

[Home](#) > [Journal](#) > [Earth & Environmental Sciences](#) > [JEP](#)
[Indexing](#) | [View Papers](#) | [Aims & Scope](#) | [Editorial Board](#) | [Guideline](#) | [Article Processing Charges](#)
[JEP](#) > Vol.1 No.2, June 2010



New Design & Build Biological System through the Use of Microalgae Addressed to Sustainable Development

PDF (Size: 477KB) PP. 183-200 DOI : 10.4236/jep.2010.12023

Author(s)

Armen B. Avagyan

ABSTRACT

Current trends in energy consumption and biofuel manufacturing are neither secure nor sustainable, because they are not provided by necessary cost effective technologies. Further reductions of cost and technological development will be needed for biofuels to be able to compete effectively without subsidy. With the debate raging about raw material of biofuel, microalgae may offer a solution to this conundrum; creating enormous reserves of biofuels and boosting feed production. In this goal Center suggest projects, which incorporate water recourse management and restoration of lakes, freshwater conservation and cleanup through cost effective biodiesel manufacturing as well as pharmaceuticals destruction through the use of microalgae Chlorella and wastewaters aimed to replace the burning technology includes also supplying biofuel profitably and developed pilot bussiness plan based on the cost effective technology through applying new innovative approaches in various stages of microalgae production. The benefits of microalgae are so overwhelming that this, combined with the prospect of the improvement in nature protection, makes it imperative for the world to devise an international response and a plan of action. Incentives will be needed for the development of industry-led platforms such as the World Microalgae Technology Platform and its international financial fund. Microalgae must be the key tool for the new design and building sustainable development and environment management.

KEYWORDS

Environmental Management, Microalgae, Algal Bloom, Lake Restoration, Biofuel, Feed Additive, Waste-water

Cite this paper

A. Avagyan, "New Design & Build Biological System through the Use of Microalgae Addressed to Sustainable Development," *Journal of Environmental Protection*, Vol. 1 No. 2, 2010, pp. 183-200. doi: 10.4236/jep.2010.12023.

References

- [1] International Fund for Agricultural Development, 2007. <http://www.ifad.org/climate/factsheet/e.pdf>
- [2] The World Bank, "Adaptation and Mitigation of Climate Change in Agriculture," World Development Report: Agriculture for Development, 2008. http://siteresources.worldbank.org/INTWDR2008/Resources/2795087-1192112387976/WDR08_15_Focus_F.pdf
- [3] R. Pachauri, "Where's the World's Plan of Action against Climate Change?" 2009. <http://www.guardian.co.uk/commentisfree/cif-green/2009/jun/23/climate-change-ipcc>
- [4] G. Platt, "A Bridge to Recovery," *Global Finance*, Vol. 23, No. 3, 2009, pp. 26-29. <http://www.gfmag.com/archives/33-march-2009/706-features-a-bridge-to-recovery.html>
- [5] A. B. Avagyan, "A Contribution to Global Sustainable Development: Inclusion of Microalgae and their Biomass in Production and Bio Cycles," *Clean Technologies and Environmental Policy*, Vol. 10, No. 4, 2008, pp. 313-317.
- [6] R. J. Clarke, "Water Crisis?" 2003. http://www.oecdobserver.org/news/fullstory.php/aid/935/Water_crisis_.html

- [Open Special Issues](#)
- [Published Special Issues](#)
- [Special Issues Guideline](#)

[JEP Subscription](#)
[Most popular papers in JEP](#)
[About JEP News](#)
[Frequently Asked Questions](#)
[Recommend to Peers](#)
[Recommend to Library](#)
[Contact Us](#)

Downloads:	301,495
Visits:	672,905

[Sponsors, Associates, and Links >>](#)

- [The International Conference on Pollution and Treatment Technology \(PTT 2013\)](#)

- [7] M. Zalewski, " Ecohydrology. IHP-V Project 2.3/2.4," United Nations Educational and Cultural Organization, McClain, Paris, 1998. <http://unesdoc.unesco.org/images/0011/001146/114659Eo.pdf>
- [8] D. A. Clifford, " Water Use Efficiency (WUE) Rule Development," Water Tap, Vol. 21, No. 3, 2005, pp. 10-12. http://www.doh.wa.gov/ehp/dw/Water_Tap/water_tap_june_2005.pdf
- [9] European Environment Agency, " Water Resources across Europe—Confronting Water Scarcity and Drought. EEA Report No. 2/2009," March 2009. <http://www.eea.europa.eu/publications/water-resources-across-europe>
- [10] W. J. Cosgrove and F. R. Rijsberman, " World Water Vision: Making Water Everybody's Business," Earthscan Publications, London, 2000. <http://www.worldwatercouncil.org/fileadmin/wwc/Library/WWVision/TableOfContents.pdf>
- [11] J. S. Ramsdell, D. M. Anderson and P. M. Gilbert, " HARN- NESS: Harmful Algal Research and Response: A National Environmental Science Strategy 2005-2015," Ecological Society of America, Washington, D.C., 2010, pp. 1-96. http://www.who.edu/cms/files/HARNNESS_18189_23044.pdf
- [12] C. B. Lopez, Q. Dortch, E. B. Jewett and D. Garrison, " Scientific Assessment of Marine Harmful Algal Blooms," Interagency Working Group on Harmful Algal Blooms, Hypoxia, and Human Health of the Joint Subcommittee on Ocean Science and Technology, Washington, D.C., 2008. http://ocean.ceq.gov/about/docs/jsost_marine_habs_1208.pdf
- [13] Soil and Water Conservation Society of Metro Halifax, " Biological Controls," 2006. <http://www.chebucto.ns.ca/ccn/info/Science/SWCS/biomanip.html>
- [14] P. Warrington. " Aquatic Pathogens Cyanophytes. The Blue- Green Algae," 2009. <http://www.env.gov.bc.ca/wat/wq/reference/cyanophytes.html>
- [15] A. Afsar and S. Groves, " Blue-Green Algae Management in Aquaculture," 1995. http://www.phoslock.com.au/new_docs/Front%20PAGE/Blue-Green%20Algae%20Management%20in%20Aquaculture.pdf
- [16] Soil & Water Conservation Society of Metro Halifax, " The Blue-Green Algae (Cyanobacteria)," 2007. <http://www.chebucto.ns.ca/ccn/info/Science/SWCS/cyano.html>
- [17] S. Pitso, B. A. Jacson, F. R. C. Path and B. J. B. Wood, " Sources of the Eutrophication Problems Associated with Toxic Algae: An Overview," Journal of Environmental Health, Vol. 64, No. 5, 2001, pp. 25-32. <http://www.co.what.com.wa.us/health/pdf/water/blue-green-algae-research.pdf>
- [18] P. Krasprzak, " Objectives of Biomanipulation," in: R. De Bernardi and G. Giusanni, Ed., Guidelines of Lake Management. Biomanipulation in Lakes and Reservoirs Management. UN Environment Program, Vol. 7, 1995, pp. 15-32. http://www.ilec.or.jp/eg/pubs/guideline/Vol.7_Biomanipulation.pdf
- [19] P. Kasprzak, J. Benndorf, T. Mehner and R. Koschel, " Biomanipulation of Lake Ecosystems: An Introduction," Freshwater Biology, Vol. 47, No. 12, 2002, pp. 2277-2281.
- [20] R. D. Gulati, " Manipulation of Fish Population for Lake Recovery from Eutrophication in the Temperate Region," in: R. De Bernardi and G. Giusanni, Ed., Guidelines of Lake Management. Biomanipulation in Lakes and Reservoirs Management, UN Environment Program, Vol. 7, 1995, pp. 53-80. http://www.ilec.or.jp/eg/pubs/guideline/Vol.7_Biomanipulation.pdf
- [21] B. Hilary, " U.K. Companies to Face More Risks under Environmental Directive," Business Insurance Europe, January 2009, p. 2.
- [22] International Energy Agency, " World Energy Outlook," 2006. <http://www.iea.org/textbase/nppdf/free/2006/weo2006.pdf>
- [23] Organization of the Petroleum Exporting Countries, " World Oil Outlook," 2008. <http://www.opec.org/library/World%20Oil%20Outlook/pdf/WOO2008.pdf>
- [24] The European Union, " An EU Strategy for Biofuels," Commission Communication, February 2006. <http://europa.eu/scadplus/leg/en/lvb/l28175.htm>
- [25] The European Union, " Report on the Progress Made in the Use of Biofuels and other Renewable Fuels in the Member States of the European Union," Commission Report on Biofuels, January 2007. http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=COMfinal&an_doc=2006&nu_doc=845

- [26] The European Union, "Transport at a Crossroads 2008. TERM 2008: Indicators Tracking Transport and Environment in the European Union," EEA Report No. 3/2009, 2008. <http://www.eea.europa.eu/publications/transport-at-a-crossroads>
- [27] Technical Advisory Committee & Biomass Research and Development Initiative, "Roadmap for Bioenergy and Biobased Products in the United States," Biomass Research and Development, 2007. <http://www.biomass.govtools.us>
- [28] United States Department of Agriculture, "USDA Targeted Incentives for Greenhouse Gas Sequestration," 2003. <http://www.usda.gov/news/releases/2003/06/fs-0194.html>
- [29] European Climate Change Programme Working Group, "ECCP Working Group on JI/CDM Conclusions," November 2002. http://ec.europa.eu/environment/climat/jicdm/jicdm_final_conclusions.pdf
- [30] Global Fuels Staff, "Global Industrial Energy Review," Global Fuels Magazine, February 2007, pp. 11-19.
- [31] Efeedlink, "More Ethanol in Gasoline will Mean Higher Meat, Feed Prices in the US," 2009. <http://www.efeedlink.com/Membership/dc15eb4f-c423-47b8-9e69-ad8f4bb25892.html>
- [32] A. Avagyan, "Global Prospects for Microalgae Production for Biofuels and for the Preservation of Nature," Global Fuel Magazine, February 2008, pp. 22-27. http://www.propubs.com/global-fuels/eGF_Feb08_LowRes.pdf
- [33] A. Avagyan, "Microalgae: Big Feed Potential in a Small Package," Feed International, Vol. 29, No. 2, 2008, pp. 16-18. <http://www.fi-digital.com/fi/200803/data/feedinternational200803-win32.zip>
- [34] D. R. Davis, M. D. Epp and H. D. Riordan, "Changes in USDA Food Composition Data for 43 Garden Crops, 1950 to 1999," Journal of the American College of Nutrition, Vol. 23, No. 6, 2004, pp. 669-682.
- [35] H. C. Indresh, "Organic Acids, Plant Extracts can be Effective Choice for Antibiotic Alternative," Feed International, Vol. 28, No. 8, 2007, pp. 10-12.
- [36] World of Renewables, "Taiwan Green Energy Industry Set to Boom after New Law Enacted," Renewables Today, Vol. 1, No. 2, 2009. <http://www.worldofrenewables.com/archive/index.php/t-34997.html>
- [37] A. Avagyan, "Microalgae Production Development Global Prospects and Profitable Technology Wasterwater Purification by the Use Microalgae," Water and Waste-water International, 2008. http://www.pennnet.com/articles/article_display.cfm?article_id=340236&dcmp=WaterWorldEnl
- [38] T. F. Riesing, "Cultivating Algae for Liquid Fuel Production," 2009. http://oakhavenpc.org/cultivating_algae.htm
- [39] J. Sheehan, T. Dunahay, J. Benemann and P. Roessler, "A Look Back at the US Department of Energy's Aquatic Species Program: Biodiesel from Algae," 2006. http://www1.eere.energy.gov/biomass/pdfs/biodiesel_from_algae.pdf
- [40] L. Weafer, "Food versus Fuel Debate Continues to Churn," Feed International, Vol. 29, No. 3, May 2008, p. 6.
- [41] O. Daniello, "An Algae-Based Fuel," Biofutur, No. 255, May 2005. http://www.greenfuelonline.com/gf_files/algae_fuel.pdf
- [42] "Algae Grow Your Own? Algal Biodiesel: Fact or Fiction?" 2008. <http://www.americanscientist.org/template/AssetDetail/assetid/53356>; <http://i-r-squared.blogspot.com/2007/05/algal-biodiesel-fact-or-fiction.html>
- [43] Chevron Corporation and National Renewable Energy Laboratory, "Chevron Using Algae," 2007. <http://www.chevron.com/news/press/release/?id=2007-10-31>; <http://www.greencarcongress.com/2007/10/chevron-and-nre.html>
- [44] J. LeCrone, "Why Algae-to-Biofuels? Why Not Now?" 2008. <http://biz.yahoo.com/iw/080324/0378475.html>
- [45] G. Sweeney, "Shell and HR Biopetroleum Form Joint Venture for Algal Biofuel Production," 2007. <http://www.greencarcongress.com/2007/12/shell-and-hr-bi.html>

- [46] Aquaflo Bionomin, 2007. <http://www.bio-diesel.co.nz>
- [47] AlgoDyne, 2007. <http://www.algodynecorp.com>
- [48] Maes Anturio, 2007. <http://www.maesanturio.org>
- [49] Solix Biofuels, 2007. <http://www.solixbiofuels.com>
- [50] ExxonMobil Corporation, "ExxonMobil to Launch Bio-fuels Program," 2009. http://www.businesswire.com/portal/site/exxonmobil/index.jsp?ndmViewId=news_view&ndmConfigId=1001106&newsId=20090714005554&newsLang=en
- [51] "Chinese Company Uses Innovative Approach to Make Biofuel," 2009. http://english.ntdtv.com/ntdtv_en/ns_china/2009-10-21/862888436184.html
- [52] World Health Organization, "Guidelines for Safe Disposal of Unwanted Pharmaceuticals in and after Emergencies," 1999. http://www.who.int/water_sanitation_health/medical_waste/unwantpharm.pdf
- [53] M. Veasna and V. O. A. Khmer, "Original Report from Phnom Penh," 2007. <http://ki-media.blogspot.com/2007/05/us-dea-pledges-50000-for-pharmaceuticals.html>
- [54] Health Research Association, "Pharmaceuticals Returns & Destruction," 2009. <http://www.health-research.org/files/pharmacy/PharmaceuticalsReturns.pdf>.
- [55] Environmental Protection Agency, "Unused Pharmaceuticals in the Health Care Industry: EPA Interim Report," 2008. <http://epa.gov/guide/304m/2008/hsi-PRELIM-study-200808.pdf>
- [56] "Proceedings of the Roundtable Discussion on Managing Unused Pharmaceuticals in NYS," 15 May 2008, pp. 1-9. <http://www.mass.gov/dep/toxics/stypes/nypharm.pdf>
- [57] Environmental Protection Agency, "Solving the Pharmaceuticals Disposal Problem through Product Stewardship," 2006. <http://www.calpsc.org/assets/ppt/PharmaceuticalsDec06fd.ppt>
- [58] United States Department of Agriculture, "Release No. 0067.08, 2008. http://www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_1RD?printable=true&contentidonly=true&contentid=2008/03/0067.xml
- [59] M. Edwards, "The Algal Industry Survey," Arizona State University & Center for Management Technology, Tempe, 2009. <http://www.futureenergyevents.com/algae/survey/>