Poluanți. Procedee de degradarea a acestora. Toxicitate.

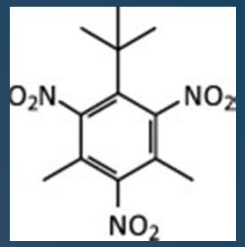
Rezultate profesionale anterioare și planuri pe termen scurt

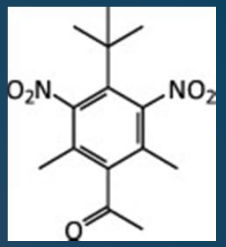
Dr. Mariana Neamțu

Metode de oxidare avansate (AOPs)

Poluanţi/ Micropoluanţi	**Specii reactive ale oxigenului (ROS) rezultate din precedeele:**	**Produşii de degradare**	**Teste de toxicitate**
Nitomoscuri (nitromosc xilen (NMX), nitromosc cetonă (NMK), nitromosc ambret (NMA), nitromosc mosken (NMM), nitromosc tibeten (NMT))	*UV* *UV/H_2O_2* *O_3* *UV/O3* *Fe(II)/H_2O_2* *UV/Fe(II)/H_2O_2* *solar/Fe(II)/H_2O_2* *UV/Fe(II)/H_2O_2* *UV/Cu(II)/Fe(III)/H_2O_2* *UV/Fe(III)oxalat/H_2O_2* *UV/Fe(III)/H_2O_2* *dark/Fe(II)/H_2O_2* *solar/Fe(III)oxalat/H_2O_2* *UV/Fe(II)* *Zeoliti (FeY5, FeY11.5, FeY80)* *Al-Fe PILC*	hidrochinona 2-hidroxi-4-(Nacetil) Aminofenol acetamida p-benzochinona fenolul acidul oxamic acidul glicolic acidul tartronic acidul maleic acidul glioxilic acidul ketomalonic acidul oxalic acidul acetic acidul formic etc	Testul de bioluminiscenţă (*Vibrio fisheri*) Testul YES (Yeast Estrogen Screen)
Bisfenolul A (BPA)			
Coloranţi textili (RY84, RR120, RB5, Disperse Red 354, Procion Marine H-EXL)			
Alchilfenoletoxilaţi Nonilfenol Octilfenol			
Medicamente (atenolol, claritromicină, gabapenten, metformin, metoptolol, primidon, paracetamol)			
Alţi compuşi chimici (benzotriazol, polifenoli, metilbenzotriazol, etc)			

Nitromoscuri

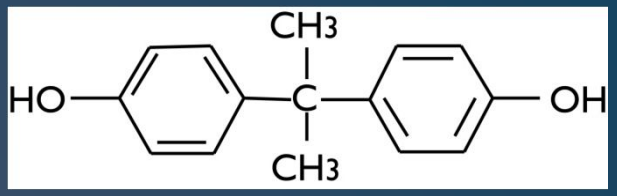


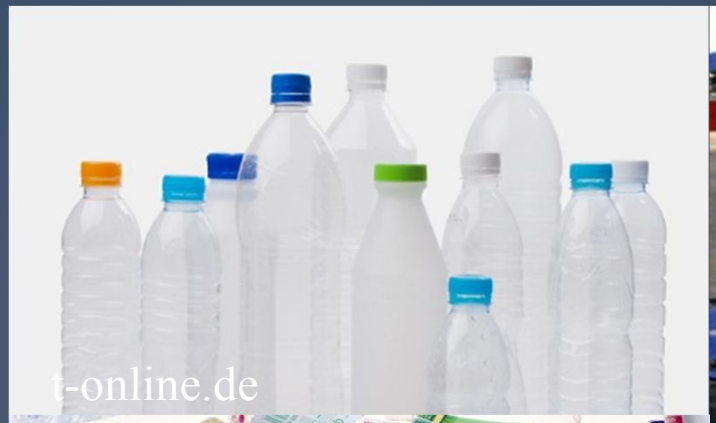


Nitomosc xilen *Nitomosc cetonă*

Neamtu, M., Siminiceanu I., Kettrup A., (2000) *Chemosphere*, 40(12), 1407-1410.
Neamtu M., Sminiceanu I., (1999) *Rev. Chim. (Bukarest)*, 50(7) 545-553.
Neamtu M., Sminiceanu I., (1998) *Rev. Chim.* (Bukarest), 49(11), 745-750.

Bisfenol A




t-online.de


treehugger.com


allwellness.wordpress.com


directindustry.de

Tercero Espinoza, L.A., Neamtu M., Frimmel F. H. (2007), *Water Research*, 41, 4479-4487
Neamtu M., Frimmel F. H. (2006), *Water Research*, 40, 3745-3750
Siminiceanu I., Neamtu M., (2001), *Rev. Chim.* (Bucureşti) (English Edition), 2 (1-2) 19-22

Coloranți textili

Neamtu M., Catrinescu C., Kettrup A. (2004), *Applied Catalysis: Environmental*, 51, 149-157.

Neamtu M., Yediler A., Siminiceanu I., Macoveanu M., Kettrup A. (2004), *Dyes and Pigments*, 60, 61-68.

Neamtu M., Zaharia C., Catrinescu C., Yediler A., Macoveanu M., Kettrup A. (2004), *Applied Catalysis: Environmental* 48, 287-294.

Neamtu M., Yediler A., Siminiceanu I., Kettrup A. (2003), *Journal of Photochemistry and Photobiology A: Chemistry*, 161 (1), 87-93.

Neamtu, M, Siminiceanu I., Yediler A., Kettrup A., (2002), *Dyes and Pigments*, 53, 93.

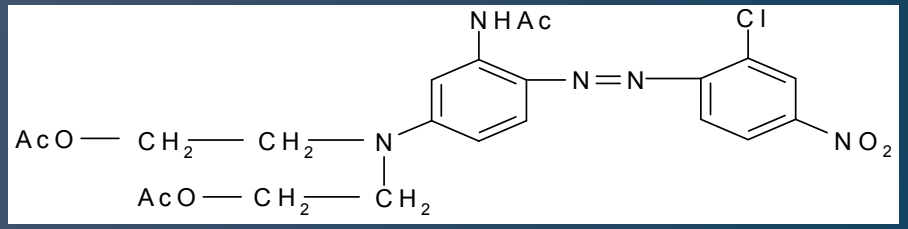
Catrinescu C., Neamtu M., Yediler A., Macoveanu M., Kettrup A. (2002), *Environmental Engineering and management Journal*, 1(2), 177.

Siminiceanu I., Neamtu M., (2001), *Rev. Chim.* (Bucureşti) (English Edition), 2 (1-2) 19

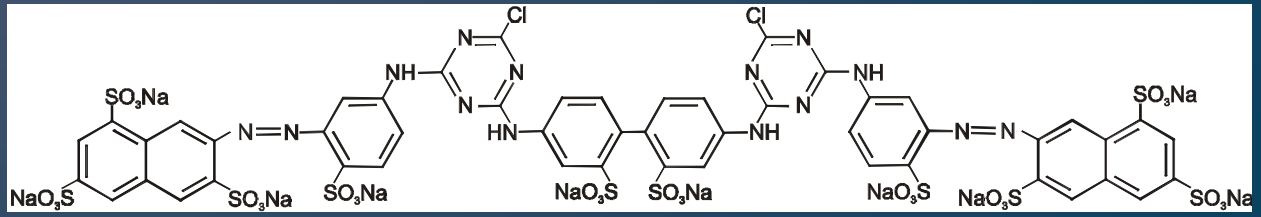
Lienert D., Neamtu M., Koch M., Yediler A., Kettrup A., (2000), *Melliand Textilberichte International Textile Reports*, 81(6), 523-525

Neamtu, M., Yediler A., Siminiceanu I., Macoveanu M., Kettrup A., (2000), *Toxicological and Environmental Chemistry*, vol.78, 31-40

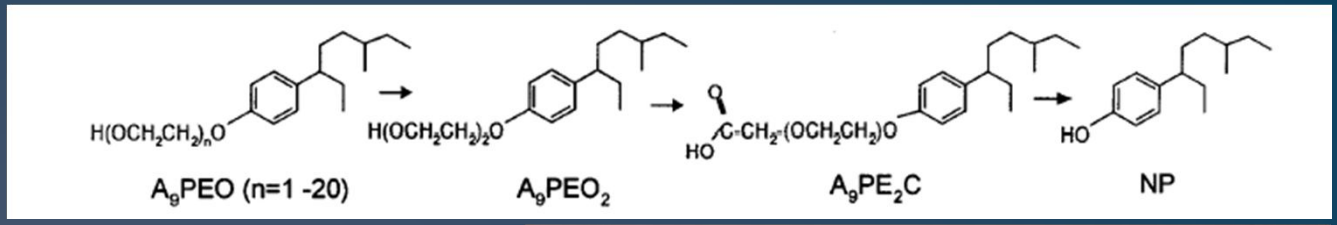
Disperse Red 354 (CI)



Reactive Yellow 84 (CI)



APEO



Neamtu M., Popa D. M., Frimmel F. H. (2009), *Journal of Hazardous Materials*, 164, 1561

Neamtu M., Popa D. M., Frimmel F. H. (2009). Photodegradation of octylphenol using simulated and natural sunlight radiation. In Sewage treatment: uses, processes and impact, Eds. A. Stephens and M. Füller, Nova Science Publishers, New York, ISBN 978-1-60876-875-2, pp. 341-362.

Tercero Espinoza, L.A., Neamtu M., Frimmel F. H. (2007), *Water Research*, 41, 4479

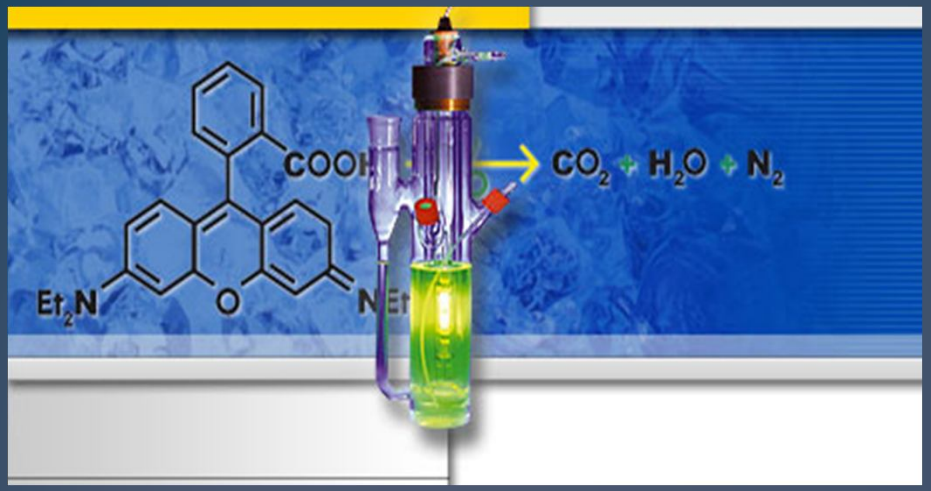
Neamtu M., Frimmel F. H. (2006), *Water Research*, 40, 3745

Neamtu M., Frimmel, F. H. (2006), *Science of the Total Environment* 369 (1-3), 295

Jahnel J., Neamtu M., Schudoma D., Frimmel F. H. (2006), *Acta hydrochemica et hydrobiologica* 34 (4), 389

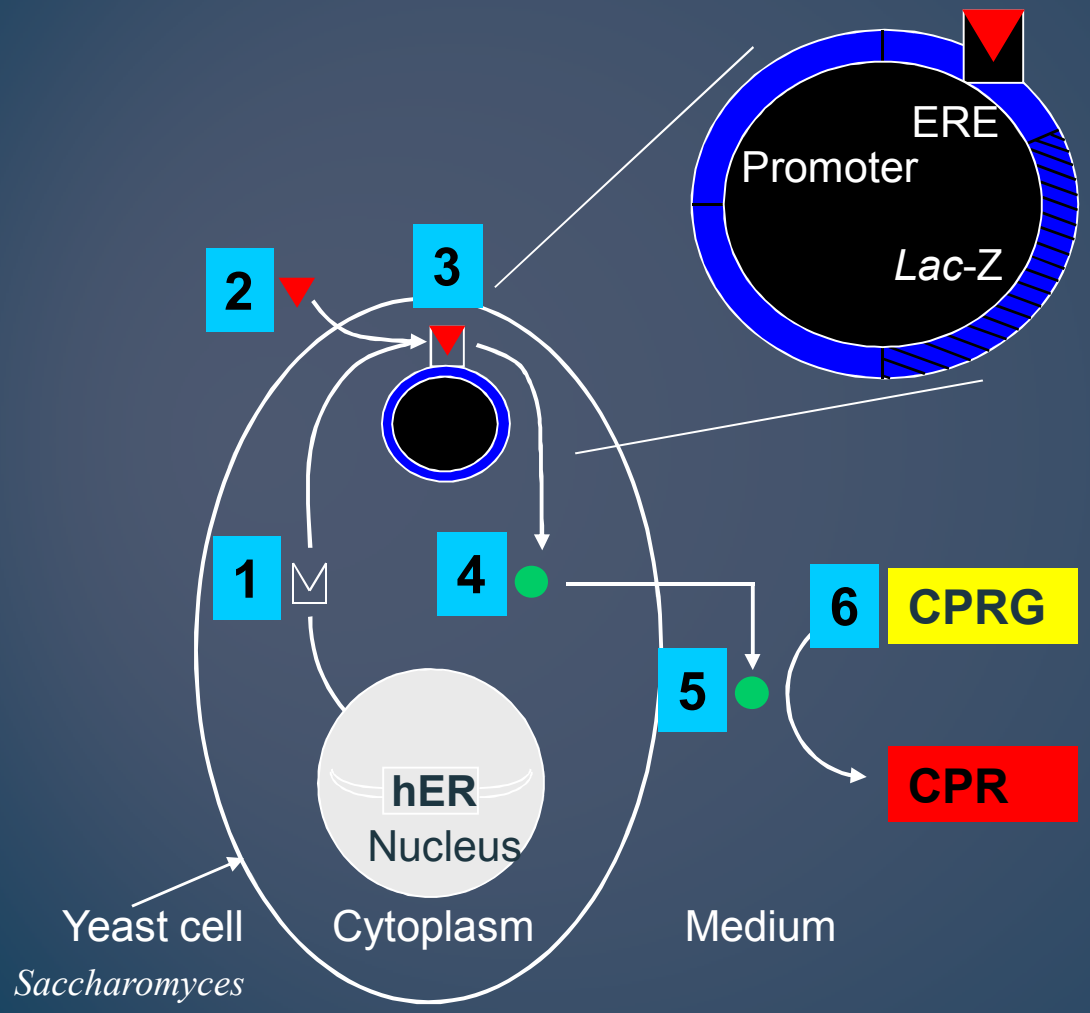
Neamtu M., Popa D. M., Frimmel F. H. (2006) Photodegradation of endocrine disrupting chemicals nonylphenol and octylphenol in River Rhine and Lake Hohloh waters. In *Humic Substances – Linking Structure to Functions*. Eds. Fritz H. Frimmel, Gudrun Abbt-Braun, Universität Karlsruhe, ISSN 1612-118X, 45-II, p.913-917

Tehnici de laborator utilizate



Metode cromatografice (HPLC, HPICE, TLC, GC/MS)
UV/VIS , ICP-AES, TOC,
XRD, FTIR, XPS
Teste de ecotoxicitate și cancerigenitate

Testul de cancerigenitate (YES)



Estrogen

Estrogen Receptor

Activated Receptor

β -galaktosidase

hER: human estrogen receptor

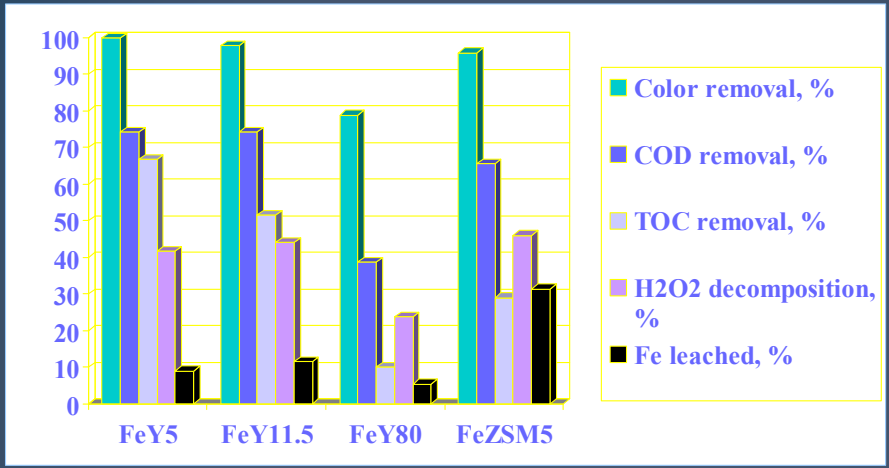
ERE: estrogen responsive element

lac-Z: reporter gene

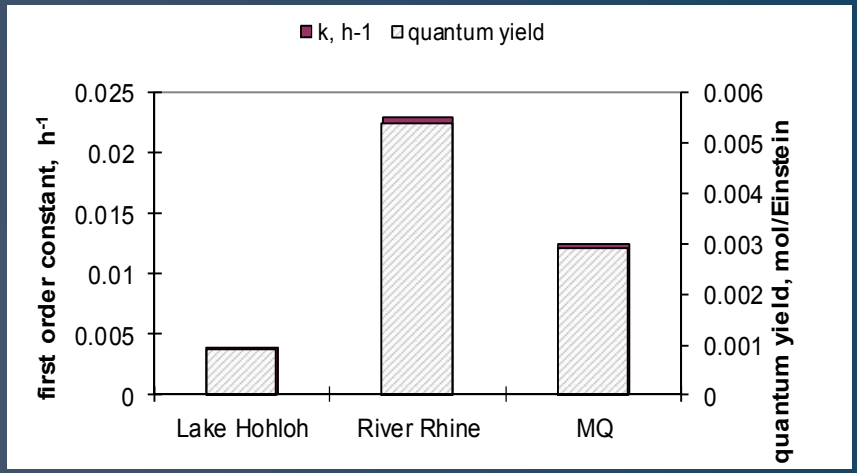
CPRG: chlorophenol red-β -D-galactopyranoside

Routledge, E. J., Sumpter, J. P. (1996), Environ. Toxicol. Chem. 15, 241-248

Câteva rezultate



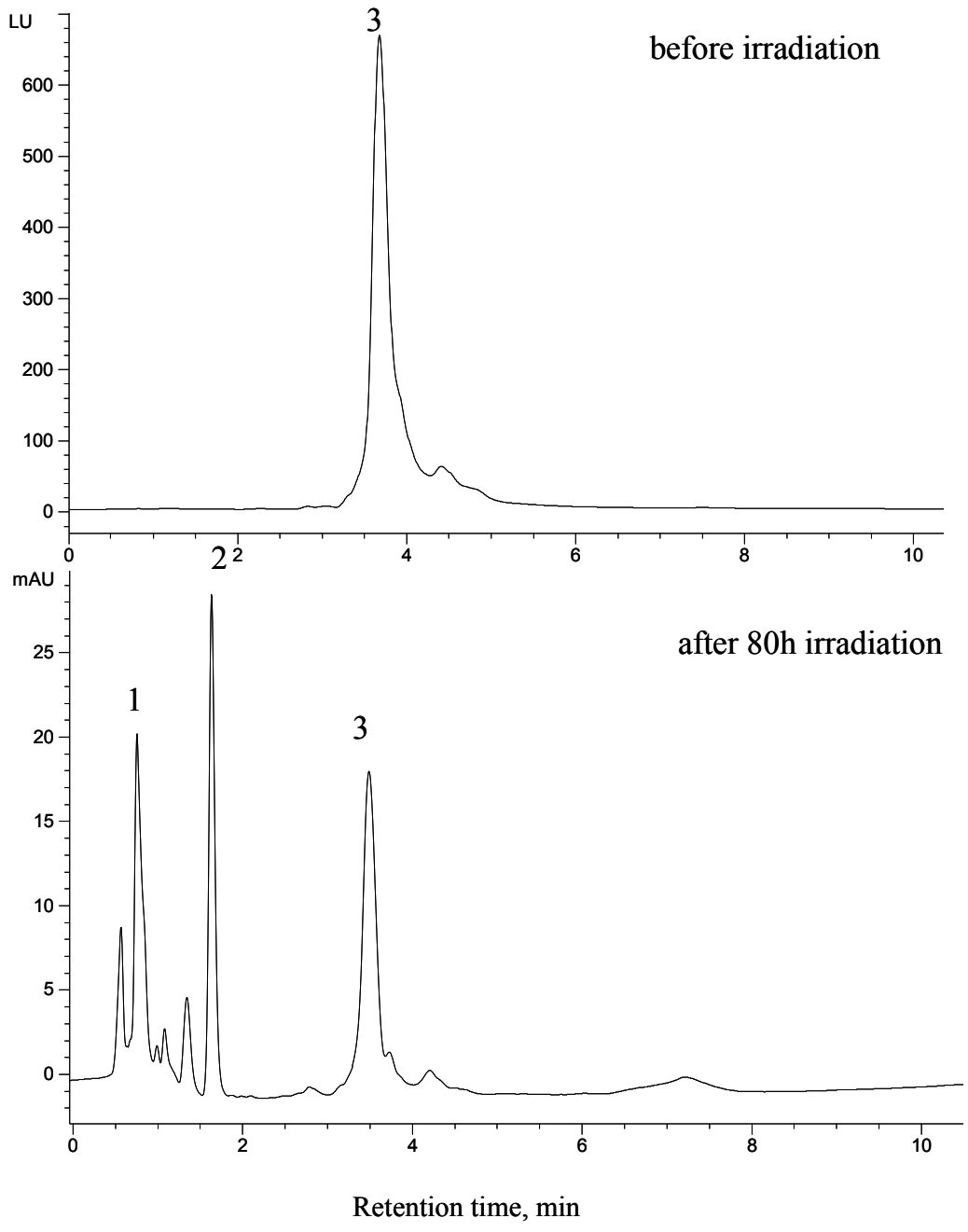
Catalytical removal of RY84. Initial conditions: C^0(dye) = 100 mg/L, pH=5, $C^0(H_2O_2)$ = 20mM, C^0(catal) =1g/L and reaction time of 120 min.



Effect of DNOM upon photodegradation of nonylphenol. Initial conditions: 2.55×10^{-5} M NP, 10°C

Neamtu M., Catrinescu C., Kettrup A. (2004), *Applied Catalysis: Environmental*, 51, 149-157.
Neamtu M., Zaharia C., Catrinescu C., Yediler A., Macoveanu M., Kettrup A. (2004), *Applied Catalysis: Environmental* 48, 287-294

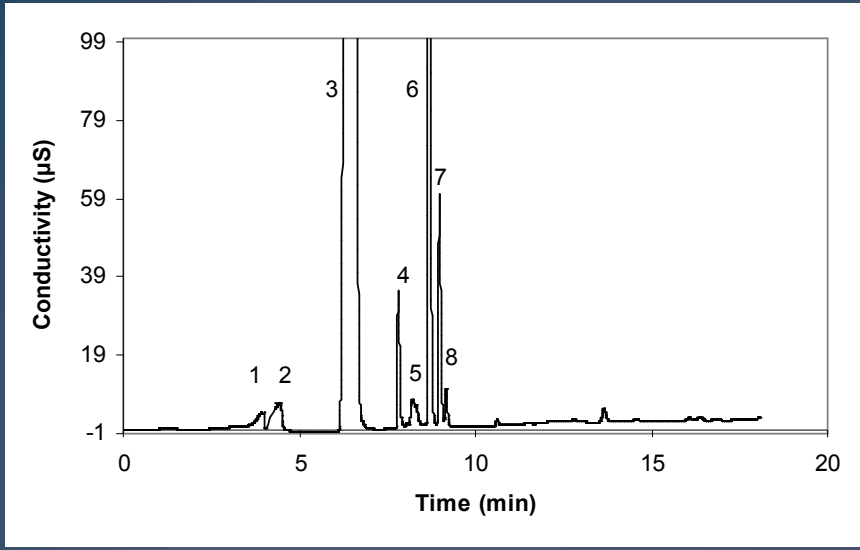
Neamtu M., Frimmel, F. H. (2006), *Science of the Total Environment* 369 (1-3), 295-306



HPLC chromatogram of nonylphenol and its intermediates (phenol and 1,4-dihydroxylbenzene).
Initial conditions: 2.55×10^{-5} M of NP, pH 5.4, 10 °C, 50 mM H_2O_2. Peak identities are as follows: (1) DHB; (2) phenol; (3) nonylphenol

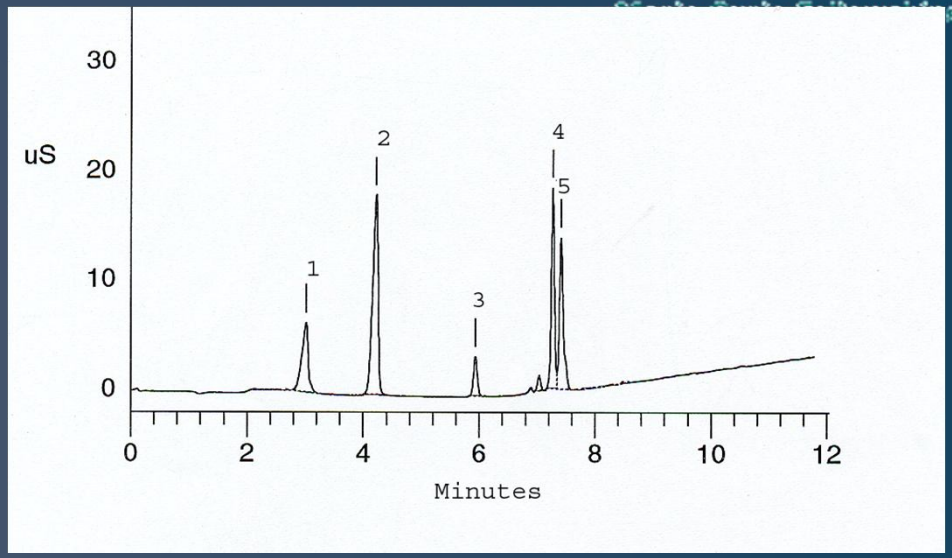
Neamtu M., Frimmel, F. H. (2006) Photodegradation of endocrine disrupting chemical nonylphenol by simulated solar UV-irradiation, *Science of the Total Environment* 369 (1-3), 295-306

Produșii degradării
HPICE



Procion Marine H-EXL after 60 minutes of the catalytic oxidation.

Applied Catalysis: Environmental 48, (2004), 287.



Disperse Red 354 after 30 minutes irradiation with 24.5 mmol H_2O_2/L.
Peak identities are as follows: 1, formate; 2, chloride; 3, nitrate; 4, sulphate; 5, oxalate.

Dyes and Pigments, 60, (2004), 61.

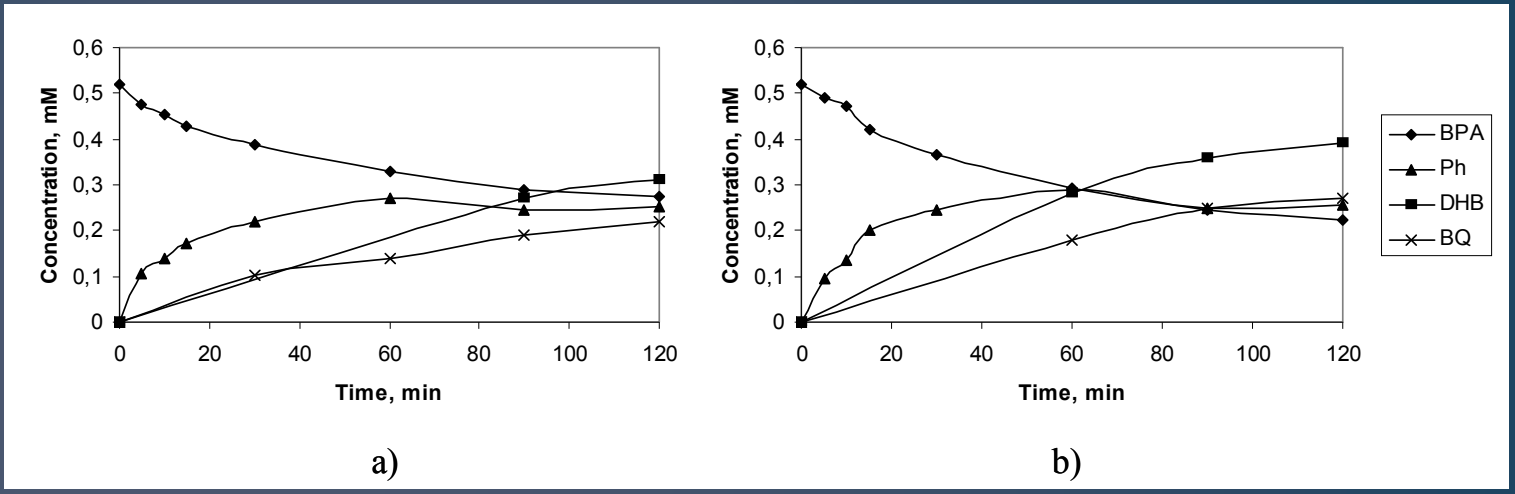
UNION OF THE GERMAN ACADEMIES OF SCIENCES AND HUMANITIES

ANCS

KONFERENZ DER DEUTSCHEN AKADEMIEN DER WISSENSCHAFTEN

Hanns Seidel Stiftung

Produşii degradării



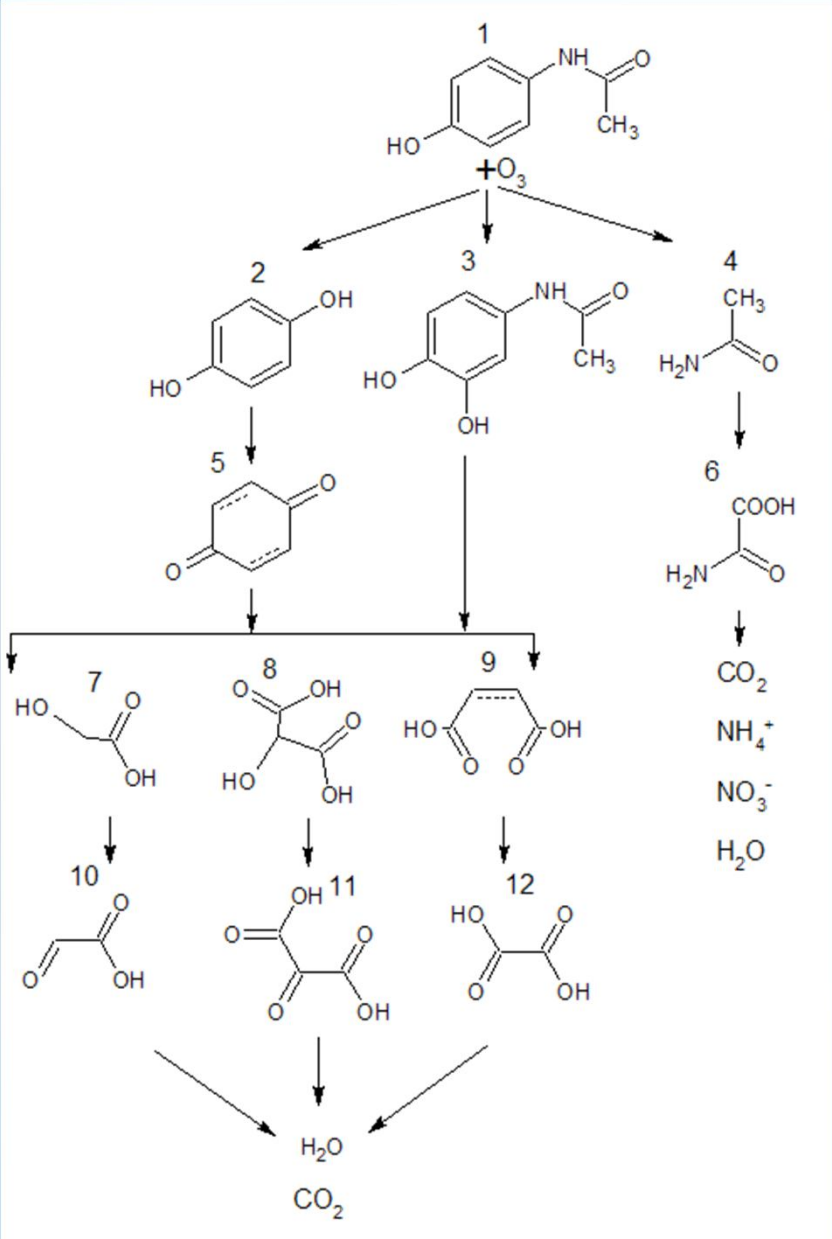
Degradation of Bisphenol A in MilliQ water and formation of products upon irradiation at 253.7 nm in the presence of 250 μM H_2O_2 (a) and 750 μM H_2O_2 (b)

Neamtu M., Frimmel F. H. (2006) Degradation of endocrine disrupting Bisphenol A by 254 nm irradiation in different water matrices and effect on yeast cells, *Water Research*, 40, 3745-3750

DFG Deutsche Forschungsgemeinschaft

Universität Karlsruhe, Engler-Bunte-Institut, Bereich Wasserchemie

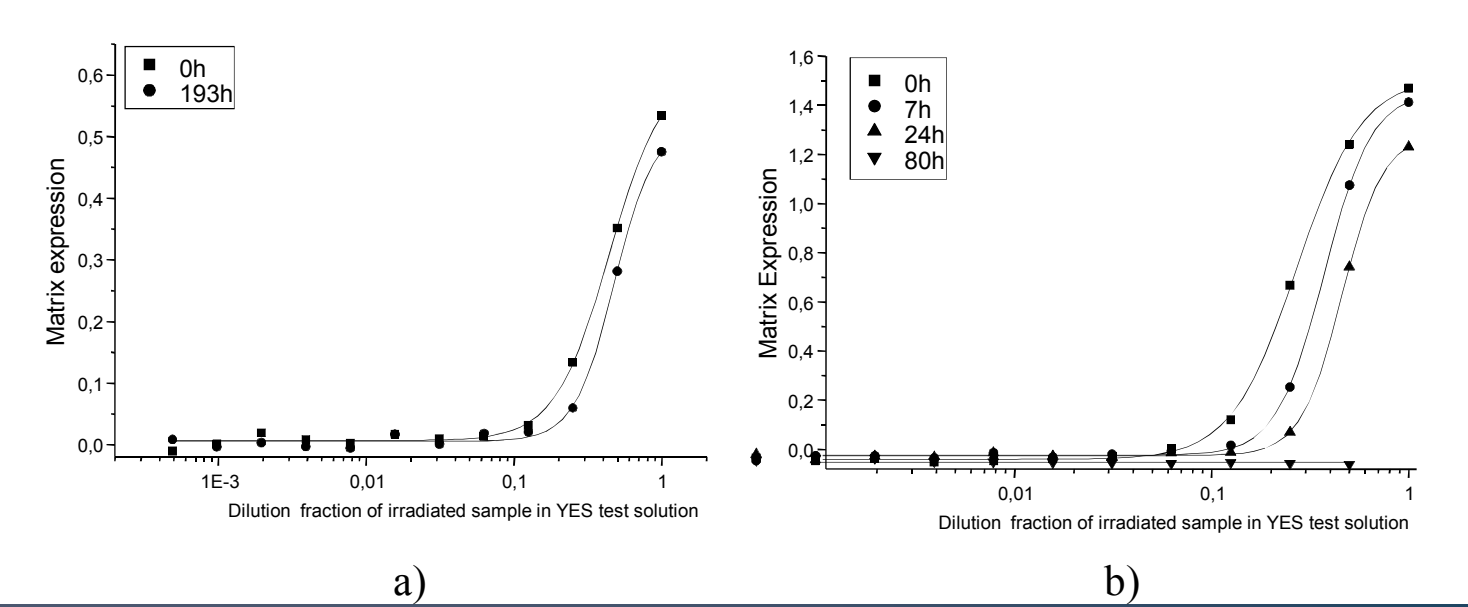
Mecanismul degradării



The possible mechanism of the degradation of paracetamol (1–paracetamol, 2–hydroquinone, 3–2-hydroxy-4-(Nacetyl) aminophenol, 4–acetamide, 5–p-benzoquinone, 6–oxamic acid, 7–glycolic acid, 8–tartronic acid, 9–maleic acid, 10–glyoxylic acid, 11–ketomalonic acid, 12–oxalic acid).

Neamtu M., Bobu M., Kettrup A., Siminiceanu I. (2013). *Journal of Environmental Science and Health, Part A,* 48 (10), 1264 – 1271.

Testul YES



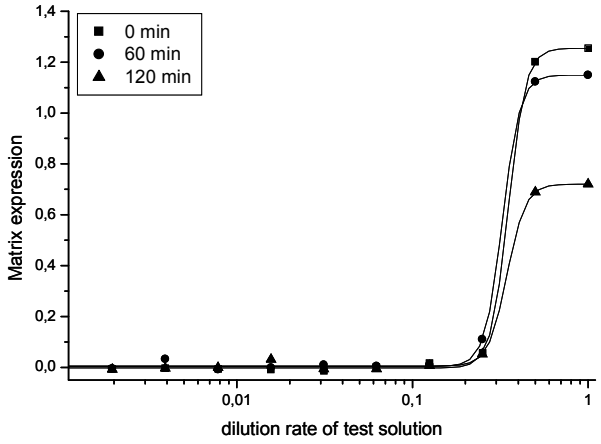
Yeast screening of estrogen activity for experiments under solar simulator irradiation in the absence (a) and in presence of 50 mmol/l H_2O_2 (b). Initial conditions: 2.55x10^{-5} M of nonylphenol, pH 5.4, 10°C. The axis X represents the dilution fraction of tested sample across 12 wells in a 96-well plate (undiluted – 1, second – 0.5, third – 0.25 etc)

Neamtu M., Frimmel, F. H. (2006) Photodegradation of endocrine disrupting chemical nonylphenol by simulated solar UV-irradiation, *Science of the Total Environment* 369 (1-3), 295-306

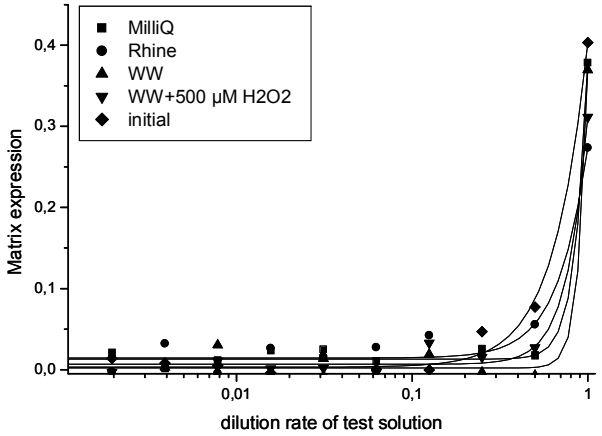
DFG Deutsche Forschungsgemeinschaft

Universität Karlsruhe, Engler-Bunte-Institut, Bereich Wasserchemie

Testul YES



a)



b)

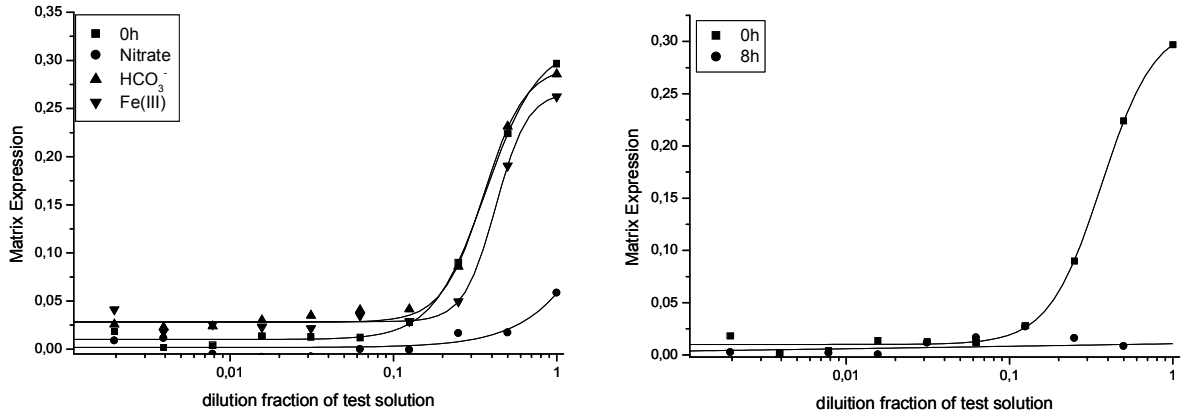
Response of estrogen screen for irradiated samples. (a) Disappearance of estrogenic activity of bisphenol A in MilliQ water with irradiation time; (b) Disappearance of estrogenic activity of bisphenol A in different waters, irradiation time 120 min. Initial conditions: 520 µM of bisphenol A, 500 µM H_2O_2. The X axis represents the dilution fraction of tested sample across 12 wells in a 96-well plate (undiluted – 1, second – 0.5, third – 0.25, etc.)

Neamtu M., Frimmel F. H. (2006) Degradation of endocrine disrupting Bisphenol A by 254 nm irradiation in different water matrices and effect on yeast cells, *Water Research*, 40, 3745-3750

DFG Deutsche Forschungsgemeinschaft

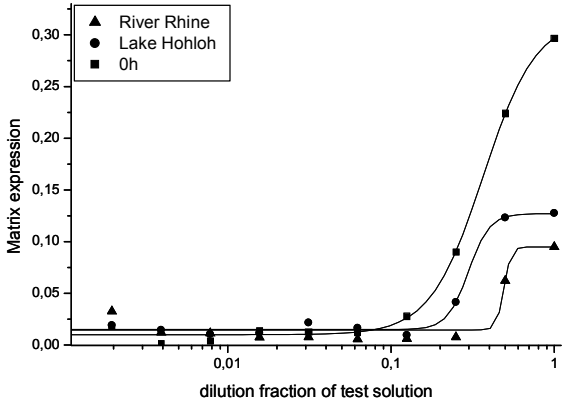
Universität Karlsruhe, Engler-Bunte-Institut, Bereich Wasserchemie

Testul YES



a)

b)



c)

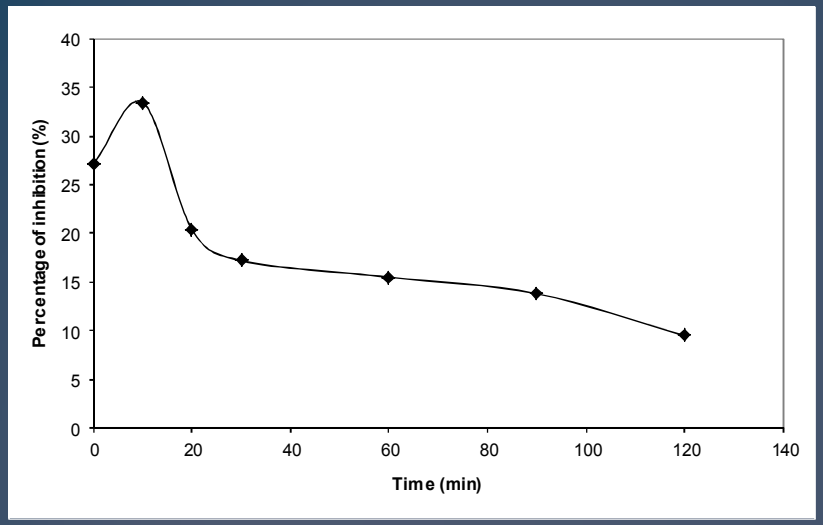
Yeast screening of estrogen activity of OP under solar simulator irradiation for experiments: (a) – under solar irradiation in the initial presence of 61 mg NO_3^-/L, 100µg Fe (III)/L, 750 mg HCO_3^-/L (b) – under solar simulated irradiation in the presence of 50 mM H_2O_2, (c) – under solar radiation, in the presence of Rhine River and Hohloh Lake water. Irradiation time 8h. The axis X represents the dilution fraction of tested sample across 12 wells in a 96-well plate (undiluted – 1, second – 0.5, third – 0.25 etc)

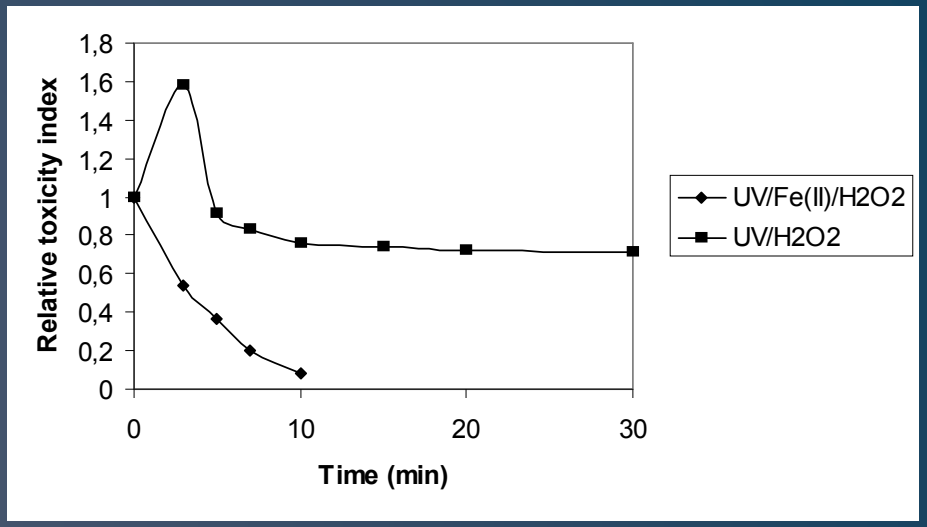
Neamtu M., Popa D. M., Frimmel F. H. (2009). *Journal of Hazardous Materials*, 164, 1561-1567

DFG Deutsche Forschungsgemeinschaft

Universität Karlsruhe, Engler-Bunte-Institut, Bereich Wasserchemie

Testul de bioluminiscență





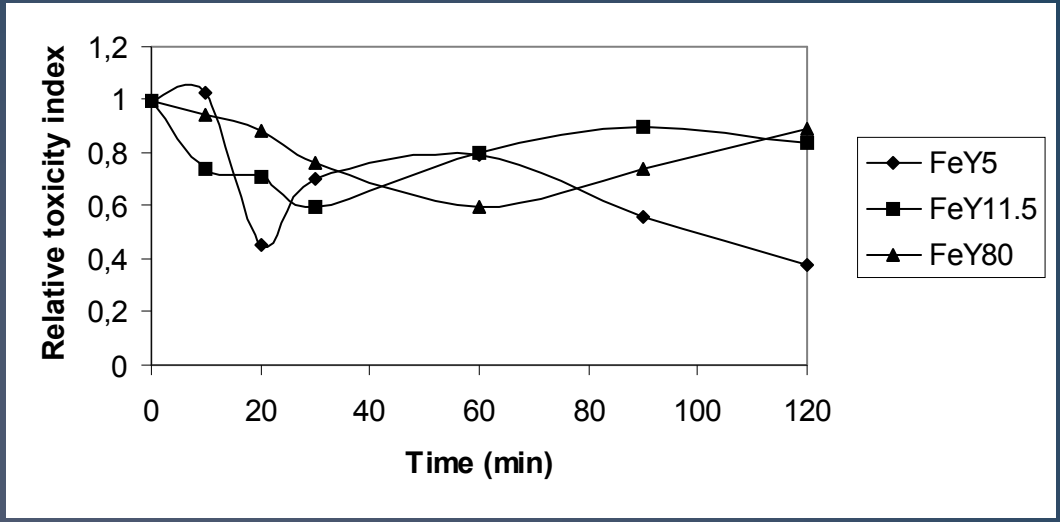
Percentage inhibition after 15 minutes incubation by the bacterium *Vibrio fisheri* in LUMIStox300 of *Procion Marine H-EXL* azo-dye. Initial conditions were 100 mg/L azo-dye, pH=5, t=50^{0}C, catalyst concentration 1 g/L and 20 mmol/L H_2O_2.

Toxicity assay using the bacterium *Vibrio* fisheri in LUMIStox 300 during the treatment. Incubation time 30 minutes. Initial conditions: C^0(dye) = 100 mg/L, $C^0(H_2O_2)$ = 5 mM, $C^0(Fe^{2+})$ = 0.25 mM

Neamtu M., Zaharia C., Catrinescu C., Yediler A., Macoveanu M., Kettrup A. (2004), *Applied Catalysis: Environmental* 48, 287-294.

Neamtu M., Yediler A., Siminiceanu I., Kettrup A. (2003), *Journal of Photochemistry and Photobiology A: Chemistry*, 161 (1), 87-93.

Testul de bioluminiscență



Toxicity assay using the bacterium *Vibrio* fisheri in LUMIStox 300 during the treatment with different catalysts. Incubation time 30 minutes. Initial conditions were 100 mg/L azo-dye, pH=5, t=50^0C, catalyst concentration 1 g/L and 20 mmol/L H_2O_2.

Neamtu M., Catrinescu C., Kettrup A. (2004) Effect of dealumination of iron (III) - exchanged Y zeolites on oxidation of reactive yellow 84 azo dye in the presence of hydrogen peroxide, *Applied Catalysis: Environmental*, 51, 149-157.

GSF – Forschungszentrum für Umwelt und Gesundheit in der Helmholtz-Gemeinschaft

MARIE CURIE FELLOWSHIPS

Alte teme/proiecte cercetate

- German Countries Working Party on Water (Länderarbeitsgemeinschaft Wasser – LAWA) LAWA–Nr. 0 10.03; 2003-2006. Tema: „Recommendation for Environmental Quality Standards for the protection of aquatic biota in surface waters"; *Membru în echipă*.

Jahnel J., Neamtu M., Schudoma D., Frimmel F. H. (2006) Bestimmung von Umweltqualitätsnormen für potenziell gewässerrelevante Stoffe. *Acta hydrochemica et hydrobiologica* 34 (4), 389-397

- Grant Romano-Elvețian, finanțat de Swiss National Science Foundation (SNSF), ESTROM, IB6120-106996-POPIASI. 2005-2007. Tema: "Chemical, Biological and Ecotoxicological Assessment of the Bahlui River, in North-Eastern Romania. Case Study: Pesticides and Persistent Organic Pollutants (POPs)"; Co-***Director de proiect.***

Ciumasu M.I., Costica M., Costica N., Neamtu M., Dirtu A. C., De Alencastro L. F., Buzdugan L., Andriesa R., Iconomu L., Stratu A., Popovici O. A., Secu C. V., Olariu C. P., Dunca S., Stefan M., Lupu A., Stingaciu-Basu A., Netedu A., Dimitriu R.-I., Gavrilovici O., Talmaciu M., Borza M. (2012)., *Journal of Hazardous, Toxic, and Radioactive Waste* (ASCE), 16 (2), 158-170.
Neamtu M., Ciumasu I. M., Costica N., Costica M., Bobu M., Nicoara M. N., Catrinescu C., Becker van Slooten K., De Alencastro L. F. (2009), *Environmental Science and Pollution Research*, 16, S76
Ciumasu M.I, Neamtu M., Costica N., De Alencastro F. (2008), *Danube News*, 17, 9-10.
Ciumaşu I. M., Costică N., Neamțu M., De Alencastro F. (2008), *Geo-Eco-Marina*, 14, 57-61.

- Grant finanțat de Swiss National Science Foundation (SNSF), IZKOZ2_L45025. 2013. "Degradation of 5 emergent contaminants on Fe photoresponsive catalysts". ***Director de proiect***.

- Ministerul Educației şi Cercetării, Grant PN-II-ID-PCE-2011-3-0652. 2011-2014. "Graniţa romană în estul Provinciei Dacia". ***Membru în echipă***

Planuri pe termen scurt

PN-II-ID-PCE-2012-4-0477