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Ecotoxicological characterisation of some wastewaters decontaminated with hydroxyapatite

Roxana Zaharia[1], Carmen Mincea[1], Daniela Predoi[2], Simion Liliana Iconaru[2]
[1]Research and Development Institute for Plant Protection, Bucharest
[2]National Institute of Materials Physics, Magurele

Introduction: **The need to protect aquatic and terrestrial biota on our planet from uncontrolled releases of pollutants has gradually triggered over the past five decades the development of methods capable of evaluating the adverse effects of chemicals and of solid/liquid wastes. Hydroxyapatite (HAp, Ca10(PO4)6(OH)2), is a very promising candidate for air, water and soil decontamination. Due to its particular structure, the HAp could be used in the field of environmental management. The HAp has special properties such as ion-exchange capability, great adsorption capacities and good thermal stability.**

Keywords: **Hydroxyapatite, wastewater, ecotoxicology, *Daphnia magna***

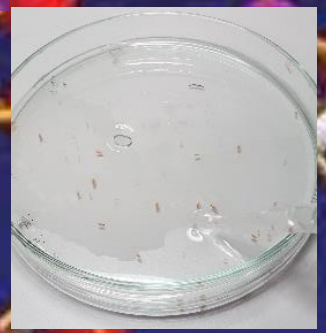
The aim of this study was to establish the acute toxicity of hydroxyapatite treated wastewaters on Daphnia magna by using a method developed based on the OECD 202 guidelines and to highlight the adsorbent capacity of HAp for wastewater treatment.

Material and methods

The biological material - samples of wastewaters treated with Hap and CTAB-Oxid :

- ✓ **HAp-TEOS – hydroxyapatite functionalized with tetraethoxysilane (TEOS; Si(OC2H5)4;**
- ✓ **HAp–CTAB - hydroxyapatite functionalized with cetyl-trimethyl ammonium bromide (CTAB; [(C16H33)N (CH3)3]Br);**
- ✓ **HAp-C – commercial hydroxyapatite;**
- ✓ **Oxide-CTAB - oxide functionalized with cetyl-trimethyl ammonium bromide (CTAB; [(C16H33)N (CH3)3]Br).**
- ✓ **As test organisms it was used the biologic system - *Daphnia magna* and reconstituted water.**

Method - Immobilization test of crustaceous D. magna, by a procedure elaborated within the Ecotoxicology laboratory in compliance with OECD Guideline 202.



Results: **The wastewaters samples were analysed without dilution in order to assess the evolution of whole sample toxicity on targeted organisms. Only one out of four treated wastewaters did not induced Daphnia immobilisation during the 48 hours period of observations the other samples, respectively the wastewater treated with hydroxyapatite functionalized with cetyl-trimethyl ammonium bromide. The other variants of wastewaters exerted acute toxicity by immobilisation of test organisms in different percentage.**

Variant	24 hours		48 hours	
	Alive	Immobilized	Alive	Immobilized
H_2O-HA_p-TEOS	13	2	3	12
H_2O-HA_P-CTA B	0	15	0	15
H_2O-oxid-CTAB	14	1	8	7
H_2O-HA_P-C	9	6	6	9
H_2O+HA_P-N	13	2	12	3

Conclusion: **Hydroxyapatite, because of its special properties, could be used for the treatment of polluted water.**

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