1-The prospective toxic effects of some heavy metals overload in surface drinking water of Dakahlia Governorate, Egypt.

Mandour, R A; Azab, Y A

mandourraafat@yahoo.com

Emergency Hospital, Mansoura University, Egypt.

Abstract: BACKGROUND: The concentration of heavy metals in drinking water is very important.

OBJECTIVE: To evaluate the chemistry of some heavy metals in surface drinking water of Dakahlia Governorate, Egypt.

METHODS: 51 surface drinking water samples were collected from the main surface water stations and compact units in October 2009 and analyzed chemically. 26 water samples were analyzed by atomic absorption spectrophotometer for iron, manganese, lead, nickel, chromium, zinc, copper, cobalt, aluminum, and cadmium concentrations.

RESULTS: Aluminum concentration was slightly high in water sample of Bosat network. Cadmium concentration in samples of up-streams of shark and Mit-Khamis stations, networks of Mit-Antar, Demera, Bosat, Bilqas, El-satamony, El-Gamalia, Mit-asim and Bilqas station exceeded the permissible limits of Egyptian Ministry of Health (EMH, 2007) and World Health Organization (WHO, 2008). The nickel concentration in the network samples taken from Shoha, Bosat and El-Gamalia as well as up-stream of Bosat station exceeded the permissible limits. Also, lead concentrations of the network samples of Shoha, Mit-Antar, Demera and Nabaru exceeded the permissible limits.

CONCLUSION: Regular chemical analysis of surface drinking water is required. Since these heavy metals are most likely originate from steel, plastics and batteries industries working in the region, we believe that activities of these industries must be stopped or at least limited in urban zones.

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2- Toxic levels of some heavy metals in drinking groundwater in Dakahlyia Governorate, Egypt in the year 2010.

Mandour, R A; Azab, Y A

mandourraafat@yahoo.com

Toxicology Laboratory, Emergency Hospital, Mansoura University, Egypt.

Abstract

Fifty-four drinking groundwater samples were collected in April 2010 from some districts of the Dakahlyia governorate, Egypt. The water samples were analyzed by atomic absorption spectrophotometer for iron, manganese, lead, nickel, chromium, zinc, copper, cobalt and cadmium concentrations. All samples but two were found suitable for drinking; from the water sample from Aga district showed slightly higher levels of cadmium and nickel (Ikhtab and Feshbena) than other areas; the concentrations were higher than the permissible limits of Egyptian Ministry of Health and World Health Organization.

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3-Use of plant genotoxicity bioassay for the evaluation of efficiency of algal biofilters in bioremediation of toxic industrial effluent.

Abdel Migid, Hala M; Azab, Yehia A ; Ibrahim, Waeel M

Botany Department, Faculty of Science, Mansoura University, Mansoura, Dakahlia 23355, Egypt.

Abstract:

The toxicity and efficacy of an algal-based bioremediation technology were assessed through bioassays for ecological risk of contaminated industrial effluents. The algal bioremoval of heavy metals was evaluated using an in vitro approach. Phytogenotoxicity tests were conducted with Allium cepa and Vicia faba plants to evaluate the genotoxicity of the industrial effluents before and after treatment with different kinds of algal biofilters (BF). Root cells were exposed for 24 h to different dilutions of both raw and treated effluent of a chemical fertilizer factory. Three cytogenetic endpoints were used to assess the mutagenic potencies of the industrial effluent: mitotic inhibition, mitotic chromosome aberrations, and nuclear irregularities in interphase cells. Before algal treatment, the industrial effluent caused strong genotoxic effects represented by severe inhibition in mitotic activity of meristematic cells and high frequency of both chromosome and nucleus abnormalities. After algal treatment, the cytotoxic effects of 30% and 60% concentrations of the treated effluent were comparable to those of 5% and 10% concentrations before treatment, respectively, and the frequency of both chromosome and nuclear abnormalities declined by approximately 50%. Statistical analysis of the data indicates a significant reduction in genotoxicity associated with a remarkable reduction in heavy metal concentrations after bioremediation by algal BF. The Allium and Vicia genotoxicity approach was effective in monitoring bioremediated effluent for toxicity.

Keywords:

Algal biofilters; *Allium cepa*; Bioremediation; Genotoxicity tests; *Vicia faba*

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References

1.Antonsie-wiez, 1990D. Antonsie-wiez
Analysis of the cell cycle in the root meristem of *Allium cepa* under the influence of Leda krin
Folia Histochem. Cytobiol., 26 (1990), pp. 79–96

2.Auerbach, 1962C. Auerbach
Mutation: An Introduction to Research on Mutagenesis Part I: Methods
Oliver and Boyd, Edinburgh (1962)

3.Badr and Ibrahim, 1987A. Badr, A.G. Ibrahim
Effect of herbicide glean on mitosis, chromosomes and nucleic acids in *Allium cepa* and *Vicia faba* root meristems
Cytologia, 52 (1987), pp. 293–302

4.Badr et al., 1992A. Badr, A. Ghareeb, H.M. El Din
Cytotoxicity of some pesticides in mitotic cells of *Vicia faba* roots
Egypt. J. Appl. Sci., 7 (1992), pp. 457–468

5.Bonaventura and Johnson, 1997C. Bonaventura, F.M. Johnson
Healthy environments for healthy people: bioremediation today and tomorrow
Environ. Health Perspect., 105 (1997), pp. 5–20

6.Cotelle et al., 1999S. Cotelle, J.F. Masfaraud, J.F. Férard
Assessment of the genotoxicity of contaminated soil with the *Allium/Vicia* micronucleus and the Tradescantia-micronucleus assays
Mutat. Res., 426 (1999), pp. 167–171

7.Dash et al., 1988S. Dash, K.K. Panda, B.B. Panda
Biomonitoring of low levels of mercurial derivatives in water and soil by Allium micronucleus assay
Mutat. Res., 203 (1988), pp. 11–21

8.Dovgaliuk et al., 2001A.L. Dovgaliuk, T.B. Kaliniiak, L.A.B. Blium
Assessment of phyto- and cytotoxic effects of heavy metals and aluminum compounds using onion apical meristem
Tsitol. Genet., 35 (2001), pp. 3–9

9.Fiskesjo, 1988G. Fiskesjo
The *Allium* test-an alternative in environmental studies: the relative toxicity of metal ions
Mutat. Res., 197 (1988), pp. 243–260

10.Grant, 1978W.F. Grant
Chromosome aberrations in plants as a monitoring system
Environ. Health Perspect., 99 (1978), pp. 273–291

11.Grant, 1982W.F. Grant
Chromosome aberration assays in *Allium*. A report of the USEPA Gene Tox Program
Mutat. Res., 99 (1982), pp. 273–291

12.Grover and Kaur, 1999I.S. Grover, S. Kaur
Genotoxicity of wastewater samples from sewage and industrial effluent detected by the *Allium* root anaphase aberration and micronucleus assays
Mutat. Res., 426 (1999), pp. 183–188

13.Grover et al., 1990I.S. Grover, A.K. Dhingra, N. Adhikar, S.S. Ladhar
Genotoxicity of pesticides. M.L. Mendelsohn, R.J. Albertini (Eds.), Mutation and the Environment: Part E, Wiley Liss, New York (1990), pp. 91–106

14.Jiang et al., 2000W. Jiang, D. Liu, H. Li
Effects of Cu on root growth, cell division, and nucleus of Helianthus *annuus* L
Sci. Total Environ., 265 (2000), pp. 59–65

15.Johnson, 1998F.M. Johnson
The genetic effects of environmental lead
Rev. Mutat. Res., 410 (1998), pp. 123–140

16.Kihlman, 1966B.A. Kihlman
Action of Chemicals on Dividing Cells
Prentice-Hall, New Jersey (1966)

17.Klasterska *et al*., 1976I. Klasterska, A.T. Natarajam, C. Ramel
An interpretation of the origin of subchromatid aberrations and chromosome stickiness as a category of chromatid aberration
Hereditas, 83 (1976), pp. 153–162

18.Knasmüller et al., 1998S. Knasmüller, E. Gottman, H. SteinKellner, A. Fomin, C. Pickl, A. Paschke, G. Richard, M. Kundi
Detection of genotoxic effects of heavy metal contaminated soils with plant bioassays
Genet. Toxicol. Environ. Mutagen., 420 (1998), pp. 1–3

19.Knoke et al., 1999K.L. Knoke, T.M. Marwood, M.B. Cassidy, D. Liu, A.G. Seech, H. Lee, J.T. Tervors
A comparison of five bioassays to monitor toxicity during bioremediation of

Pentachlorophenol contaminated soil
Water Air Soil Pollut., 110 (1999), pp. 157–169

20.Koa, 1975aK.N. Koa
A nuclear staining method for plant protoplasts
O.L. Gamborg, L.R. Wetter (Eds.), Plant Tissue Culture Methods, National Research Council of Canada, Ottawa, Ontario (1975) (Chapter 10)

21.Koa, 1975bK.N. Koa
A chromosomal staining method for cultured cells
O.L. Gamborg, L.R. Wetter (Eds.), Plant Tissue Culture Methods, National Research Council of Canada, Ottawa, Ontario (1975) (Chapter 10)

22.Kong and Ma, 1999M.S. Kong, T.H. Ma
Genotoxicity of contaminated soil and shallow well water detected by plant bioassays
Mutat. Res., 426 (2) (1999), p. 221

23.Linnainmaa et al., 1978K. Linnainmaa, T. Meretoja, M. Sorsa, H. Vainto
Cytogenetic effects of styrene and styrene oxide
Mutat. Res., 58 (1978), pp. 277–286

24.Ma et al., 1995T.H. Ma, Z. Xu, C. Xu, H. McConnell, E.V. Rabago, G.A. Arreola, H. Zhang
The improved *Allium/Vicia* root tip micronucleus assay for clastogenicity of environmental pollutants
Mutat. Res., 334 (1995), pp. 185–195

25.McGill et al., 1974M. McGill, S. Pathak, T.C. Hsu
Effects of ethidium on mitosis and chromosomes: a possible material basis for chromosomal stickiness
Chromosoma, 47 (1974), pp. 157–167

26.Mendonca and Picado, 2002E. Mendonca, A. Picado
Ecotoxicological monitoring of remediation in a coke oven soil
Environ. Toxicol., 17 (2002), pp. 74–79

27.Minissi and Lombi, 1997S. Minissi, E. Lombi
Heavy metal content and mutagenic activity evaluated by *Vicia faba* micronucleus test, of Triber river sediments
Mutat. Res., 393 (1997), pp. 17–21

28.Minissi et al., 1998S. Minissi, D. Caccese, F. Passafiume, A. Grella, C. Eleonora, M. Rizzoni

Mutagenicity (micronucleus test in *Vicia Faba* root tips), polycyclic aromatic hydrocarbons and heavy metal content of sediments collected in Tiber river and its tributaries within the Urban area of Rome
Mutat. Res., 420 (1998), pp. 77–84

29.Nie *et al*., 1975N.H. Nie, C.H. Hull, J.G. Jenkins, K. Steinbrenner, D.H. Bancn
SPSS Statistical Package for the Social Sciences
(second ed)McGraw-Hill, New York (1975)

30.Panda and Sahu, 1985B.B. Panda, U.K. Sahu
Induction of abnormal spindle function and cytokinesis inhibition in mitotic cells of Allium cepa by the organophosphorus insecticide fensulfothion
Cytobios, 42 (1985), pp. 147–155

31.Rank and Nielsen, 1998J. Rank, M.H. Nielsen
Genotoxicity testing of wastewater sludge using the Allium cepa anaphase-telophase chromosome aberration assays
Mutat. Res., 418 (1998), pp. 113–119

32.Sharma, 1983C.B.S.R. Sharma
Plant meristems as monitors of genetic toxicity of environmental chemicals
Curr. Sci., 52 (1983), pp. 1000–1002

33.Villalobas-Pietrini et al., 1993R. Villalobas-Pietrini, A.R. Flores-Marquez, S. Gomez-Arroyo
Cytogenetic evaluation of the effects of Chromium and Detergents in *Vicia faba*
Cytologia, 58 (1993), pp. 41–45

34.Wattiau, 2002P. Wattiau
Microbial aspects in bioremediation of soils polluted by polyaromatic hydrocarbons
S.N. Agathos, W. Reineke (Eds.), Biotechnology for the Environment: Strategy and Fundamentals, Kluwer Academic Publishers, Netherlands (2002), pp. 69–89