



CURRICULUM VITAE

Dimitrios V. Vayenas
Professor

Department of Chemical Engineering
University of Patras

PERSONAL DETAILS

| | |
|-------------------------|---|
| Name: | Dimitrios V. Vayenas |
| Date of Birth: | 19 th January 1969 |
| Nationality: | Greek |
| Work Address: | Department of Chemical Engineering, University of Patras Caratheodory 1, University Campus, Greece GR 265 04 Patras |
| Contact details: | Tel.: : +30-2610-962748, e-mail: dvagenas@chemeng.upatras.gr |

EDUCATION

| | |
|---------------------------------|--|
| Bachelors Degree (1991): | Chemical Engineering, University of Patras, Greece |
| Doctorate (1995): | Chemical Engineering, University of Patras, Greece |

EMPLOYMENT HISTORY

| | |
|-----------------------|---|
| 3/2015-present | Professor of Environmental Systems, Department of Chemical Engineering, University of Patras |
| 6/2013-2/2015 | Professor of Environmental Systems, Department of Environmental and Natural Resources Management, University of Patras |
| 9/2009-6/2013 | Professor of Environmental Systems, Department of Environmental and Natural Resources Management, University of Western Greece |
| 7/2009-9/2009 | Professor of Environmental Systems, Department of Environmental and Natural Resources Management, University of Ioannina |
| 1/2011-present | Visiting Faculty Member at |

| | |
|----------------------|--|
| | FORTH/ICEHT |
| 9/2005-7/2009 | Associate Professor of Environmental Systems, Department of Environmental and Natural Resources Management, University of Ioannina |
| 9/2000-9/2005 | Assistant Professor of Environmental Systems, Department of Environmental and Natural Resources Management, University of Ioannina |
| 1996-2000 | Post-Doc research assistant at FORTH/ICEHT and the Department of Chemical Engineering, University of Patras |

| SCHOLARSHIPS/ AWARDS | |
|----------------------|--|
| 1991-1994: | Postgraduate scholarship from FORTH/ICEHT |
| 1996-2000: | Post-Doc scholarship from FORTH/ICEHT |
| 2001-2002: | Senior Research Award, Fulbright Foundation (Visiting |
| 2011 | Hellenic Federation of Enterprises/Eurobank competition "Greece Innovates" for applied research and innovation. Distinction in the category "innovation" for the design and operation of the biological filter for potable water in the village of New Vouprasio, Achaia, Greece |

A. TEACHING ACTIVITIES (2000-2014)

Teaching - Undergraduate Courses

| | |
|---|------------------------------|
| Wastewater Management (Department of Environmental and Natural Resources Management) | (14 semesters) - (2002-2014) |
| Solid Waste Management (Department of Environmental and Natural Resources Management) | (13 semesters) - (2001-2014) |
| Soil & Groundwater Remediation (Department of Environmental and Natural Resources Management) | (12 semesters) - (2002-2014) |
| Potable Water Technologies (Department of Environmental and Natural Resources Management) | (6 semesters) - (2009-2014) |
| Atmospheric Pollution (Department of Environmental and Natural Resources Management) | (2 semesters) - (2003-2004) |

Teaching - Postgraduate Courses

| | |
|--|-------------|
| Part of the unit (and unit coordinator) "Environmental pollution - remediation of degraded elements in protected areas - ecotoxicology and biotechnological applications" of the M.Sc. course "Sustainable Management of Protected Areas", University of Ioannina, | (2003-2012) |
| Hellenic Open University. | (2011-2014) |
| M.Sc. "Microbiological Technology", Department of Biology, Kapodistrian University of Athens. Soil and groundwater remediation lectures. | (2009-2014) |

B. AUTHORSHIP - COURSE NOTES

1. Dimitrios V. Vayenas (2002): Principles of Biological Soil and Groundwater Remediation. University of Ioannina, Pp. 238. (First edition 2001). (In Greek)
2. Dimitrios V. Vayenas (2002): Wastewater Management. University of Ioannina, Pp. 185. (First edition 2001). (In Greek)
3. Dimitrios V. Vayenas (2002): Solid Waste Management. University of Ioannina, Pp. 340. (First edition 2001). (In Greek)
4. P. Dimopoulos, J.D. Pantis, D. Tzanoudakis & D. Vayenas (eds) (2008): Sustainable Management of Protected Areas. Pappas Editions, Athens, Pp. 643. (In Greek)
5. Gerasimos Lyberatos & Dimitrios V. Vayenas (2012): Wastewater Management. Tziolas Editions, Thessaloniki, Pp. 564. (In Greek)

C. AUTHORSHIP - RESEARCH

C1. PAPERS IN INTERNATIONAL REVIEWED JOURNALS

1994

1. D.V. Vayenas and G. Lyberatos, 1994. A novel model for nitrifying trickling filters. *Water Research*, 28, 1275-1284.
2. M. Tzitzzi, D.V. Vayenas and G. Lyberatos, 1994. Pretreatment of textile industry wastewaters with ozone. *Wat. Sci. Tech.*, 29, 151-160.

1995

3. D.V. Vayenas and G. Lyberatos, 1995. On the design of nitrifying trickling filters for potable water treatment. *Wat. Res.*, 29 (4), 1079-1084.

1997

4. D.V. Vayenas, S. Pavlou and G. Lyberatos, 1997. Development of a dynamic model describing nitritification and nitrification in trickling filters. *Wat. Res.*, 31 (5), 1135-1147.
5. G. Dimitrakos-Michalakos, J. Martinez-Nieva, D.V. Vayenas and G. Lyberatos, 1997. Removal of iron from potable water using a trickling filter. *Wat. Res.*, 31 (5), 991-996.
6. D.V. Vayenas, S. Pavlou and G. Lyberatos, 1997. Transient modeling of trickling filters for biological ammonia removal. *Environmental Modeling and Assessment*, 2 (3), 221-226.

1998

7. P. Lenas, N.A. Thomopoulos, D.V. Vayenas and S. Pavlou, 1998. Oscillations of two competing microbial populations in configurations of two interconnected chemostats. *Mathematical Biosciences*, 148, 43-63.
8. A. Gouzinis, N. Kosmidis, D.V. Vayenas and G. Lyberatos, 1998. Removal of Mn and simultaneous removal of Fe, Mn, and NH₃ from potable water using a trickling filter. *Wat. Res.*, 32 (8), 2442-2450.
9. D.V. Vayenas, M. Repanti, A. Vassilopoulos and D.A. Papanastasiou, 1998. Influence of iron overload on manganese, zinc, and copper concentration in rat tissues *in vivo*: study of liver, spleen and brain. *IJ Clinical & Laboratory Research (Clinical and Experimental Medicine)*, 28 (3), 183-186.
10. N.A. Thomopoulos, D.V. Vayenas and S. Pavlou, 1998. On the coexistence of three competing microbial populations competing for two complementary substrates in configurations of interconnected chemostats. *Mathematical Biosciences*, 154 (2), 87-102.

1999

11. D.V. Vayenas and S. Pavlou, 1999. Coexistence of three microbial populations competing for three complementary nutrients in a chemostat. *Mathematical Biosciences*, 161 (1-2), 1-13.
12. D.V. Vayenas and S. Pavlou, 1999. Chaotic dynamics of a food web in a chemostat. *Mathematical Biosciences*, 162 (1-2), 69-84.

2000

13. D.A. Papanastasiou, D.V. Vayenas, A. Vassilopoulos and M. Repanti, 2000. Concentration and Distribution of Iron and Transferrin after Experimental Iron Overload in Rat Tissues *in vivo*: I. Study of the Liver, the Spleen and the Central Nervous System. *Pathol. Res. Pract.*, 196 (1), 47-54.

2001

14. D.V. Vayenas and S. Pavlou, 2001. Chaotic dynamics of a microbial system of coupled food chains. *Ecological Modelling*, 136 (2-3), 285-295.

2002

15. D.V. Vayenas, E. Michalopoulou, G.N. Constantinides, S. Pavlou and A.C. Payatakes, 2002. Visualization experiments of biodegradation in porous media and calculation of the biodegradation rate. *Adv. Water Res.*, 25, 203-219.

2003

16. G. Tekerlekopoulou and D.V. Vayenas, 2003. Operational and design considerations of a trickling filter for ammonia removal from potable water. *Environmental Modeling and Assessment*, 8, 55-62.

2004

17. S. Takahama, D. Vayenas, S.N. Pandis and C. Davidson, 2004. Modelling the diurnal variation of nitrate during the Pittsburgh Air Quality Study. *Journal of Geophysical Research D: Atmospheres* 109 (16), pp. D16S06 1-10.

2005

18. G. Aggelis, D. V. Vayenas, V. Tsagou and S. Pavlou, 2005. Prey-predator dynamics with predator switching regulated by a catabolic repression control mode. *Ecological Modelling*, 183, 451-462.

19. D.V. Vayenas, G. Aggelis, V. Tsagou and S. Pavlou, 2005. Dynamics of a two-prey-one-predator system with predator switching regulated by a catabolic repression control-like mode. *Ecological Modelling*, 186, 345-357.

20. D. Vayenas, S. Takahama and S.N. Pandis, 2005. Simulation of the thermodynamics and removal processes in the sulfate-ammonia-nitric acid system: implications for PM_{2.5} control strategies. *Journal of Geophysical Research D: Atmospheres* 110 (7), art. no. D07S14, pp. 1-11.

21. G. Tziotzios, G. Lyberatos and D.V. Vayenas, 2005. Biological phenol removal using packed bed reactors. *Biochemical Engineering Journal* 26, 65-71.

22. E. Dermou, A. Velissariou, D. Xenos and D.V. Vayenas, 2005. Biological Chromium (VI) Reduction using a trickling filter. *Journal of Hazardous Materials*, B126, 78-85.

2006

23. I.A. Vasiliadou, S. Pavlou and D.V. Vayenas, 2006. A kinetic study of hydrogenotrophic denitrification. *Process Biochemistry* 41, 1401-1408.

24. A.G. Tekerlekopoulou, I.A. Vasiliadou and D.V. Vayenas, 2006. Physicochemical and biological iron removal from potable water" *Biochemical Engineering Journal* 31 (1), 74-83.

25. I.A. Vasiliadou, S. Siozios, I.T. Papadas, K. Bourtzis, S. Pavlou and D.V. Vayenas, 2006. Kinetics of pure cultures of hydrogen-oxidizing denitrifying bacteria and modeling of the interactions among them in mixed cultures. *Biotechnology and Bioengineering* 95 (3), 513-525.

2007

26. A. Kavadia, D.V. Vayenas, S. Pavlou and G. Aggelis, 2007. Dynamics of free-living nitrogen-fixing bacterial populations in antagonistic conditions. *Ecological Modelling*, 200, 243-253.
27. E. Dermou, A. Velissariou, D. Xenos and D.V. Vayenas, 2007. Biological removal of hexavalent chromium in trickling filters operating with different filter media types. *Desalination* 211, 156-163.
28. G. Tziotzios, Ch. N. Ekonomou, G. Lyberatos and D.V. Vayenas, 2007. Effect of the Specific Surface Area and Operating Mode on Biological Phenol Removal Using Packed Bed Reactors. *Desalination* 211, 128-137.
29. A.G. Tekerlekopoulou and D.V. Vayenas, 2007. Ammonia, Iron and Manganese Removal from Potable Water Using Trickling Filters. *Desalination* 210, 225-235.
30. E. Dermou and D.V. Vayenas, 2007. A kinetic study of biological Cr(VI) reduction in trickling filters with different filter media types. *Journal of Hazardous Materials* 145, 256-262.
31. G. Tziotzios, S. Michailakis and D.V. Vayenas, 2007. Aerobic biological treatment of olive mill wastewater by olive pulp bacteria. *International Biodeterioration & Biodegradation* 60 (4), 209-214.
- 2008**
32. A. Vasiliadou, G. Tziotzios and D.V. Vayenas, 2008. A kinetic study of combined aerobic biological phenol and nitrate removal in batch suspended growth cultures. *International Biodeterioration & Biodegradation* 61 (3), 261-271.
33. A.G. Tekerlekopoulou and D.V. Vayenas, 2008. Simultaneous biological removal of ammonia, iron and manganese from potable water using a trickling filter. *Biochemical Engineering Journal* 39 (1), 215-220.
34. A.G. Tekerlekopoulou, I.A. Vasiliadou and D.V. Vayenas, 2008. Biological manganese removal from potable water using trickling filters. *Biochemical Engineering Journal* 38 (3), 292-301.
35. G. Tziotzios, G. Lyberatos, S. Pavlou and D.V. Vayenas, 2008. Modelling of biological phenol removal in draw-fill reactors using suspended and attached growth olive pulp bacteria. *International Biodeterioration & Biodegradation* 61 (2), 142-150.
36. G. Tziotzios, E. Dermou, D. Politi and D.V. Vayenas, 2008. Simultaneous phenol removal and biological reduction of hexavalent chromium in a packed-bed reactor. *Journal of Chemical Technology & Biotechnology* 83 (6), 829-835.
37. E. Dermou and D.V. Vayenas, 2008. Biological Cr(VI) reduction in trickling filter under continuous operation with recirculation. *Journal of Chemical Technology and Biotechnology* 83 (6), 871-877.
38. A. Kavadia, D.V. Vayenas, S. Pavlou and G. Aggelis, 2008. Dynamics of free-living nitrogen-fixing bacterial populations and nitrogen fixation in a two-prey-one-predator system. *Ecological Modelling*, 218 (3-4), 323-338.
- 2009**
39. A. Gaki, A. Theodorou, D.V. Vayenas and S. Pavlou, 2009. Complex dynamics of microbial competition in the gradostat. *Journal of Biotechnology* 139 (1), 38-46.

40. I.A. Vasiliadou, K.A. Karanasios, S. Pavlou and D.V. Vayenas, 2008. Experimental and modelling study of drinking water hydrogenotrophic denitrification in packed-bed reactors. *Journal of Hazardous Materials*, 165 (1-3), 812-824.
41. I.A. Vasiliadou, K.A. Karanasios, S. Pavlou and D.V. Vayenas, 2009. Hydrogenotrophic denitrification of drinking water using packed-bed reactors. *Desalination* 248, 859-868.
42. I.A. Vasiliadou, S. Pavlou and D.V. Vayenas, 2009. Dynamics of a chemostat with three competitive hydrogen oxidizing denitrifying microbial populations and their efficiency for denitrification. *Ecological Modelling*, 220 (8), 1169-1180.
- 2010**
43. C.E. Economou, A. Makri, G. Aggelis, S. Pavlou and D.V. Vayenas, 2010. Semi-solid fermentation of sweet sorghum for the biotechnological production of single cell oil. *Bioresource Technology* 101, 1385-1388.
44. A.G. Tekerlerkopoulou, P.G.D. Papazafiris and D.V. Vayenas, 2010. A full-scale trickling filter for the simultaneous removal of ammonium, iron and manganese from potable water. *Journal of Chemical Technology and Biotechnology* 85, 1023-1026.
45. A.G. Tekerlekokoulou, G. Tsiamis, E. Dermou, S. Siozios, K. Bourtzis and D.V. Vayenas, 2010, The effect of carbon source on microbial community structure and Cr(VI) reduction rate, *Biotechnology and Bioengineering* 107 (3), 478-487.
46. K.A. Karanasios, I.A. Vasiliadou, S. Pavlou and D.V. Vayenas, 2010, Hydrogenotrophic denitrification of potable water - A review. *Journal of Hazardous Materials* 180, 20-37.
- 2011**
47. C.E. Economou, G. Aggelis, S. Pavlou and D.V. Vayenas, 2011. Modelling of single-cell oil production under nitrogen-limited and substrate inhibition conditions. *Biotechnology and Bioengineering* 108 (5), 1049-1055.
48. C.E. Economou, G. Aggelis, S. Pavlou and D.V. Vayenas, 2011. Single cell oil production from rice hulls hydrolysate. *Bioresource Technology* 102, 9737-9742.
49. C.E. Economou, I.A. Vasiliadou, G. Aggelis, S. Pavlou and D.V. Vayenas, 2011. Modeling of oleaginous fungal biofilm developed on semi-solid media. *Bioresource Technology* 102, 9697-9704.
50. M. Michailides, P. Panagopoulos, C.S. Akratos, A.G. Tekerlekokoulou and D.V. Vayenas, 2011. A full-scale system for aerobic biological treatment of olive mill wastewater. *Journal of Chemical Technology and Biotechnology* 86, 888-892.
51. M. Michailides, G. Christou, C.S. Akratos, A.G. Tekerlekokoulou and D.V. Vayenas, 2011. Composting of olive leaves and pomace from a three-phase olive mill plant *International Biodeterioration & Biodegradation* 65 (3), 560-564.
52. E. Herouvim, C.S. Akratos, A. Tekerlekokoulou and D.V. Vayenas, 2011. Treatment of olive mill wastewater in pilot-scale vertical flow constructed wetlands. *Ecological Engineering* 37 (6), 931-939.
53. K.A. Karanasios, M.K. Michailidis, I.A. Vasiliadou, S. Pavlou and D.V. Vayenas, 2011. Potable water denitrification. *Desalination and Water Treatment* 33, 86-96.
54. A. Kavadia, D.V. Vayenas, S. Pavlou and G. Aggelis, 2011. Dynamics of a Free-Living Nitrogen-Fixing Bacteria Population Lacking of Competitive Advantage Towards an Antagonistic Population. *The Open Environmental Engineering Journal*,

4, 190-198.

2012

55. G. Tsiamis, G. Tzagkaraki, A. Chamalaki, N. Xypteras, G. Andersen, D.V. Vayenas and K. Bourtzis, 2012. Olive-mill wastewater bacterial communities display a cultivar specific profile. *Current Microbiology* 64: 197-203.
56. A.G. Tekerlerkopoulou, P.G.D. Papazafiris, and D.V. Vayenas, 2012. Effect of environmental and operating conditions on a full-scale trickling filter for well treatment. *Desalination and Water Treatment* 39(1-3): 228-234.
57. K. Katsaveli, D.V. Vayenas, G. Tsiamis, K. Bourtzis, 2012. Bacterial Diversity in Cr(VI) and Cr(III)-contaminated industrial wastewaters. *Extremophiles* 16(2): 285-296.

2013

58. A.G Tekerlekopoulou, M. Tsiflikiotou, L. Akritidou, A. Viennas, G. Tsiamis, S. Pavlou, K. Bourtzis, D.V. Vayenas, 2013. Modelling of biological Cr(VI) removal in draw-fill reactors using microorganisms in suspended and attached growth systems. *Water Research* 47 (2): 623-636.
59. A.G. Tekerlekopoulou, S. Pavlou, D.V. Vayenas, 2013. Removal of ammonium, iron and manganese from potable water in biofiltration units: A review. *Journal of Chemical Technology and Biotechnology* 88 (5) , 751-773.
60. A.K.M. Muktedirul Bari Chowdhury, C.S. Akratos, D.V. Vayenas, S. Pavlou, 2013. Olive mill waste composting: A review. *International Biodeterioration and Biodegradation* 85 , 108-119.
61. M.K. Michailides, Mar-Yam Sultana, A.G. Tekerlekopoulou, C.S. Akratos, D.V. Vayenas, 2013. Biological Cr(VI) removal using bio-filters and constructed wetlands. *Water Science & Technology*, 68, 2228-2233.
62. K. Pelendridou, M.K. Michailides, D.P. Zagklis, A.G. Tekerlekopoulou, C.A. Paraskeva, D.V. Vayenas, 2013. Treatment of olive mill wastewater using a coagulation-flocculation process either as a single step or as post-treatment after aerobic biological treatment. *Journal of Chemical Technology and Biotechnology, Article in Press*

2014

63. A. Chowdhury, M.K. Michailides, C.S. Akratos, A.G. Tekerlekopoulou, S. Pavlou, D.V. Vayenas, 2014. Composting of three phase olive mill solid waste using different bulking agents. *International Biodeterioration & Biodegradation*, 91, 66-73.
64. M. Michailides, T. Tatoulis, M.Y. Sultana, A. Tekerlekopoulou, I. Konstantinou, C. S. Akratos, S. Pavlou and D. V. Vayenas, 2014. Start-up of a free water surface constructed wetland for treating olive mill wastewater. *Journal of Chemical Industry, In press*.
65. Triantafyllos I. Tatoulis, Athanasia G. Tekerlekopoulou, Christos S. Akratos, Stavros Pavlou and Dimitrios V. Vayenas (2014). Aerobic Biological Treatment of Second Cheese Whey in Suspended and Attached Growth Reactors. *Journal of Chemical Technology and Biotechnology, in press*.
66. Mar-Yam Sultana, Christos S. Akratos, Stavros Pavlou and Dimitrios V. Vayenas (2014). Chromium removal in constructed wetlands: A review. *International Biodeterioration & Biodegradation*, 96, 181-190.

2015

67. M.-Y. Sultana, A.K.Md.M.B. Chowdhury, M.K. Michailides, C.S. Akrotos, A.G. Tekerlekopoulou, D.V. Vayenas, (2015). Integrated Cr(VI) removal using constructed wetlands and composting. *Journal of Hazardous Materials*,281, 106-113.
68. M.K. Michailides, A.G. Tekerlekopoulou, C.S. Akrotos, S. Coles, S. Pavlou and D.V. Vayenas (2015). Molasses as an efficient low cost carbon source for biological Cr(VI) removal. *Journal of Hazardous Materials*, 281, 95-105.
69. C.N. Economou, N. Marinakis, M. Moustaka-Gouni, G. Kehayias, G. Aggelis, D.V. Vayenas (2015). Lipid production by the filamentous cyanobacterium *Limnothrix* sp. growing on a synthetic wastewater in suspended- and attached-growth photobioreactor systems. *Annals of Microbiology, in press*.
70. M.-Y. Sultana, Ch. Mouri, T. Tatoulis, C.S. Akrotos, A.G. Tekerlekopoulou and D.V. Vayenas (2015). Effect of hydraulic retention time, temperature, and organic load on a horizontal subsurface flow constructed wetland treating cheese whey wastewater. *Journal of Chemical Technology & Biotechnology, in press*.
71. A.K.Md.M.B. Chowdhury, F. Konstantinou, A. Damati, C.S. Akrotos, D. Vlastos, A.G. Tekerlekopoulou and D. V. Vayenas (2015). Is physicochemical evaluation enough to characterize olive mill waste compost as soil amendment? The case of genotoxicity and cytotoxicity evaluation. *Journal of Cleaner Production*, 93, 94-102.

C2. BOOK CHAPTERS

- 1) D.V. Vayenas and G. Lyberatos, 2005. Cartridge filters for iron removal. Pp. 152-155 in Lehr J.H. & Keeley J. (eds) *The Encyclopedia of Water, Vol. Water Quality & Resource Development*, J. Wiley, New York.
- 2) D.V. Vayenas and G. Lyberatos, 2005. Nitrification of potable water using trickling filters. Pp. 346-350 in Lehr J.H. & Keeley J. (eds) *The Encyclopedia of Water Vol. Domestic, Municipal, and Industrial Water Supply and Waste Deposal*, J. Wiley, New York.
- 3) D.V. Vayenas, 2011. Attached growth biological systems in the treatment of potable water and wastewater. Pp. 371-383 in *Comprehensive Biotechnology* Vol. 6, 2nd edn. Elsevier.

C3. CONFERENCE PRESENTATIONS AND PROCEEDINGS

C3.1. International Conferences

1. M. Tzitzzi, D.V. Vayenas and G. Lyberatos (13-15 October 1993) "Pretreatment of textile industry wastewaters with ozone". IAWQ International Specialised Conference on Pretreatment of Industrial Wastewaters, Athens, Greece.
2. D.V. Vayenas, E. Michalopoulou, P. Dromazou, G. Sioulas, G.N. Constantinides, S. Pavlou and A.C. Payatakes (2000) "Visualization experiments of intrinsic biodegradation and calculation of biodegradation rates", Proc. 1st European Conference on Pesticides and Related Organic Micropollutants in the Environment, pp. 177-180 Ioannina, Oct. 5-8 (2000).
3. D.V. Vayenas, G. Kapellos, I. Sgountzos, E. Michalopoulou, G.N. Constantinides, S. Pavlou and A.C. Payatakes (2001) "Biofilm dynamics during biodegradation of organic pollutants in porous media", Proc. European Geophysical Society, XXVI Assembly, Nice, France 25-30 March 2001.
4. D.V. Vayenas, G. Kapellos, I. Sgountzos, E. Michalopoulou, G.N. Constantinides, S. Pavlou and A.C. Payatakes (2001) "Biofilm dynamics in soil", Proc. First European Bioremediation Conference, Chania, Crete, Greece 2-5 July 2001, pp.389-392.
5. D.V. Vayenas, G. Kapellos, I. Sgountzos, G. N. Constantinides, S. Pavlou and A.C. Payatakes (2001) "Biodegradation of organic compounds and biofilm dynamics in porous media", 2nd CCMS/NATO Workshop on Management of Industrial Toxic Wastes and Substrates: Bioremediation of Polluted Ecosystems, Matera, Italy, 20/12/2001.
6. A.Y. Khlystov, C. Stanier, D. Vayenas and S.N. Pandis (2002) "Water Content of Ambient Aerosol during the Pittsburgh Air Quality Study (PAQS)", 6th International Aerosol Conference, Taipei, Taiwan, September 2002.
7. A.Y. Khlystov, C. Stanier, D. Vayenas and S.N. Pandis (2002) "Water Content during the Pittsburgh Air Quality Study", 21st Annual American Association for Aerosol Research Conference, Charlotte NC, October 2002.
8. A.Y. Khlystov, C. Stanier, D. Vayenas and S.N. Pandis (2002) "Monitoring of Water Content of Ambient Aerosol during the Pittsburgh Air Quality Study", 7th Scientific Conference of the International Global Atmospheric Chemistry Project (IGAC), Crete, Greece, September 2002.
9. S. Takahama, B. Wittig, D. Vayenas, C. Davidson and S. Pandis (2003) "Modeling the Equilibrium Partitioning of Nitrate with High-Time Resolution Measurements". American Association for Aerosol Research Annual Conference, Oct. 2003.
10. A. Khlystov, C. Stanier, S. Pandis and D. Vayenas (2003) "Water Content of Ambient Aerosol during the Pittsburgh Air Quality Study", Particulate Matter: Atmospheric Sciences, Exposure and the Fourth Colloquium on PM and Human Health, Pittsburgh PA, April 2003.
11. S. Takahama, B. Wittig, D. Vayenas, C. Davidson and S. Pandis (2003)

| | |
|-----|---|
| | “Modeling the Equilibrium Partitioning of Nitrate with High-Time Resolution Measurements.” (Poster) American Association for Aerosol Research Annual Conference, Oct. 2003. |
| 12. | D. Vayenas, S. Takahama, C. Davidson and S. Pandis (2004) “Formation and Removal of Ammonium Nitrate and its Precursors: Implications for PM _{2.5} Control Strategies.” (Presentation) American Association for Aerosol Research Annual Conference, Oct. 2004. |
| 13. | D. Vayenas, S. Takahama, C. Davidson and S. Pandis (2004) "Formation and Removal of Ammonium Nitrate and its Precursors: Implications for PM _{2.5} Control Strategies". American Association for Aerosol Research Annual Conference, Oct. 2004. |
| 14. | D. Vayenas, S. Takahama, C. Davidson and S. Pandis (2004) "Formation and Removal of Ammonium Nitrate and its Precursors: Implications for PM _{2.5} Control Strategies". American Association for Aerosol Research Annual Conference, Oct. 2004. |
| 15. | A.G. Tekerlekopoulou and D.V. Vayenas (2005) “Ammonia, Iron and Manganese removal from potable water using trickling filters” 9 th International Conference on Environmental Science and Technology”, Rhodes 2005. |
| 16. | G. Tziotziou, G. Lyberatos and D.V. Vayenas (2005) “Biological phenol removal”, 9 th International conference on Environmental Science and Technology”, Rhodes 2005. |
| 17. | E. Dermou, D. Xenos, A. Velissariou and D.V. Vayenas (2005) “Biological removal of hexavalent chromium from industrial waste”, 9 th International conference on Environmental Science and Technology”, Rhodes 2005. |
| 18. | G. Tziotziou and D.V. Vayenas (2006) “Aerobic Biological Treatment of Olive Mill Wastewater”, 8 th International Conference “Protection and Restoration of the Environment VIII”, Chania 2006. |
| 19. | E. Dermou, K.H. Antoniou, Ch.A. Mauronicola and D.V. Vayenas (2006) “A kinetic study of biological Cr(VI) reduction using a trickling filter”. International Conference, Protection and Restoration of the Environment VIII, 3-7 July 2006, Chania. |
| 20. | E. Dermou and D.V. Vayenas (2006) “Chromium reduction from industrial wastewater”, 4 th CCMS/NATO Workshop on Management of Industrial Toxic Wastes and Substances Research”, Ioannina 26-27 August, Greece 2006. |
| 21. | I.A. Vasiliadou and D.V. Vayenas (2006) “Hydrogenotrophic denitrification of drinking water using flasks and packed-bed reactors” International Conference, Protection and Restoration of the Environment VIII, 3-7 July 2006, Chania. |
| 22. | G. Tziotziou, E. Dermou, D. Politi and D.V. Vayenas (2007) “Simultaneous biological reduction of hexavalent chromium and degradation of phenol in a packed-bed reactor”, 1 st International Conference on Environmental Management, Engineering, Planning and Economics (CEMEPE), Skiathos island, Greece, June 24-28, 2007. |
| 23. | G. Tziotziou, G. Lyberatos, S. Pavlou and D.V. Vayenas (2007) “Modelling of biological phenol removal in draw-fill reactors using suspended and attached growth olive pulp bacteria”, 10 th International Conference of Environmental |

| | |
|-----|---|
| | Science and Technology (CEST2007), 5-7 September 2007, Cos Island, Greece. |
| 24. | I.A.Vasiliadou and D.V. Vayenas (2007) "Hydrogenotrophic denitrification of drinking water: the effect of the operating mode using packed-bed reactors" 10th International Conference on the Environmental Science and Technology (CEST2007), 5-7 September 2007, Cos island, Greece. |
| 25. | I.A. Vasiliadou, K.A. Karanasios and D.V. Vayenas (2007) "Hydrogenotrophic Denitrification of drinking water: the effect of support media using packed-bed reactors" International Conference on Environmental Management, CEMEPE Conference June 24-28, 2007, Skiathos, Greece. |
| 26. | I.A. Vasiliadou and D.V. Vayenas (2008) "Hydrogenotrophic denitrification of drinking water using packed-bed reactors" Protection and Restoration of the Environment IX (PRE9), 30/6-3/7, 2008, Kefalonia, Greece. |
| 27. | A.G. Tekerlekopoulou and D.V. Vayenas (2009) "Biological potable water treatment", 2nd International Conference on Environmental Management, Engineering, Planning and Economics (CEMEPE) and SECOTOX Conference, Mykonos, June 21-26, 2009. |
| 28. | K.A. Karanasios, M.K. Michailidis, I.A. Vasiliadou, S. Pavlou and D.V. Vayenas (2009) "Potable water denitrification" 2nd International Conference on Environmental Management, Engineering, Planning and Economics (CEMEPE) and SECOTOX Conference, Mykonos, June 21-26, 2009. |
| 29. | A. Tekerlekopoulou, M. Michailidis, E. Herouvim, G. Christou, I Konstantinou, C.S. Akratos and D.V. Vayenas (2010) "Free water surface constructed wetland treating olive mill wastewater" Protection and Restoration of the Environment X (PRE10), 5-9/7/2010, Corfu, Greece. |
| 30. | D.V. Vayenas (2010) "Attached growth biological systems in the treatment of potable water and wastewater", The 4 th International Conference of Environmental Science and Technology, 14-16/12/2010, Cairo, Egypt. |
| 31. | Michail Michailides, Christos S. Akratos, Athanasia G. Tekerlekopoulou and Dimitrios V. Vayenas. (2012). Horizontal subsurface flow constructed wetland treating Cr(VI), Proceedings of XI Protection and Restoration of Environment International Conference, 3-6 July 2012, Thessaloniki, Greece. |
| 32. | M. Michailides, A.G. Tekerlekopoulou, C.S. Akratos, S. Pavlou and D.V Vayenas. (2012). A kinetic study of biological Cr(VI) reduction in draw-fill reactors, Proceedings of XI Protection and Restoration of Environment International Conference, 3-6 July 2012, Thessaloniki, Greece. |
| 33. | M.K. Michailides, Mar-yam Sultana, A.G. Tekerlekopoulou, C.S. Akratos, D.V. Vayenas (2013). Biological Cr(VI) reduction using biofilters and constructed wetlands, International conferences of Economics and Asset Management, 24-26 April 2013, Marbella, Spain. |
| 34. | M.K. Michailides, A.G. Tekerlekopoulou, C.S. Akratos and D.V. Vayenas (2013) Biological Cr(VI) reduction 13th International Conference on Environmental Science and Technology, Athens, Greece, 5-7 September 2013. |
| 35. | M. Sultana, M.K. Michailides, C.S. Akratos, A.G. Tekerlekopoulou and D.V. Vayenas (2013) Effect of hydraulic residence time on Cr(VI) removal using constructed wetlands, 13th International Conference on Environmental Science and Technology Athens, Greece, 5-7 September 2013. |

| | |
|-------------------------------------|---|
| 36. | M. Sultana, M.K. Michailides, C.S. Akratos, A.G. Tekerlekopoulou and D.V. Vayenas (2013) "Pilot scale horizontal subsurface flow constructed wetlands for the co-treatment of cheese whey wastewaters and hexavalent chromium" Fourth International Conference on Small and Decentralized Water and Wastewater Treatment Plants (SWAT 2013), 26-27 October, 2013, Volos, Greece. |
| 37. | T.I. Tatoulis, A.G. Tekerlekopoulou and D.V. Vayenas (2013), "Aerobic treatment o cheese whey wastewater" Fourth International Conference on Small and Decentralized Water and Wastewater Treatment Plants (SWAT 2013), 26-27 October, 2013, Volos, Greece. |
| 38. | Michail K. Michailides, Athanasia G. Tekerlekopoulou , Sandra Coles, Christos S. Akratos and Dimitrios V. Vayenas (2014), "Chromium (VI) in the environment: history and strategies for the treatment of polluted water and wastewater with Cr(VI)" IWA Regional Symposium on Water, Wastewater and Environment: Traditions and Culture, 22-24 March, 2014, Patras, Greece. |
| 39. | Triantafyllos I. Tatoulis, Athanasia G. Tekerlekopoulou , Christos S. Akratos and Dimitrios V. Vayenas, (2014), "Genesis and Diaspora of the Dairy Process: Aerobic Biological Treatment of its Wastewaters" IWA Regional Symposium on Water, Wastewater and Environment: Traditions and Culture, 22-24 March, 2014, Patras, Greece. |
| C3.2. Hellenic Conferences | |
| A total of 60 presentations to date | |

| D. POSTGRADUATE SUPERVISION | |
|-----------------------------|---|
| D1. Ph.D. Students | |
| 1. | Tekerlekopoulou A. (2002-2006), Study of the mechanisms of biological pollutant removal from water using porous media |
| 2. | Dermou E. (2003-2007) Removal of chromium from industrial wastes |
| 3. | Tziotzios Γ. (2003-2007) Biological treatment of olive mill wastewaters |
| 4. | Kavvadia A.-E. (2003-2009) The dynamics of free-living nitrogen-fixing microbial populations in competitive environments |
| 5. | Vasiliadou I. (2004-2008) Biological denitrification of potable water |
| 6. | Economou C. (2007-2012) Biotechnological biofuel production |

| | |
|---------------------------|---|
| 7. | Karanasios K. (2008-2012) Biological treatment of potable water |
| 8. | Chowdhury A. (2010-2014) Composting of agro-industrial by-products |
| 9. | Michailidis M. (2011-2014) Removal of chromium from industrial wastes and potable water |
| D2. M.Sc. Students | |
| 10. | Houliaras D. (2004-2006) Laboratory quality control of environmental parameters |
| 11. | Syggouna V. (2004-2006) Simulation of the groundwater flow and pollutant transport in the landfill of the Municipality of Patras |
| 12. | Kolokotsa A. (2005-2007) Economic-technical study of the biological wastewater sludge composting unit on the island of Zakynthos, Greece |
| 13. | Mousafiri Z. (2005-2007) Biological wastewater treatment |
| 14. | Skretas N. (2007-2009) Aerobic biological treatment of olive mill wastewaters using fixed bed reactors |
| 15. | Christou G. (2009-2010) Determination of phytotoxicity of olive mill waste by-products |
| 16. | Theodori C. (2009-2010) Artificial wetland for olive mill wastewater treatment |
| 17. | Michailidis M. (2009-2011) Biological treatment of olive mill waste |
| 18. | Herouveim E. (2009-2011) Application of artificial wetlands for the treatment of olive mill waste |
| 19. | Tatoulis T. (2010-2012) Biological treatment of dairy wastewaters |
| 20. | Klaliotou D. (2010-2012) Biodiesel production from algae |
| 21. | Kantzari M. (2010-2012) Biological treatment of industrial beverage wastewaters |
| 22. | Gouvali M. (2013-2014). Biological treatment of hexavalent chromium |

| E. Reviewer in International Journals |
|--|
| 1. Adsorption |
| 2. African Journal of Agricultural Research |
| 3. African Journal of Biotechnology |
| 4. American Chemical Science Journal |
| 5. Annals of Microbiology |
| 6. Applied Biochemistry and Biotechnology |
| 7. Applied Microbiology and Biotechnology |
| 8. Biochemical Engineering Journal |
| 9. Biodegradation |
| 10. Bioprocess and Biosystems Engineering |
| 11. Bioresource Technology |
| 12. Biotechnology and Bioengineering |
| 13. Biotechnology for Biofuels |
| 14. Biotechnology Progress |
| 15. Chemical Engineering Journal |
| 16. Chemical Engineering Research and Design |
| 17. Chemical Engineering Science |
| 18. Chemosphere |
| 19. Chinese Journal of Chemical Engineering |
| 20. Critical Reviews in Biotechnology |
| 21. Current Microbiology |
| 22. Desalination |
| 23. Desalination and Water Treatment |
| 24. Drinking Water Engineering and Science Discussions |
| 25. Ecological Modelling |
| 26. Energy and Fuels |
| 27. Environmental Engineering and Management Journal |
| 28. Environmental Engineering Science |

| |
|---|
| 29. Environmental Processes |
| 30. Environmental Progress |
| 31. Environmental Science and Pollution Research |
| 32. Environmental Science & Technology |
| 33. Environmental Technology |
| 34. Enzyme and Microbial Technology |
| 35. Food and Bioproducts Processing |
| 36. Food Research International |
| 37. Fresenius Environmental Bulletin |
| 38. Fuel |
| 39. Global NEST |
| 40. Industrial & Engineering Chemistry Research |
| 41. International Journal of Biodeterioration & Biodegradation |
| 42. International Journal of Environmental Research and Public Health |
| 43. Iranica Journal of Energy & Environment |
| 44. IWA Conferences |
| 45. Jordan Journal of Biological Sciences |
| 46. Journal of Basic Microbiology |
| 47. Journal of Chemical Technology and Biotechnology |
| 48. Journal of Chemistry |
| 49. Journal of Engineering Science and Technology Review |
| 50. Journal of Environmental Chemical Engineering |
| 51. Journal of Environmental Engineering and Science |
| 52. Journal of Environmental Management |
| 53. Journal of Environmental Science and Health, Part A |
| 54. Journal of Hazardous Materials |
| 55. Journal of Water Process Engineering |
| 56. Journal of Water Supply - AQUA |
| 57. Journal of Zhejiang University-SCIENCE B |

| |
|---|
| 58. Materials |
| 59. Mathematical Biosciences |
| 60. Microbial Cell Factories |
| 61. PLOS ONE |
| 62. Polish Journal of Environmental Studies |
| 63. Process Biochemistry |
| 64. Process Safety and Environmental Control |
| 65. Sensors and Actuators, B |
| 66. Separation & Purification Technology |
| 67. Separation Science and Technology |
| 68. Sky Journal of Food and Science |
| 69. The Canadian Journal of Chemical Engineering |
| 70. The Open Civil Engineering Journal |
| 71. Waste Management |
| 72. Water |
| 73. Water Research |
| 74. Water Science and Technology |
| 75. Water South Africa |
| 76. World Applied Science Journal |
| 77. World Journal of Microbiology & Biotechnology |

F. OTHER ACTIVITIES

F1. Conference and Workshop Organization

1. Member of the organizing committee and speaker in the workshop "Integrated Solid Waste Management in the Prefecture of Aitolokarnania" of the Department of Environmental and Natural Resources Management and Hellenic Technical Chamber Aitolokarnania branch, Agrinio, 05-04-2003.
2. Member of the organizing committee of the workshop "Environment: University Education and Research" of the Department of Environmental and Natural Resources Management, Agrinio, 27-05-2003.
3. Organizer of the workshop "Department of Environmental and Natural Resources Management - A modern study programme", Agrinio, 09-11-2004.
4. Member of the scientific committee of the Second International Conference on "Small and Decentralized Waste and Wastewater Treatment Plants", Skiathos Island, Greece, 2-4 May 2008
5. Organizer of the 2-day workshop "Environment - Problems - Prospects" of the Department of Environmental and Natural Resources Management, Agrinio, 15-16 May 2008.
6. Member of the organizing committee of the Second International Conference on Engineering for Waste Valorisation - WasteEng08. Patras, Greece, 3-5 June 2008.
7. Member of the organizing committee of the International Conference "Protection and Restoration of the Environment IX - PRE9". Kefalonia Island, Greece, 29 June - 3 July 2008.
8. Member of the scientific committee of the Third International Conference on "Small and Decentralized Waste and Wastewater Treatment Plants". Skiathos Island, Greece, 14-16 May 2010.
9. Member of the organizing committee of the Third International Conference on Environmental Management, Engineering, Planning and Economics (CEMEPE) & SECOTOX Conference. Skiathos Island, Greece, 19-24 June 2010.
10. Member of the organizing committee of the International Conference "Protection and Restoration of the environment X". Corfu Island, Greece, 5-9 July 2010.
11. Member of the provisional scientific and problem committee of the Twelfth International Conference on Environmental Science and Technology. Rhodes Island, Greece, 8-10 September 2011.
12. Member of the scientific committee of the International Conference "Asset Management for enhancing energy efficiency in water and wastewater systems" Marbella, Spain, 24-26 April, 2013
13. Member of the scientific committee of the IWA Regional Symposium on Water, Wastewater and Environment: Traditions and Culture, 22-24 March 2014 Patras, Greece
14. Member of the Programme Committee of the IWA Balkan Young Water Professionals Conference 2015.

| |
|--|
| |
|--|

| F2. Positions of Responsibility | |
|--|--|
| 1. | Member of the board of governors of the Management Body of Mesologgi – Aitoliko Wetland Protected Area (2003-2007). |
| 2. | Scientific coordinator for the “Technologies for Protected Area Management” module of the M.Sc. course “Sustainable Management of Protected Areas” (2003-present). |
| 3. | Member of the negotiation committee of the Municipality of Western Achaia (2011-present). |
| 4. | Member of the scientific committee of the Management Body of Amvrakikos Gulf Protected Area (2011-present). |
| 5. | Chair of the Department of Environmental and Natural Resources Management, University of Patras (2013-present) |

| H. RESEARCH PROGRAMMES | |
|---|--|
| H1 Scientific coordinator & contribution | |
| • | Restructuring of the undergraduate course studies of the department of Environmental and Natural Resources Management, University of Ioannina, 2003-2008, EPEAEK II (452,000€). |
| • | Study of the mechanisms of biological removal of pollutants from potable water using trickling filters, 2002-2005, HERAKLITOS -Operational Program for Education and Initial Vocational Training of the Hellenic Ministry of Education under the 3rd Community Support Framework and the European Social Fund (34,017 €). |
| • | Cr(VI) reduction from industrial wastewater, 2004-2006, Hellenic Aerospace |

| |
|--|
| Industry S.A. (59,000 €). |
| <ul style="list-style-type: none"> • Development of attached growth systems for the integrated management of olive mill wastewater, 2006-2008, General Secretariat of Research and Technology, Greece (332,440 €). |
| <ul style="list-style-type: none"> • Spin-off preparation for the commercial exploitation of a biological filter for potable water treatment, 2006-2008, General Secretariat of Research and Technology, Greece (60,000 €). |
| <ul style="list-style-type: none"> • Development of a sustainable and integrated system for bio-diesel production from energy crops, 2007-2009, INTERREG IIIA GREECE-ITALY 2000-2006, Principal Investigator (40,750 €). |
| <ul style="list-style-type: none"> • Biological Cr(VI) reduction of potable water and wastewater, 2012-2015, Thalys project (600,000 €). |
| H2. Scientific contribution |
| <ul style="list-style-type: none"> • Development of a flexible bioprocess for handling and recycling seasonal industrial process liquid effluents, BRITE-EURAM, 1994-1998. |
| <ul style="list-style-type: none"> • Pore-to-core scale-up studies of the transport properties of organic pollutants with natural attenuation, ENVIRONMENT, 1998-2001. |
| <ul style="list-style-type: none"> • Clean combustion of organic wastes in cement plant, EPET 1998. |
| <ul style="list-style-type: none"> • Theoretical and experimental study of the dynamic behaviour of bacterial systems, ICEHT/FORTH 1998. |
| <ul style="list-style-type: none"> • Model development for the simulation of absorption phenomena, PENED1997. |
| |
| |

I. RESEARCH INTERESTS

Laboratory of Environmental Systems

The Laboratory of Environmental Systems aims to produce research of a high standard in the fields of environmental protection and the development of new technologies. One characteristic of the laboratory is its focus on attached growth biological systems (porous media, filters). Nine Ph.D. theses have been completed in the lab, along with 13 Master and more than 50 undergraduate theses. The basic working principal of the lab is the deep-rooted understanding of the mechanisms that govern the processes studied, and the conversion of knowledge to technology. For this reason, we design micro- or laboratory-scale experiments to study the mechanisms governing the processes. The physical/biological processes are then described by mathematical models to obtain the abilities of prediction and process design. Pilot systems are then constructed in the laboratory and used to verify the model predictions and overcome any operational problems occurring at this larger scale. Finally, industrial systems are designed and constructed to test the research efforts in the field. This laboratory working method has proved especially successful as it offers many opportunities to those trained there, is an integrated approach with integrated results, and also connects research with existing social/environmental problems. Research in the laboratory includes:

- Potable Water Treatment

Biological removal of ammonia, iron and manganese from potable water. For this purpose four pilot-scale trickling filters have been built and are used to test the simultaneous or separate removal of these three pollutants. Both the effects of the size of the support media and the effects of the operational conditions on the results of these processes are being investigated. The results of these experiments were applied in real-life conditions with the construction and successful operation of an industrial-scale trickling filter in the village of New Vouprasio in the Prefecture of Achaia (see www.water-biofilter.gr for more details on the filter).

The autotrophic denitrification of potable water is another research topic being investigated in the laboratory. Experiments are being carried out on the autotrophic – hydrogenotrophic denitrification where pure hydrogen and carbon dioxide are used as the electron donor and carbon source, respectively. Hydrogen is produced in-situ using an electrolysis cell powered by a photovoltaic system.

- Treatment of Industrial Waste

Laboratory research also includes the biological and physicochemical removal of chromium contained in industrial waste. This is the first time where pilot-scale experiments on the biological reduction of chromium have involved using a mixed culture. This effort was supported financially by the Hellenic Aerospace Industry

S.A. and the Cr(VI) reduction rates obtained were especially high. Present research focuses on the discovery of a cheap and more effective source of organic carbon (e.g. commercial sugar) that would help substantially minimize the cost of the process and further increase Cr(VI) reduction rates.

Olive mill wastes are a major problem in Greece. Our research attempts the aerobic biological treatment of olive mill wastes using trickling filters and microorganisms isolated from the olive fruit. An industrial-scale filter was constructed in an olive mill in the area of Amfilochia and operates with great success for the third consecutive year. Current research focuses on the use of pig-farm waste as a nitrogen source and phosphorus for the olive mill waste, and also the application of constructed wetlands to reduce the pollutant load to zero. A compost unit has been constructed in the area for the exploitation of olive leaves and pomace. (See www.olivemillwaste.gr for further details.)

- ***Biodiesel production***

The production of biodiesel from fermentation of sweet sorghum in a semi-solid state is the laboratory's most recent research topic. The aim is the successful use of mixed fungal cultures that can transform sorghum sugars to lipids. Sorghum shredding and the addition of water are the only treatment phases necessary in the production phase and therefore minimize the production cost. Until now, results of about 10% have been achieved. To further increase the process's efficiency we have designed and constructed an innovative attached-growth reactor. The experiments continue to date. Additionally, algae are being tested for biodiesel production.

J. Major Research Achievements

1. Full-scale operational biological filter for olive mill wastewater treatment, Ambelaki village, Amfilochia, Aitolokarnania.



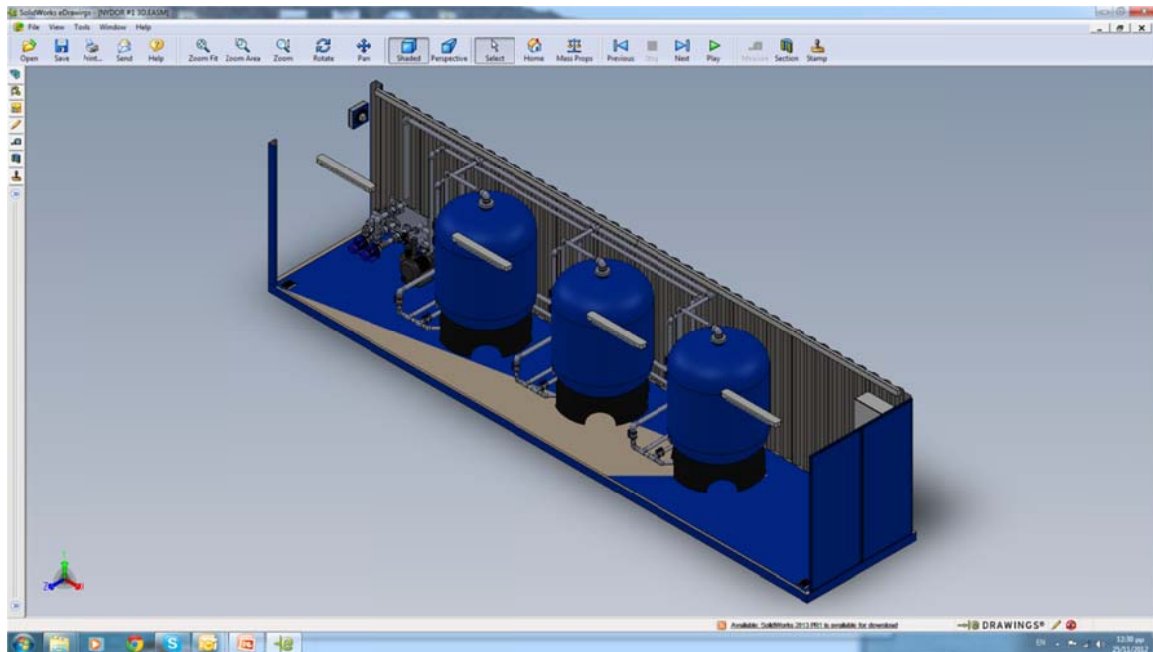
2. Full-scale operational composting unit of olive mill waste, Ambelaki village, Amfilochia, Aitolokarnania.



3. Full-scale operational biological filter for potable water, New Vouprasio village, Achaia.



4. Design of full-scale biological filters for potable water and wastewater treatment.



5. Industrial-scale biological filters for dairy wastewater treatment.



K. Granted Patents

- 1. "Biological filter for the removal of hydrogen sulphide, ammonium, iron and manganese from potable water without mechanical aeration" Greek Patent No 1006922.**
- 2. "Attached growth aerobic biological treatment of olive mill wastewater" Greek Patent No 1007517.**