

Environmental Toxicology 2003 vol.18 N6, pages 395-402

A practical and user-friendly toxicity classification system with microbiotests for natural waters and wastewaters

Persoone G., Marsalek B., Blinova I., Törökne A., Zarina D., Manusadzianas L., Nalecz-Jawecki G., Tofan L., Stepanova N., Tothova L., Kolar B.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Various types of toxicity classification systems have been elaborated by scientists in different countries, with the aim of attributing a hazard score to polluted environments or toxic wastewaters or of ranking them in accordance with increasing levels of toxicity. All these systems are based on batteries of standard acute toxicity tests (several of them including chronic assays as well) and are therefore dependent on the culturing and maintenance of live stocks of test organisms. Most systems require performance of the bioassays; on dilution series of the original samples, for subsequent calculation of L(E) C50 or threshold toxicity values. Given the complexity and costs of these toxicity measurements, they can only be applied in well-equipped and highly specialized laboratories, and none of the classification methods so far has found general acceptance at the international level. The development of microbiotests that are independent of continuous culturing of live organisms has stimulated international collaboration. Coordinated at Ghent University, Belgium, collaboration by research groups from 10 countries in central and eastern Europe resulted in an alternative toxicity classification system that was easier to apply and substantially more cost effective than any of the earlier methods. This new system was developed and applied in the framework of a cooperation agreement between the Flemish community in Belgium and central and eastern Europe. The toxicity classification system is based on a battery of (culture-independent) microbiotests and is particularly suited for routine monitoring. It indeed only requires testing on undiluted samples of natural waters or wastewaters discharged into the aquatic environment, except for wastewaters that demonstrate more than 50% effect. The scoring system ranks the waters or wastewaters in 5 classes of increasing hazard/toxicity, with calculation of a weight factor for the concerned hazard/toxicity class. The new classification system was applied during 2000 by the participating laboratories on samples of river water, groundwaters, drinking waters, mine waters, sediment pore waters, industrial effluents, soil leachates, and waste dump leachates and was found to be easy to apply and reliable. © 2003 Wiley Periodicals, Inc.

<http://dx.doi.org/10.1002/tox.10141>

Keywords

Microbiotests, Natural waters, Toxicity classification, Toxicity scoring, Toxkits, Wastewaters