of organisms after 24h ($LC_{50\text{-}24h}$)
Aquatic plants			
*Spirodela duckweed (*duckweed*)*	**Acute toxicity** ISO 20227:2017	Chemicals Wastewater / groundwater /surface/ sediments	Rate of inhibition of growth / effective conc. for 50% of organisms after 72 h ($EC_{50\text{-}72h}$)
Selenastrum capricornutum / Pseudokirchneriella subcapitata (green algae)	**Acute/chronic toxicity / algaecide efficiency** OECD 201/ SR EN ISO 8692:2012 [*]	Chemicals Wastewater / groundwater /surface/ leachate /waste	Growth rate/biomass/ effective conc. for 50% of organisms after 72h ($EC_{50\text{-}72h}$)
Bentonic crustaceans (ostracode)			
Heterocypris incongruens	**Chronic toxicity** ISO 14371:2012	Chemicals Waste water / surface/ leachate / mud/ soil/ sediment	Mortality/ Inhibition of growth/ effective conc. for 50% of organisms after 6 days ($EC_{50\text{-}6\ days}$)
Bacteria			
Aliivibrio fischeri	**Acute toxicity** SR EN ISO 11348-3:2009	Chemicals Waste water/ groundwater	Inhibition of bioluminescence / inhibitors conc. (IC_{50})
Escherichia coli	**Genotoxicity** ISO 13829:2000	Chemicals Waste water / groundwater / surface / leachate / waste / mud /	Enzymatic activity (β-galactosidase and alkaline phosphatase) / Induction factor
Microbacterium sp. Brovundimonas diminuta, Citrobacter freundii, Comamonas testosterroni, Enterococcus casseliflavus, Delftia acidovorans, Kurthia gibsonii, Sthaphilococcus warnerii, Pseudomonas aurantiaca, Serratia rubidae, Pichia anomala	**Chronic multi-species** test - **MARA** (Microbial Array for Toxicity Risk Assessment) / Internal procedure	Chemicals / wastewater	Inhibition of microbial growth / microbial toxic concentration (MTC)
TERESTRIAL TOXICITY			
Terrestrial plants			
Lepidium sativum (creson) *Sinapis alba (mustard)* *Sorghum saccharatum (sorg)*	**Phytotoxicity** SR EN ISO 11269-1,2:2013 / OECD 208	Chemicals / waste water irrigation/ sludge/ soil/ waste/ leachate	Inhibition of germination and root growth / $EC_{50\text{-}72h}$
Earthworms			
Eisenia andrei	**Acute toxicity /** SR EN ISO 11268-1:2016 OECD 207	soil, compost, sludge, waste, chemicals	Determination of acute lethal concentration $LC_{50\text{-}14\ days}$

BIODEGRADATION POTENTIAL			
Assessment of degradation capacity by determining global indicators: COD and BOD	SR ISO 6060:1996 [*] SR EN 1899-1:2003 [*]	Chemicals/ Waste water	BOD/COD report >0.5
Qualitative analysis of activated sludge biocenosis	In-house standard	Sewage sludge	Qualitative analysis of microorganisms inhabiting activated sludge of WWTPs
ULTIMATE AEROBIC BIODEGRADABILITY			
Test	**Reference**	**Matrix**	**Parameter / End point**
Static test for the evaluation of "inherent" aerobic biodegradability under action of aerobic microorganisms – Zahn-Wellens method	SR EN ISO 9888:2004 / OECD 302B/ EC-C.9 [*]	Chemicals/ Waste water / surface water	% abiotic degradation >20% COD removal – primary biodegradation ≥70% COD removal – inherent biodegradation
	Dissolved organic carbon (COD) analysis method [*] (SR EN ISO 7827:2013 / OECD 301A / EC-C.4-A)		≥70% COD removal in 28 days
Watery environmental assessment of "rapid" aerobic biodegradability by experiments in biological installations with active sludge, conducted in a discontinuous system (batch)	Method by analysis of biochemical oxygen consumption (CBO) - Closed container test [*] SR EN ISO 10707:2001 / OECD 301D / EC-C.4-E	Chemicals/ Waste water / surface water	Specific BOD (mg oxygen /mg tested compound) / ≥60% theoretical oxygen consumption (CTO) in 28 days
	Test to assess the inhibitory effect on oxygen consumption of active sludge microorganisms with oxidation of carbon and ammonium SR EN ISO 8192:2007 / OECD 209 / EC-C.11		Inhibition of total oxygen consumption (*I%*) which inhibits 50% oxygen consumption (EC_{50}) in 30-180 min.
Determination of elimination and biodegradability in a continuous testing system that simulates the biological process with activated sludge	Simulation test in aerobic treatment plants with activated sludge (simulates a wastewater treatment plant) SR EN ISO 11733:2015 / OECD 303A / EC-C.10	Water-soluble organic compounds	Determine daily COD in influence and effluent. Test duration: 12 weeks >80% COD removal in 28 days
Determination of the biodegradability of surface agents	Reference method described in Annex VIII.1 to Reg.EC 648/2004 OECD Confirmation Test 303A [*]	Detergents / cleaning products	% remove COD at time *t* % removal surfactant at time *t* >80% COD removal for 2 weeks

NOTE:
[*] accredited method SR EN ISO/CEI 17025:2018, the rest of the methods are applied in a SR EN ISO 9001 and SR EN ISO 14001 certified infrastructure.
In vivo tests were approved and supervised by the Commission of Ethics and Professional Deontology of ECOIND.



→ **The laboratory can help you to obtain ecotoxicological information for** completing of Technical Security Files (Ecological Information section), obtaining authorization/marketing product approvals, environmental opinions, evacuation notices, risk assessment studies, environmental impact assessment studies, obtaining of the eco label, etc.

Contact persons:
Dr. Biol. Mihai Nita-Lazar – senior researcher, Head of laboratory, *mihai.nita@incdecoind.ro,*
Dr. Biol. Stefania Gheorghe - senior researcher, *stefania.gheorghe@incdecoind.ro*
Dr. Ecol. Catalina Stoica - senior researcher, *catalina.stoica@incdecoind.ro,*

Useful links:

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