J Environ Anal Toxicol 2016, 6:5(Suppl)
http://dx.doi.org/10.4172/2161-0525.C1.006

Mechanisms and assessment of toxic effects via luminescent bio-monitoring

N S Kudryasheva
Siberian Federal University, Russia

Marine luminous bacteria are widely used as bioassays for monitoring environmental toxicity due to high sensitivity to toxic compounds. Main testing parameter here is bioluminescent intensity. Bioluminescent assays can be based on bacterial cells or their enzyme reactions, providing study of effects on cellular or molecular levels. The assays are convenient tools for studying interrelations between biological and chemical analyses, due to broad experience in effects of exogenous compounds. The effects can be multiple, changing rates of intracellular physicochemical, chemical and/or biochemical processes. Effects of exogenous compounds were classified basing on multiple investigations of influence of model toxic compounds (groups of organic dyes, oxidizers, halogen-substituted molecules, metal salts, stable and radioactive). A series of spectroscopic (Vis and IR), kinetic, microbiological, biochemical, microscopic, genetics, and radiometric methods were applied. Several toxicity mechanisms are discussed: (1) change of rates of enzymatic redox reactions under exposure to oxidizers; (2) binding of hydrophobic and/or halogen-substituted compounds with enzymes and decrease of enzymatic activity; (3) non-specific effects of metal cations as electron acceptors; (4) ionization of aquatic media and reactive oxygen species formation under low-dose radioactive exposure, resulting in change of cellular cross-membrane processes; (5) changes in content of intracellular low-molecular components and crystallinity of intracellular proteins; (6) genetic mutations; (7) enhancement of mucous layers on the cell surface as a response to unfavorable impact of toxicants in the presence of detoxifying agents. All the effects listed are integrated (by a non-additive way) in change of bioluminescent intensity as a physiological function.

n_qdr@yahoo.com

The European native cord grass *Spartina maritima* and the South American invasive *Spartina densiflora* as biotools for phytoremediation in salt marshes

Jesús M Castillo
University of Seville, Spain

Our research group has been studying for three decades the possibilities of using the European native cord grass *Spartina maritima* and the South American invasive *Spartina densiflora* as biotools in phytoremediation and ecological restoration projects. Our studies have been carried out mostly in the estuary of Odiel and Tinto rivers, the most polluted estuary with heavy metals all around the world. Our results show that both cordgrass species are suitable biotools for phytoextraction and phytostabilizations of different pollutants. Analyzing specific traits of these two cord grasses allowed us to decide which species is more adequate depending on the pollutant, location and environmental conditions. For example, *Spartina densiflora* is especially good in sequestering heavy metals in its old tissues as dead shoots and leaves since they are attached to the clump for longer than in the case of *Spartina maritima*. On the other hand, Spartina matitima is a better biotools for phytostabilization and to phytoextract dispersed pollutants since its growth forms allows it to colonise bare sediments faster than *Spartina densiflora*. Our results show that analyzing certain plant traits is key step to identify the most suitable biotools for different phytoremediation projects.

manucas@us.es