

REFERENCES

- Abioye, O. P, Abdul Aziz, A, Agamuthu, P. (2009b). Stimulated biodegradation of used lubricating oil in soil using organic wastes. *Malaysian Journal of Science*. 28(2): 127 – 133.
- Abioye, O. P, Abdul Aziz, A, Agamuthu, P. (2010). Enhanced Biodegradation of Used Engine Oil in Soil Amended with Organic Wastes. *Water Air and Soil Pollution*. 209: 173 – 179.
- Abioye, O.P, Alonge, O.A, Ijah, U.J.J. (2009a) Biodegradation of crude oil in soil amended with melon shell. *Assumption University Journal of Technology* 13(1): 34 – 38.
- Abhilash, P.C. Jamil, S., Singh, N. (2009) Transgenic plants for enhanced biodegradation and phytoremediation of organic xenobiotics, *Biotechnology Advances* 27: 474 – 488.
- Adam, G., Duncan, H. (2002) Influence of diesel fuel on seed germination. *Environmental Pollution* 120:363–70.
- Adams, N, Carroll, D, Madalinski, K, Rock, S, Wilson, T, Pivetz, B. (2000) Introduction to phytoremediation. National Risk Management Research Laboratory. Office of Research and Development. US EPA Cincinnati, Ohio. EPA/600/R-99/107.
- Adegoroye G (1997). Environmental Considerations in Property Design, Urban Development and Renewal In. Akinjide O (Ed). *Dimensions of Environmental Problems in Nigeria*. Friedrich Ebert Foundation. pp: 12-25.
- Adelowo, O.O., Alagbe, S.O., Ayandele, A.A. (2006). Time-dependent stability of used engine oil degradation by cultures of *Pseudomonas fragi* and *Achromobacter aerogens*. *African Journal of Biotechnology* 5(24): 2476-2479
- Adesodun, J.K., Mbagwu, J.S.C. (2008). Biodegradation of waste lubricating petroleum oil in a tropical alfisol as mediated by animal droppings. *Bioresource Technology* 99: 5659-5665
- Adesodun, J.K., Atayese, M.O., Agbaje, T.A., Osadiaye, B.A., Mafe, O.F., Soretire, A.A. (2010) Phytoremediation potential of sunflowers (*Tithonia diversifolia* and

- Helianthus annuus*) for metals in soil contaminated with lead and zinc nitrates. *Water, Air and Soil Pollution* 207:195 – 201.
- Adriana, R., Graciano, C., Norma, R., Ma.Dolores, D. and Refugio, R. (2007). Solid culture amended with small amounts of raw coffee beans for the removal of petroleum hydrocarbon from weathered contaminated soil. *International Biodeterioration and Biodegradation*. 60:35-39
- Agamuthu, P., Abioye, O.P., Abdul Aziz, A. (2010). Phytoremediation of soil contaminated with used lubricating oil using *Jatropha curcas*. *Journal of Hazardous Materials* 179: 891 – 894.
- Ahn, YH, Sanseverino, J, Sayler, G.S. (1999). Analyses of polycyclic aromatic hydrocarbon- degrading bacteria isolated from contaminated soils. *Biodegradation* 10: 149–157.
- Aken, B. V. (2008) Transgenic plants for phytoremediation: helping nature to clean up environmental pollution. *Trends in Biotechnology* 26(5): 225 – 227.
- Alberdi, M., Moldowan, J. M., Peters, K. E. and Dahl, J. E. (2001). Stereoselective biodegradation of tricyclic terpanes in heavyoils from Bolivar Coastal Field, Venezuela. *Organic Geochemistry* 32:181 - 191.
- Alexander M (1999). *Biodegradation and Bioremediation* (2nd edition) Academic Press, San Diego.
- Alexander, M. (2001) *Biodegradation and bioremediation*, 2nd edition. Academic Press, San Diego, Calif.
- Alexander, M., (1994). *Biodegradation and Bioremediation*. Academic Press, San Diego, CA.
- Allard, A. S. and Neilson, A. H. (1997). Bioremediation of organic waste sites: A critical review of microbiological aspects. *International Biodeterioration & Biodegradation*. 39: 253-285.

- AL-Saleh, E.S, Obuekwe, C. (2005). Inhibition of hydrocarbon bioremediation by lead in a crude oil-contaminated soil. *International Biodeterioration and Biodegradation*. 56: 1–7.
- Aluyor, E. O., Ori-Jesu, M. (2009) Biodegradation of mineral-oils – a review. *African Journal of Biotechnology* 8(6): 915 – 920.
- Amadi, A., Dickson, A.A., Maate, G.O. (1993) Remediation of oil polluted soils: Effects of organic and inorganic nutrient supplements on the performance of maize (*Zea may* L.). *Water Air and Soil Pollution* 66: 59 – 76.
- Amro, M.M. (2004) Factors affecting chemical remediation of oil contaminated water-wetted soil. *Chemical Engineering Technology* 27: 890–894.
- Amund, O.O, Omole, A.C. Esiobu, N. and Ugoji, O.E. (1993). Effect of waste engine oil spillage on soil physicochemical and microbiological properties. *Journal of Science and Resource Development* (1): 61-64 .
- Anderson, J.W., J.M. Neff, B.A. Cox, H.E. Tatem and G.M. Hightower. (1974). Characteristics of dispersions and watersoluble extracts of crude and refined oils and their toxicity to estuarine crustaceans and fish. *Marine Biology* 27:75-88.
- Anoliefo, G.O., Vwioko, D.E., (1995). Effect of spent lubricating oil on the growth of *Capsicum annum* L and *Lycopersicon esculentum* Mill. *Environmental Pollution* 99: 361–364.
- Antai S.P (1990). Biodegradation of Bonny light crude oil by *Bacillus* sp. and *Pseudomonas* sp. *Waste Management*. 10: 61–64.
- Antai, S P.and Mgbomo, E. (1989). Distribution of hydrocarbon utilizing bacteria in oil-spill areas. *Microbial Letters* 40:137-143.

- Antizar-Ladislao B, Lopez-Real J, Beck AJ (2005a) In-vessel composting bioremediation of aged coal tar soil: effect of temperature and soil/green waste amendment ratio. *Environment International* 31:173–178.
- Antizar-Ladislao B, Lopez-Real J, Beck AJ (2005b) Laboratory studies of the remediation of polycyclic aromatic hydrocarbon contaminated soil by in-vessel composting. *Waste Management* 25:281–289
- Antizar-Ladislao B, Lopez-Real J, Beck AJ (2006) Degradation of polycyclic aromatic hydrocarbons (PAHs) in an aged coal tar contaminated soil under in-vessel composting conditions. *Environmental Pollution* 141:459–468.
- Antizar-Ladislao, B., Lopez-Real, J. M. and Beck, A. J. (2004). Bioremediation of polycyclic aromatic hydrocarbons (PAH)-contaminated waste using composting approaches. *Critical Review in Environmental Science and Technology*. 34: 249 – 289.
- Atagana, H. I., Haynes, R. J. and Wallis, F. M. (2003). Co-composting of soil heavily contaminated with creosote with cattle manure and vegetable waste for bioremediation of creosote contaminated soil. *Soil and Sediment Contamination*. 12: 885 – 899.
- Atlas R. M (1984). Pathways of hydrocarbon degradation. In: *Petroleum Microbiology*. Macmillan Publishing Company, New York, USA, pp. 1- 15.
- Atlas R.M, Bartha R (1998). Fundamentals and Applications. In: *Microbial Ecology*. 4th edition. Benjamin/Cummings Publishing Company, Inc. California, USA, pp. 523-530.
- Atlas R.M, Bartha R. (1973). Simulated biodegradation of oil slicks using oleophilic fertilizers. *Environmental Science Technology* 7:538-541.

- Atlas RM (1981). Microbial degradation of petroleum hydrocarbons: an environmental perspective. *Microbiology Review* 45:180-209.
- Atlas, R. M. (1975). Effects of temperature and crude oil composition on petroleum biodegradation. *Applied Microbiology*. 30:396-403.
- Atlas, R. M. (1988). *Microbiology: fundamentals and applications*, 2nd ed., Macmillan Publishing Co., New York. p. 352-353.
- Atlas, R. M. and Bartha, R. (1992). Hydrocarbon biodegradation and oil spill bioremediation. In: Marshall, K. C. (ed.) *Advances in Microbial Ecology*. Vol. 12. Plenum Press, New York. pp. 287-338.
- Atlas, R. M., and R. Bartha. (1972). Biodegradation of petroleum in seawater at low temperatures. *Canadian Journal of Microbiology*. 18:1851-1855.
- Atlas, R.M. (1981). Microbial degradation of petroleum hydrocarbons: An environmental perspective. *Microbiology Review* 45:180-209.
- Atlas, R.M., Bartha, R., (1998) *Microbial ecology: Fundamentals and applications*. Benjamin/Cummings publishing Company Inc., Don Mills.
- Avakian, M.D. (2004) Quantifying enhanced in-situ TCE biodegradation. Research brief 109 [online] NIEHS/EPA superfund basic research program. <http://www-apps.nih.gov> (accessed on 28th March, 2009)
- Azam, M.M, Waris, A, Nahar N.M. (2005). Prospects and potential of fatty acid methyl esters of some non-traditional seed oils for use as biodiesel in India. *Biomass Bioenergy* 29:293–302.
- Bada, B.S., Raji, K.A. (2010). Phytoremediation potential of kenaf (*Hibiscus cannabinus* L.) grown in different soil textures and cadmium concentration. *African Journal of Environmental Sciences and Technology* 4(5): 250 – 255.

- Bagherzadeh N. A, Shojaosadati S. A, Hashemi N. S (2008) Biodegradation of used engine oil using mixed and isolated cultures. *International Journal of Environmental Research* 2(4): 431 – 440.
- Baker J.A. (1995) Evaluation of the Natural Biodegradation of Jet Fuel JP- 8 in Various Soils Using Respirometry. Master Thesis for the Air Force Institute of Technology, Wright Patterson AFB, Ohio USA.
- Balasubramaniam, A., Boyle, A.R., Voulvoulis, N. (2007). Improving petroleum contaminated land remediation decision making through the MCA weighting process. *Chemosphere* 66: 791 – 798.
- Balba, M.T., Al-Daher, R., Al-Awadhi, N., Chino, H., Tsuji, H., (1998). Bioremediation of oil-contaminated desert soil: the Kuwaiti experience. *Environmental International* 24: 163–173.
- Banks, M.K., Schultz, K.E. (2005) Comparison of plants for germination toxicity test in petroleum contaminated soil. *Water, Air, and Soil Pollution* 167: 211–219.
- Barahona, L. M., Vazquez, R. R., Velasco, M. H., Jarquin, C. V., Perez, O. Z., Cantu, A. M., Albores, A. (2004) Diesel removal from contaminated soils by biostimulation and supplementation with crop residues. *Applied Soil Ecology* 27: 165 – 175.
- Barahona, L., Veg-Loyo, L., Guerrero, M., Ramirez, S., Romero, I., Vega-Jarquin, C., Albores, A. (2005) Ecotoxicological evaluation of diesel-contaminated soil before and after bioremediation process. *Environmental Toxicology* 20(1): 100 – 109.
- Baraniecki, C.A., Aislabie, J., Foght, J.M. (2002). Characterization of *Sphingomonas* sp. Ant 17, an aromatic hydrocarbon-degrading bacterium isolated from Antarctic soil. *Microbial Ecology* 43: 44–54.

- Barathi S, N Vasudevan (2001). Utilization of petroleum hydrocarbons by *Pseudomonas fluorescens* isolated from a petroleum-contaminated soil. *Environment International* 26: 413 – 416.
- Bartha, R. (1986a). *Microbial ecology: fundamentals and applications*. Addison Wesley Publ., Reading, Mass.
- Bartha, R. (1986b). Biotechnology of Petroleum pollutant biodegradation. *Microbial Ecology* 12:155-172.
- Bartha R, Atlas R.M (1977). The microbiology of aquatic oil spills. *Advances in Applied Microbiology* 22: 225-266.
- Bartha, R. and Bossert, I. (1984). The treatment and disposal of petroleum refinery wastes. In: Atlas, R. M. (ed.) *Petroleum Microbiology*, Macmillan, New York, pp. 553-557.
- Bazin, M. J., Saunders, P. T., & Prosser, J. I. (1976) Models of microbial interactions in the soil. *CRC Critical Reviews in Microbiology* 4(4): 463–498.
- Beattie, V.E., Sneddon, I.A., Walker, N., Weatherup, R.N. (2001). Environmental enrichment of intensive pig housing using spent mushroom compost. *Animal Science* 72 (Part 1), 35–42.
- Bej, A.K., Saul, D. and Aislabie, J. (2001). Cold-tolerant alkane-degrading *Rhodococcus* species from Antarctica. *Polar Biology* 23:100-105.
- Bento, F.M., Camargo, F.O.A., Okeke, B.C., Frankenberger, W.T., 2005. Comparative bioremediation of soils contaminated with diesel oil by natural attenuation, biostimulation and bioaugmentation. *Bioresource Technology* 96, 1049–1055.
- Bhattacharya D, P.M Sarma, S Krishnan, S Mishra, B Lal, (2002). Evaluation of genetic diversity among *Pseudomonas citronellolis* strains isolated from oily sludge-contaminated sites. *Applied Environmental Microbiology* 69(3): 1435–1441.

- Biederbeck, V.O., Bouman, O.T., Campbell, C.A., Bailey, L.D., Winkleman, G.E. (1996) Nitrogen benefits from four-green manure legumes in dryland cropping systems. *Canadian Journal of Plant Science* 76: 307 – 315.
- Blaylock, M.J., Salt, D.E., Dushenkov, S., Zakharova, O., Gussman, C., Kapulnik, Y., Ensley, B.D., Raskin, I. (1997) Enhanced accumulation of Pb in Indian mustard by soil-applied chelating agents. *Environmental Science and Technology* 31:860 – 865.
- Blodgett W.C. (2001). Water-soluble mutagen production during the bio-remediation of oil-contaminated soil. *Florida Scientist*. 60(1):28–36.
- Bogan, B.W. and Lamar, R.T. (1996). Polycyclic aromatic hydrocarbon degrading capabilities of *Phanerochaete laevis* HHB-1625 and its extracellular ligninolytic enzymes. *Applied and Environmental Microbiology* 62:1597 – 1603.
- Boonchan S, Britz, M.L., Stanley G.A. (2000). Degradation and Mineralization of high-molecular weight polycyclic aromatic hydrocarbons by defined fungal-bacterial cocultures. *Applied Environmental Microbiology* 66(3): 1007–1019.
- Borressen, M., Breedveld, G. D., Rike, A. G. (2003) Assessment of the biodegradation potential of hydrocarbons in contaminated soil from a permafrost site. *Cold Regions Science and Technology* 37: 137 – 149.
- Bossert, I., and Bartha, R. (1984). The fate of petroleum in soil ecosystems, In: R. M. Atlas (ed.), *Petroleum microbiology*. Macmillan Publishing Co., New York. p. 434-476.
- Bouchez, M., Blanchet, D. and Vandecasteele, J. P. (1995). Degradation of polycyclic aromatic hydrocarbons by pure strains and defined strain associations: Inhibition phenomena and cometabolism. *Applied Microbiology and Biotechnology*. 43: 156-164.
- Bouchez, M., Blanchet, D., Bardin, V., Haeseler, F. and Vandecasteele, J. P. (1999). Efficiency of defined strains and of soil consortia in the biodegradation of

- polycyclic aromatic hydrocarbon (PAH) mixtures. *Biodegradation*. 10: 429-435.
- Bouchez, M., Blanchet, D., Van-decasteele, J.P. (1995) Substrate availability in phenanthrene biodegradation: transfer mechanism and influence on metabolism. *Applied Microbiology and Biotechnology* 43: 952 – 950.
- Boughton, B., Horvath, A. (2004) Environmental assessment of used oil management methods. *Environmental Science and Technology* 38: 353–358
- Bouwer, E.J. and Zehnder, A.J.B. (1993). Bioremediation of organic compounds – putting microbial metabolism to work. *Trends in Biotechnology* 11:360 – 367.
- Boyajian, G. E, Carreira, L. H (1997) Phytoremediation: a clean transition from laboratory to marketplace. *Nature and Biotechnology* 15:127–128.
- Broderick, L. S., and J. J. Cooney. (1982). Emulsification of hydrocarbons by bacteria from freshwater ecosystems. *Development and Industrial Microbiology* 23:425-434.
- Bumpus J.A. (1989) Biodegradation of polycyclic aromatic hydrocarbons by *Phanerochaete chrysosporium*. *Applied Environmental Microbiology* 55:154–158
- Caldwell, M.E., Garrett, R.M., Prince, R.C. and Suflita, J.M. (1998). Anaerobic biodegradation of long chain n-alkanes under sulfate-reducing conditions. *Environmental Science and Technology* 32:2191-2195.
- Cao, B., Nagarajan, K., Loh, K. (2009) Biodegradation of aromatic compound: current status and opportunities for biomolecular approaches. *Applied Microbiology and Biotechnology* 85: 207 – 228.
- Cerniglia C.E, Sutherland J.B. (2001) Bioremediation of polycyclic aromatic hydrocarbons by ligninolytic and non-ligninolytic fungi. In: Gadd GM (ed)

- Fungi in bioremediation. Cambridge University Press, Cambridge, pp 136–187
- Cerniglia, C.E. (1993). Biodegradation of polycyclic aromatic hydrocarbons. *Current Opinion in Biotechnology* 4, 331-338.
- Chaillan F, Chameau C.H, Point V, Saliot A, Oudot J (2006). Factors inhibiting bioremediation of soil contaminated with weathered oils and drill cuttings. *Environmental Pollution*. 144:228 - 237
- Chaineau, C.H., Morel, J.L., Oudot, J. (1997) Phytotoxicity and plant uptake of fuel oil hydrocarbons. *Journal of Environmental Quality* 26: 1478 – 1483.
- Chameau CH, Rougeux G, Yepremian C, Oudot J (2005). Effects of nutrient concentration on the biodegradation of crude oil and associated microbial populations in the soil. *Soil Biology and Biochemistry* 37:1490-1497.
- Chakraborty, R., Coates, J.D. (2004) Anaerobic degradation of monoaromatic hydrocarbons. *Applied Microbiology and Biotechnology* 64: 437 – 446.
- Chang, W., Dyen, M., Spagnuolo, L., Simon, P., Whyte, L., Ghoshal, S. (2010) Biodegradation of semi and non-volatile petroleum hydrocarbons in aged, contaminated soils from sub-arctic site: Laboratory pilot-scale experiments at site temperatures. *Chemosphere* 80: 319 – 326.
- Chaudhry, Q, Blom-Zandstra, M, Gupta, S, Joner, E. J. (2005) Utilizing the synergy between plants and rhizosphere microorganisms to enhance breakdown of organic pollutants in the environment. *Environmental Science Pollution Research* 12: 34 – 48.
- Chen, G.Q., Zeng, G.M., Tu, X., Huang, G.H., Chen, Y.N. (2005). A novel biosorbent: characterisation of the spent mushroom compost and its application for removal of heavy metals. *Journal of Environmental Sciences – China* 17 (5):756–760.

- Cheng, Z. (2001). Kenaf research products and applications in Japan. *Plant Fibres and Products* 23(3): 16-24.
- Chiu, S. W., Gao, T., Chan, C. S. S., Ho, C. K. M. (2009) Removal of spilled petroleum soils by spent compost of mushroom *Pleurotus pulmonarius*. *Chemosphere* 75: 837 – 842.
- Choi S-C, Kwon K.K, Sohn J.H, Kim S-J (2002). Evaluation of fertilizer additions to stimulate oil biodegradation in sand seashore mesocosms. *Journal of Microbiology and Biotechnology* 12:431-436.
- Clemente A.R, Anazawa T.A, Durrant L.R (2001) Biodegradation of polycyclic aromatic hydrocarbons by soil fungi. *Brazilian Journal of Microbiology* 32:255–261.
- Collina, E., Bestetti, G., Di Gennaro, P., Franzetti, A., Gugliersi, F., Lasagni, M., & Pitea, D. (2005). Naphthalene biodegradation kinetics in an aerobic slurry-phase bioreactor. *Environment International*, 31(2): 167–171.
- Colombo, J., Cabello, M., Arambarri, A.M. (1996). Biodegradation of aliphatic and aromatic hydrocarbons by natural soil microflora and pure cultures of imperfected and lignolytic fungi. *Environmental Pollution* 94: 355–362.
- Corgie, S.C., Beguiristain, T., Leyval, C. (2004) Spatial distribution of bacterial communities and phenanthrene degradation in the rhizosphere of *Lolium perenne* L. *Applied Environmental Microbiology* 70: 3552–3557.
- Cornfield, A. H. (1961). A simple technique for determining mineralization of carbon during incubation of soil treated with organic materials. *Plant and Soil* 9(1): 90 – 93.
- Coulon, F., Pelletier, E., St. Louis, R., Gourhant, L., Delille, D. (2004) Degradation of petroleum hydrocarbons in two sub-antarctic soils: influence of an oleophilic fertilizer. *Environmental Toxicology and Chemistry* 23: 1893 – 1901.

- Cunningham, C.J., Philip, J.C. (2000) Comparison of bioaugmentation and biostimulation in ex situ treatment of diesel contaminated soil. *Land Contamination and Reclamation* 8, 261–269.
- Cunningham, J. A, Hopkins, G. D., Lebron, C. A. and Reinhard, M. (2000). Enhanced anaerobic bioremediation of groundwater contaminated by fuel hydrocarbons at Seal Beach, California. *Biodegradation*. 11: 159-170.
- Cutright, T.J. (1995) Polycyclic aromatic hydrocarbon biodegradation and kinetics using *Cunninghamella echinulata* var. *elegans*. *International Journal of Biodeterioration and Biodegradation* 35(4): 397 – 408.
- D’Annibale, A., Rosetto, F., Leonardi, V., Federici, F., Petruccioli, M., (2006). Role of autochthonous filamentous fungi in bioremediation of a soil historically contaminated with aromatic hydrocarbons. *Applied and Environmental Microbiology* 72: 28–36.
- Das, K, Mukherjee, A.K. (2007). Crude petroleum-oil biodegradation efficiency of *Bacillus subtilis* and *Pseudomonas aeruginosa* strains isolated from petroleum oil contaminated soil from North–East India. *Bioresource Technology*. 98, 1339–1345.
- Diab, E.A. (2008) Phytoremediation of oil contaminated desert soil using rhizosphere effects. *Global Journal of Environmental Research* 2(2): 66 – 73.
- Dejonghe, W., Boon, N., Seghers, D., Top, E.M., Verstraete, W. (2001) Bioaugmentation of soils by increasing microbial richness: missing links. *Environmental Microbiology* 3: 649 – 657.
- Delille, D. (2000). Response of Antarctic soil assemblages to contamination by diesel fuel and crude oil. *Microbial Ecology* 40: 159–168.
- Dibble, J. T. and Bartha. R. (1979). Effect of environmental parameters on the biodegradation of oil sludge. *Applied Environmental Microbiology* 37:729-739.
- Ding, K. Q. and Luo, Y. M. (2001). Bioremediation of oil contaminated soil. *Soils (in Chinese)*. 33(4): 179-196.

- Divakara, B.N., Upadhyaya, H.D, Wani, S.P., Laxmipathi, C.L. (2010) Biology and genetic of *Jatropha curcas* L.: A review. *Applied Energy* 87: 732 – 742.
- Doelman, P, Breedveld, G. (1999) In situ versus on site practices. In: Andriano, D. C, Bollag, J. M, Frankenberger, W. T. Jr, Sims, R. C. (editors) *Bioremediation of contaminated soils*. Agronomy No. 37, American Society of Agronomy, Inc. Soil Science Society of America, Inc. Madison, Wisconsin, USA pp. 539 – 558.
- Dominguez-Rosado, E., Pichtel, J. (2005) Transformation of fulvic substances in the rhizosphere during phytoremediation of used motor oil. *Journal of Environmental Science and Health* 39: 2369 – 2381.
- Doucette, W.J. (2003) Quantitative structure-activity relationships for predicting soil sediment sorption coefficients for organic chemicals. *Environmental Toxicology Chemistry* 22: 1771–1788.
- Dowling, D. N, Doty, S. L. (2009) Improving phytoremediation through biotechnology. *Current Opinion in Biotechnology* 20: 204 – 206.
- Eckford, R., Cook, F.D., Saul, D., Aislabie, J., Foght, J. (2002). Free-living heterotrophic nitrogen-fixing bacteria isolated from fuel-contaminated Antarctic soils. *Applied Environmental Microbiology* 68: 5181–5185.
- Edewor T. I., Adelowo O. O., Afolabi T. J. (2004). Preliminary Studies Into The Biological Activities Of A Broad Spectrum Disinfectant Formulated From Used Engine Oil. *Pollution Research* 23(4): 581-586
- Edwards, N.T., Ross-Todd, B.M., Garver, E.G. (1982). Uptake and metabolism of ¹⁴C anthracene by soybean (*Glycine max*). *Environmental and Experimental Botany* 22:349-357.

- Edwards, C.A. (2002) Assessing the effects of environmental pollutants on soil organisms, communities, processes and ecosystems. *European Journal of Soil Biology* 38: 225 – 231.
- Eggen, T. (1999). Application of fungal substrate from commercial mushroom production- *Pleurotus ostreatus*- for bioremediation of creosote contaminated soil, *International Biodeterioration and Biodegradation*. 44: 117–126.
- Elektorowicz, M. (1994) Bioremediation of petroleum-contaminated clayey soil with pretreatment. *Environmental Technology* 15: 373– 380.
- Environment Canada. (1994). Waste Crankcase Oils: Priority Substances List Assessment Report. Canadian Environmental Protection Act. C-94-980084-8. Minister of Supply and Services, Canada. 39 pp.
- EPA (2005) Innovative remediation technologie: Field scale demonstration projects in North America-Report and database. <http://www.clu-in.org/products/nairt/default.cfm>
- EPA (2001a). A citizen's guide to soil vapour extraction and air sparging. EPA 542-F-01-006.
- EPA, (1991) Survey of Materials-Handling Technologies Used at Hazardous Waste Sites, EPA, ORD, Washington, DC, EPA/540/2-91/010.
- EPA, (2001b). A citizen's guide to monitored natural attenuation. EPA 542-F-01-004.
- Eriksson M, Dalhammer G, A.K Borg–Karlson. (1999). Aerobic degradation of a hydrocarbon mixture in natural uncontaminated potting soil by indigenous microorganisms at 20°C and 6°C. *Appl. Microbiol. Biotechnol.* 51: 532–535.
- Essien J.P, Akpan E.J, Essien E.P (2005). Studies on mould growth and biomass production using waste banana peel. *Bioresource Technology* 96:1451 - 1456.

- Euliss, K, Ho, C, Schwab, A. P, Rock, S, Banks, M. K. (2008) Greenhouse and field assessment of phytoremediation for petroleum contaminants in a riparian zone. *Bioresource Technology* 99:1961 – 1971.
- European Chemicals Bureau (1992) Part C: methods for the determination of ecotoxicity, algal inhibition test. Methods for the Determination of physico-chemical properties, toxicity and ecotoxicity. Institute for Health and Consumer Protection, Joint Research Centre–European Commission, Via Fermi, Italy.
- Faboya O.O.P (1997). Industrial Pollution and Waste Management in Akinjide O (Ed). Dimensions of Environmental Problems in Nigeria. Friedrich Ebert Foundation. pp: 12-25.
- Fact foundation (2006). Handbook of *Jatropha curcas*.
- Farrell, R.E., Germida, J.J. (2002) Phytotechnologies: Plant-based systems for remediation of oil impacted soils. www.esaa-events.com/remtech/2002/pdf/09Farrellpaper.pdf. (Accessed on 5th July, 2010).
- Fazaeli, H., Masoodi, A.R.T.(2006). Spent wheat straw compost of *Agaricus bisporus* mushroom as ruminant feed. *Asian-Australasian Journal of Animal Sciences* 19 (6), 845–851.
- Ferro, A.M, Rock, S.A, Kennedy, J, Herrick, J.J, Turner, D.L. (1999) Phytoremediation of soils contaminated with wood preservatives: greenhouse and field evaluations. *International Journal of Phytoremediation* 1: 289–306.
- Foght, J. (2002) Anaerobic biodegradation of aromatic hydrocarbons: pathways and prospect. *Journal of Molecular Microbiology and Biotechnology* 15: 93 – 120.

- Foidl, N, Foidl, G, Sanchez, M, Mittelbach, M, Hackel, S. (1996) *Jatropha curcas* L. as a source for the production of biofuel in Nicaragua. *Bioresource Technology* 58:77–82.
- Francis, G, Edinger, R, Becker, K. (2005). A concept for simultaneous wasteland reclamation, fuel production, and socio-economic development in degraded areas in India: need, potential and perspectives of *Jatropha* plantations. *Natural Resources Forum* 29:12–24.
- Frederic, C., Emilien, P., Lenaick, G and Daniel, D. (2005). Effects of nutrient and temperature on degradation of petroleum hydrocarbons in contaminated sub-Antarctic soil. *Chemosphere* 58: 1439 – 1448.
- FRTR (2005) Federal remediation technologies roundtable remediation screening matrix and reference guide. http://www.frtr.gov/matrix2/top_page.html
- Gallego, J. L. R., Loredó, J., Llamas, J. F., Vázquez, F. and Sanchez, S. (2001). Bioremediation of diesel-contaminated soils: Evaluation of potential in situ techniques by study of bacterial degradation. *Biodegradation*. 12: 325-335.
- Gao, Y. & Zhu, L. 2004. Plant uptake, accumulation and translocation of phenanthrene and pyrene in soils. *Chemosphere* 55, 1169-1178.
- Gent, M.P.N., Elmer, W.H., Stoner, K.A., Ferrandino, F.J., La Mondia, J.A. (1998). Growth, yield and nutrition of potato in fumigated or nonfumigated soil amended with spent mushroom compost and straw mulch. *Compost Science and Utilization* 6 (4): 45–56.
- Gentry TJ, Rensing C, Pepper IL (2004) New approaches for bioaugmentation as a remediation technology. *Crit Rev Environ Sci Technol* 34:447–494.
- George, S.C., Boreham, C.J., Minifie, S.A. & Teerman, S.C. (2002). The effects of minor to moderate biodegradation on C5 to C9 hydrocarbons in crude oils. *Organic Geochemistry*: 1293-1317.

- Gerhardt, K. E, Greenberg, B. M, & Glick, B. R. (2006) The role of ACC deaminase in facilitating the phytoremediation of organics, metals and salt. *Current Trend in Microbiology* 2: 61 – 72.
- Gerhardt, K. E, Huang, X. D, Glick, B. R, & Greenberg, B. M. (2009) Phytoremediation and rhizoremediation of organic soil contaminants: potential and challenges. *Plant Science* 176: 20 – 30.
- Gibb, A., Chu, A., Wong, R.C.K., & Goodman, R.H. (2001). Bioremediation kinetics of crude oil at 5 degrees. *Canadian Journal of Environmental Engineering* 127: 818–824.
- Gibson, D.T. and Subramanian, V. (1984). Microbial degradation of aromatic hydrocarbons. In: *Microbial Degradation of Organic Compounds* ed. Gibson, D.T. New York.
- Gottschalk, G. (1986) *Bacterial metabolism* 2nd edition. Springer-verlag, New York.
- Gray, M.R., Banerjee, D.K., Dudas, M.J., Pickard, M.A. (2000). Protocols to enhance biodegradation of hydrocarbon contaminants in soil. *Bioremediation Journal* 4: 249–257.
- Greenberg, B. M. (2006) Development and field tests of a multi-process phytoremediation system for decontamination of soils. *Canadian Reclamation* 1: 27 – 29.
- Greene, E. A., Kay, J. G., Jaber, K., Stehmeier, G., Voordouw, G. (2000) Composition of soil microbial communities enriched on a mixture of aromatic hydrocarbons. *Applied and Environmental Microbiology* 66(12): 5282–5289.

- Greenwood, P.F., Wilbrow, S., George, S.J., Tibbett, M. (2009) Hydrocarbon biodegradation and soil microbial community response to repeated soil exposure. *Organic Geochemistry* 40:293 – 300.
- Grossi, V., Massias, D., Stora, G., & Bertrand Burial, J. C. (2002). Exportation and degradation of acyclic petroleum hydrocarbons following simulated oil spill in bioturbated Mediterranean coastal sediments. *Chemosphere*, 48(9): 947–954.
- Guerin, T. F. (2001a). Co-composting of pharmaceutical wastes in soil. *Letter of Applied Microbiology* 33: 256 – 263.
- Guerin, T. F. (2001b). Co-composting of residual fuel contamination in soil. *Soil and Sediment Contamination*. 10: 659 – 673.
- Haderlein A, Legros R, Ramsay BA (2006) Pyrene mineralization capacity increases with compost maturity. *Biodegradation* 17:293 – 302.
- Hagwell I.S., Delfino, L.M., Rao, J.J. (1992). Partitioning of Polycyclic Aromatic Hydrocarbons from oil into water. *Environ. Sci. Technol.* 26: 2104– 2110.
- Hamaker, W. (1972). Decomposition: Quantitative aspects. In C. A. I. Goring, J. W. Hamaker, & J. Thomson (Eds.), *Organic chemicals in the soil environment*. Dekker,
- Hambrick, G. A., DeLaune, R. D. and Patrick, Jr. W. H. (1980). Effect of estuarine sediment pH and oxidation-reduction potential on microbial hydrocarbon degradation. *Appl. Environ. Microbiol.* 40:365-369.
- Harder, E. (2004). *Bioremediation of engine oil*. Little Flower Academy. Dallas, Texas.
- Haritash, A.K., Kaushik, C.P. (2009) Biodegradation aspects of polycyclic aromatic hydrocarbons (PAHs): A review. *Journal of Hazardous Materials* 169: 1 – 15.

- Hassinen, V, Vallinkoski, V. M, Issakainen, S, Tervahauta, A, Kärenlampi, S, Servomaa, K. (2009) Correlation of foliar MT2b expression with Cd and Zn concentrations in hybrid aspen (*Populus tremula x tremuloides*) grown in contaminated soil. *Environmental Pollution* 157:922 – 930.
- Head I. M., Jones D.M. and Larter S.R. (2003). Biological activity in the deep subsurface and the origin of heavy oil. *Nature* 426:344-352.
- Head, I.M., (1998). Bioremediation: towards a credible technology. *Microbiology* 144: 599–608.
- Hedge, R. S, Fletcher, J. S (1996) Influence of plant growth stage and season on the release of root phenolics by mulberry as related to the development of phytoremediation technology. *Chemosphere* 32:2471–2479.
- Heider, J., Spomann, A.M., Beller, H.R and Widdel, F. (1999). Anaerobic bacteria metabolism of hydrocarbons. *FEMS Microbiology Reviews*. 22: 459 – 473.
- Heitkamp, M. A., Cerniglia, C. E. (1987) Effects of chemical structure and exposure on the microbial degradation of polycyclic aromatic hydrocarbons in freshwater and estuarine ecosystems. *Environmental Toxicology and Chemistry* 6(7): 535–546.
- Heitkamp, M. A., Freeman, J. P., Cerniglia, C. E. (1987). Naphthalene biodegradation in environmental microcosms: estimates of degradation rates and characterization of metabolites. *Applied and Environmental Microbiology* 53(1): 129–136.
- Heller J. (1996). Physic nut *Jatropha curcas* L. Promoting the conservation and use of underutilized and neglected crops. Institute of Plant Genetic and Crop Plant Research, Gatersleben/International Plant Genetic Resource Institute, Rome, Italy. <<http://www.ipgri.cgiar.org/Publications/pdf/161.pdf>>.

- Higgins I. J and Gilbert P. D. (1978) In: Chater K W and Somerville HJ, eds. *The Oil Industry and Microbial Ecosystems*. Heydon & Sons, 82 - 117.
- Higuchi, K., Suzuki, K., Nakanishi, H., Yamaguchi, H., Nishizawa, N.K., Mori, S. (1999). Cloning of nicotianamine synthase genes, novel genes involved in the biosynthesis of phytosiderophores. *Plant Physiology* 119:471–79
- Hinga, K.R. (2003) Degradation rates of low molecular weight PAH correlate with sediment TOC in marine sub-tidal sediments. *Pollution Bulletin* 46: 466–474.
- Hiroyuki, K., Moi, W., Takahiko, H. (2005). Phytoremediation with kenaf (*Hibiscus cannabinus*) for cadmium-contaminated paddy field in southwest area of Japan. *Japanese Journal of Soil Science and Plant Nutrition* 76(1): 27 – 34.
- Ho, W.M., Ang, L.H., Lee, D.K. (2008). Assessment of Pb uptake, translocation and immobilization in kenaf (*Hibiscus cannabinus* L.) for phytoremediation of sand tailings. *Journal of Environmental Sciences* 20(11): 1341 – 1347.
- Hohener, P., Duwig, C., Pasteris, G., Kaufmann, K., Dakhel, N., & Harms, H. (2003). Biodegradation of petroleum hydrocarbon vapours: laboratory studies on rates and kinetics in unsaturated alluvial sand. *Journal of Contaminant Hydrology*, 66(1–2): 93–115.
- Holder, E. L., Miller, K. M., & Haines, J. R. (1999). Crude oil component biodegradation kinetics by marine and freshwater consortia. In: B. C. Alleman, & A. Leeson (Eds.), *In situ bioremediation of polycyclic hydrocarbons and other organic compounds*. Battelle, Columbus. pp. 245–250.
- Hollender, J., Althoff, K., Mundt, M., Dott, W. (2003). Assessing the microbial activity of soil samples, its nutrient limitation and toxic effects on contaminants using a simple respiration test. *Chemosphere* 53, 269–275.

- Horstad, I. and Larter S. R. (1997). Petroleum migration, alteration and remigration within Troll Field, Norwegian North Sea. *AAPG Bulletin* 81:222-248.
- Horstad, I., Larter, S.R. and Mills, N. (1992). A quantitative model of biological petroleum degradation within the Brent group reservoir in the gullfaks field, Norwegian North Sea. *Organic Geochemistry* 19:107-117.
- Hosomi K (2000). Utilization dried kenaf leaves to the meal. Proceedings of the 2000 International Kenaf Symposium, Hiroshima, Japan, October, 13-14, pp.171-176.
- Hu, J., Dai, X. Z. and Li, S. P. (2005). Bioremediation of atraine in unsterilized soil by two atrazine degradation strains. *Acta Pedologica Sinica* (in Chinese). 42(2): 323-327.
- Huang, X. D, El-Alawi, Y. S, Gurska, J, Glick, B. R, Greenberg, B. M. (2005) A multiprocess phytoremediation system for decontamination of persistent total petroleum hydrocarbons (TPHs) from soils. *Microchemistry Journal* 81:139–47.
- Huang, X. D, El-Alawi, Y. S, Penrose, D, Glick, B. R, Greenberg, B. M. (2004) A multiprocess phytoremediation system for removal of polycyclic aromatic hydrocarbons from contaminated soils. *Environmental Pollution* 130:465–76.
- Huige, N.J., (1994). Brewery by-products and effluents, in: Hardwick, W.A. (Ed.), *Handbook of Brewing*. Marcel Dekker, New York.
- Hunt, J.H. (1996). *Petroleum Geology and Geochemistry*, 2nd ed. W.H Freeman and Co., New York.
- Hur, J. M. and Park, J. A. (2003). Effects of sewage sludge mix ratio on the biodegradation of diesel-oil in a contaminated soil composting. *Korean Journal of Chemical Engineering*. 20: 307 – 314.
- Husaini, A., Roslan, H.A., Hii, K.S.Y. Ang, C.H. (2008). Biodegradation of aliphatic hydrocarbon by indigenous fungi isolated from used motor oil contaminated sites. *World Journal of Microbiology and Biotechnology* 24: 2789 – 2797.

- Hutchins, S. R., Sewell, G. W., Kovacs, D. A., Smith, G. A. (1991) Biodegradation of aromatic hydrocarbons by aquifer microorganisms under denitrifying conditions. *Environmental Science and Technology* 25: 68–76.
- Hutchinson, S.L., Schwab, A.P., Banks, M.K. (2003) "Biodegradation of Petroleum Hydrocarbons in the Rhizosphere." *Phytoremediation: Transformation and Control of Contaminants*, S. McCutcheon and J. Schnoor (eds.), John Wiley & Sons, Inc., Hoboken, NJ:355-386.
- Hwang, E., Namkoong, W., Park, J. (2001) Recycling of remediated soil for effective composting of dieselcontaminated soil. *Compost Science and Utilization*, 9 (2): 143–149.
- Hyman, M. R, Russell, S. A, Ely, R. L, Williamson, K. J, Arp, D. J (1995) Inhibition, inactivation, and recovery of ammonia-oxidizing activity in co-metabolism of trichloroethylene by *Nitrosomonas europaea*. *Applied Environmental Microbiology* 61:1480 – 1487.
- Ijah, U.J.J., Ukpe, L.I (1992). Biodegradation of crude oil by *Bacillus* strains 28 A and 16B isolated from oil polluted soil. *Waste Management* 12 (1): 55-60.
- Ijah, U.J.J., Safiyanu, H. (1997). Microbial degradation of Escravos light crude oil in soil amended with chicken dropping and NPK fertilizer, *10th Annual Conference of Biotechnology Society of Nigeria*, 2nd -5th April.
- Ijah, U.J. J., Antai, S.P. (1995). The effects of nitrogen and phosphorus supplementation on crude oil degradation by *Streptomyces viridosporus* T7A. *Discovery and Innovation* 7(4): 387-390.
- Ijah U. J. J, Safiyanu H., Abioye O. P. (2008) Comparative study of biodegradation of crude oil in soil amended with chicken droppings and NPK fertilizer. *Science World Journal* 3(2): 63 – 67.

- Ijah, U.J.J. (1998) Studies on relative capabilities of bacterial and yeast isolates from tropical soil in degrading crude oil. *Waste Management* 18: 293 – 299.
- Ijah, U. J. J., & Antai, S. P. (2003a). The potential use of chicken-drop microorganisms for oil spill remediation. *The Environmentalist*, 23, 89–95.
- Ijah, U.J.J. and Antai, S.P. (2003b). Removal of Nigerian light crude oil in soil over a 12-month period. *International Biodeterioration and Biodegradation* 51:93-99
- Ikeda, T., Sakai, D., Kiuchi, Y., Inoue, Y. (1999). Phytoremediation of eutrophic water by kenaf (*Hibiscus cannabinus* L.) and their utilizations. *Journal of Advanced Science* 11(2): 117 – 118.
- Irwin, R.S., van Mouwerkle, M., Stevens, L, Sees, M.D, Basham, W. (1997) Environmental contaminants encyclopedia. Water resource division, National park service, Fort Collins, Colombia.
- Itävaara, M., Piskonen, R., Rytönen, J. (2000). Biodegradation of crude oil in cold climatic conditions. In: Wise, D.L. et al. (Eds.), *Bioremediation of Contaminated Soils*. Marcel Dekker, Inc., New York–Basel, pp. 327–337.
- ITRC (2001) Phytotechnology Technical and Regulatory Guidance Document. Available on Internet at www.itrcweb.org. (retrieved on 20th Nov. 2009).
- ITRC (2009). Phytotechnology technical and regulatory guidance and decision tree. Revised, PHYTO-3. Washington D.C. Interstate Technology and Regulatory Council, Phytotechnologies Team. www.itrcweb.org. (retrieved on 20th Nov. 2009).
- James, A. T. and Burns, B. J. (1984). Microbial alteration of subsurface natural gas accumulations. *AAPG Bulletin* 68:957-960.

- Jamil, S., Abhilash, P. C., Singh, N., Sharma, P. N. (2009) *Jatropha curcas*: A potential crop for phytoremediation of coal fly ash. *Journal of Hazardous Materials* 172: 269 – 275.
- Jia, L. Q., Ou, Z. Q. and Ouyang, Z. Y. (2005). Ecological behavior of linear alkylbenzene sulfonate (LAS) in soil-plant systems. *Pedosphere*. 15(2): 216-224.
- Jim, C.P., Selina, M.B. Singleton, I and Atlas, R. M. (2005). Environmental pollution and restoration: A role for bioremediation. In: *Bioremediation: Applied Microbial Solution for Real- World Environmental Clean Up*. Atlas, R. M., and Jim, C. P. (ed.) ASM Press, Washington, D.C., pp.1-5.
- Jim, C.P., Atlas, R. M. (2005) Bioremediation of contaminated soils and aquifers. In: *Bioremediation: Applied Microbial Solution for Real- World Environmental Clean Up*. Atlas, R. M., and Jim, C. P. (ed.) ASM Press, Washington, D.C., pp.139 - 219.
- Johnson K, Anderson S, C.S Jacobson (1996). Phenotypic and genotypic characterization of phenanthrene-degrading fluorescent *Pseudomonas* biovars. *Applied Environmental Microbiology* 62: 3818–3825.
- Joo, H. S., Phae, C. G., Ryu, J. Y. (2001). Comparison and analysis on characteristics for recycling of multifarious food waste. *J KOWREC* 9:117–124.
- Joo, H. S., Shoda, M., Phae, C. G. (2007). Degradation of diesel oil in soil using a food waste composting process. *Biodegradation* 18: 597–605.
- Joo, H., Ndegwa, P.M., Shoda, M and Phae, C (2008) Bioremediation of oil-contaminated soil using *Candida catenulate* and food waste. *Environmental Pollution* 156:891 - 896.
- Jordan, S.N., Mullen, G.J., Murphy, M.C. (2008) Composition variability of spent mushroom compost in Ireland. *Bioresource Technology* 99: 411 – 418.

- Jørgensen K. S, Puustinen J, Suortti A. M. (2000) Bioremediation of petroleum hydrocarbon contaminated soil by composting in biopiles. *Environmental Pollution* 107: 245 – 254.
- Juhasz, A.L., Naidu, R., (2000). Bioremediation of high molecular weight polycyclic aromatic hydrocarbons: a review of the microbial degradation of benzo[a]pyrene. *International Biodeterioration & Biodegradation* 45: 57–88.
- Juteau, P., Bisaillon, J. G., Lepine, F., Ratheau, V., Beaudet, R., and Villemur, R. (2003). Improving the biotreatment of hydrocarbons-contaminated soils by addition of activated sludge taken from the wastewater treatment facilities of an oil refinery. *Biodegradation*. 14:31 – 40.
- Kamath, R., Rentz, J.A., Schnoor, J.L., Alvarez, P.J.J. (2004). Phytoremediation of hydrocarbon-contaminated soil: Principles and applications. In: Vazquez-Duhalt, R. and Quintero-Ramirez, R. (eds), *Petroleum biotechnology: Development and perspectives*. Elsevier, Amsterdam, pp 447 – 478.
- Kastner, M., Breuer-Jammali, M., Mahro, B., (1994). Enumeration and characterization of the soil microflora from hydrocarbon contaminated soil sites able to mineralize polycyclic aromatic hydrocarbons (PAH). *Applied Microbiology Biotechnology* 41: 267–273.
- Kayode-Isola, T. M., Eniola, K.I.T., Olayemi, A.B, Igunnugbemi, O.O. (2008) Response of a resident bacteria of a crude oil polluted river by diesel oil. *American-Eurasian Journal of Agronomy* 1(1): 6 – 9.
- Kim S, Choi DH, Sim DS, Oh Y (2005). Evaluation of bioremediation effectiveness on crude oil-contaminated sand. *Chemosphere* 59: 845 - 852.
- Kiyohara H, Takizawa N, Nagao K (1992). Natural distribution of bacteria metabolizing many kinds of polyaromatic hydrocarbons. *Journal of Fermentation and Bioengineering* 74: 49–51.

- Koma, D., Hasumi, F., Yamamoto, E., Ohta, T., Chung, S. Y. and Kubo, M., (2001). Biodegradation of longchain n-paraffins from waste oil of car engine by *Acinetobacter* sp. *Journal of Bioscience and Bioengineering* 91: 94-96.
- Koma, D., Sakashita, Y., Kubota, K., Fujii, Y., Hasumi, F., Chung, S. Y. and Kubo, M., (2003). Degradation of car engine base oil by *Rhodococcus* sp. NDKK48 and *Gordonia* sp. NDKY76A. *Bioscience, Biotechnology and Biochemistry* 67: 1590-1593.
- Kuchinda, N.C, Ndahi, W.B., Lagoke, S.T.O., Ahmed, M. K. (2001). The effects of nitrogen and period of weed interference on the fibre yield of Kenaf (*H. cannabinus*) in the northern guinea savanna of Nigeria. *Crop Protection* 20:229 – 235.
- Kuiper, I, Lagendijk, E.L, Bloemberg, G.V, Lugtenberg, B.J.J (2004) Rhizoremediation: a beneficial plant–microbe interaction, *Molecular Plant and Microbe Interaction* 17: 6– 15.
- Kumar, G. P., Yadav, S. K., Thawale, P. R., Singh, S. K., Juwarkar, A. A. (2008) Growth of *Jatropha curcas* on heavy metal contaminated soil amended with industrial wastes and *Azotobacter* – A green house study. *Bioresource Technology* 99: 2078 – 2082.
- Kumar, R, Pandey, S, Pandey, A. (2006) Plant roots and carbon sequestration. *Current Opinion in Science* 91: 885 – 890.
- Kuokkanem, T., Peramaki, P., Valimaki, I., Ronkkomaki, H. (2001) Determination of heavy metals in waste lubricating oils by inductively coupled plasma optical emission spectrometry. *International Journal of Environmental Analytical Chemistry* 81:89 – 100.
- Kyung-Hwa B, Byung-Dae Y, Hee-Mock O, Hee-Sik K In-Sook L (2006). Biodegradation of Aliphatic and Aromatic Hydrocarbons by *Nocardia* sp. H17-1. *Geomicrobiology Journal*. 23(5): 253-259

- Labud, V., García, C., Hernández, T. (2007) Effect of hydrocarbon pollution on the microbial properties of a sandy and a clay soil. *Chemosphere* 66:1863–71.
- Lam, T.B.T. (2000). Structured details of kenaf cell walls and fixation of carbon dioxide. Proceedings of the 2000 International Kenaf Symposium, Hiroshima, Japan, Oct. 13-14, pp. 81-90.
- Larter, S.R. and Aplin, A.C. (1995). Reservoir Geochemistry: methods, applications and opportunities. In: J.M. Cubitt and W.A. England (ed.), *The Geochemistry of Reservoirs*. The Geological Society, London, pp 5-22.
- Lau KL, Tsang YY, Chiu SW (2003) Use of spent mushroom compost to bioremediate PAH-contaminated samples. *Chemosphere* 52:1539–1546.
- Lau, K.L., Tsang, Y.Y., Chiu, S.W. (2003). Use of spent mushroom compost to bioremediate PAH-contaminated samples. *Chemosphere* 52 (9), 1539–1546.
- Leahly, J.C. and Colwell, R.R. (1990). Microbial degradation of hydrocarbon in the environment. *Microbiology Review* 54:305-315.
- Leavin MA, Gealt MA (1993). Overview of biotreatment practices and promises. *Biotreatment of Industrial and Harzadous Wastes*, McGraw Hill Inc. New York, USA, pp 1-12.
- Leigh, M.B., Fletcher, J.S., Fu, X., Schmitz, F.J. (2002) Root turnover: an important source of microbial substrates in rhizosphere remediation of recalcitrant contaminants. *Environmental Science and Technology* 36: 1579–1583.
- Leigh, M.B., Prouzova, P., Mackova, M., Macek, T., Nagle, D.P., Fletcher, J.S. (2006) Polychlorinatedbiphenyl (PCB)-degrading bacteria associated with trees in a PCBcontaminated site, *Applied Environmental Microbiology* 72: 2331–2342.

- Li, H., Liu, Y. H., Luo, N., Zhang, X. Y., Luan, T. G., Hu, J. M. (2006) Biodegradation of benzene and its derivatives by a psychrotolerant and moderately haloalkaliphilic *Planococcus* sp. Strain ZD22. *Research in Microbiology* 157: 629–636.
- Liebeg, E. W. and Cutright, T. J. (1999). The investigation of enhanced bioremediation through the addition of macro and micro nutrients in a PAH contaminated soil. *International Biodeterioration and Biodegradation*. 44: 55 – 64.
- Lin, Q., Mendelsohn, I.A. (1998) The combined effects of phytoremediation and biostimulation in enhancing habitat restoration and oil degradation of petroleum contaminated wetlands. *Ecology and Engineering* 10: 263 – 274.
- Liu, S. L., Luo, Y. M., Ding, K. Q., Li, H., Wu, L. H., Xing, W. Q., Song, J., Cao, Z. H. and Tao, S. (2004). Enhanced phytoremediation of benzo[a]pyrene contaminated soil with arbuscular mycorrhizal fungi. *Acta Pedologica Sinica* (inChinese). 41(3): 336-342.
- Lloyd C.A, Cackette, T.A. (2001). *Diesel Engines: Environmental Impact and Control*. Air and Waste Management Association. 51: 805–847.
- Loehr, R.C., Webster, M.T. (1996) Performance of long-term, field-scale bioremediation processes. *Journal of Hazardous Materials* 50: 105 – 128.
- Lynch, J. M. (1990) *The rhizosphere*. Willey, New York.
- Ma, X., Burken, J. G. (2002). “VOCs Fate and Partitioning in Vegetation: Use of Tree Cores in Groundwater Analysis,” *Environmental Science and Technology* 36(21): 4663–68.
- Madejon E, de Mora A. P, Felipe E, Burgos P, Cabrera F (2006): Soil amendments reduce trace element solubility in a contaminated soil and allow re-growth of natural vegetation. *Environmental Pollution* 139: 40–52.

- Majid Z, Mnouchehr V, Sussan KA (2008). Naphthalene metabolism in *Nocardia otitidiscaviarum* strain TSH 1, a moderately thermophilic microorganism. *Chemosphere* 72:905-909.
- Maletic, S., Dalmacija, B., Roncevic, S., Agbaba, J., and Petrovic, O. (2009). Degradation kinetics of an aged hydrocarbon-contaminated soil. *Water, Air and Soil Pollution* 202:149- 159.
- Mancera-López, M.E., Esparza-Garcia, F., Chávez-Gómez, B., Rodríguez-Vázquez, R., Saucedo-Castañeda, G. and Barrera-Cortés, J. (2008). Bioremediation of an aged hydrocarbon-contaminated soil by combined system of biostimulation-bioaugmentation with filamentous fungi. *International Biodeterioration Biodegradation* 61: 151-160.
- Mandri, T., Lin, J. (2007). Isolation and characterization of engine oil degrading indigenous microorganisms in Kwazulu-Natal, South Africa. *African Journal of Biotechnology* 6(1): 23-27
- Mangkoedihardjo, S., Surahmaida (2008) *Jatropha curcas* L. for phytoremediation of lead and cadmium polluted soil, *World Applied Sciences Journal* 4(4): 519 – 522.
- Margesin, R. and Schinner, F. (1999a). Biodegradation of diesel oil by cold-adapted microorganisms in presence of sodium dodecyl sulfate. *Chemosphere* 38(15): 3463-3472.
- Margesin, R. and Schinner, F. (1999b). Biological decontamination of oil spills in cold environment. *Journal of Chemical and Biotechnology* 74:381-389.
- Margesin, R., Hammerle, M., Tscherko, D. (2007). Microbial activity and community composition during bioremediation of diesel-oil contaminated soil: effects of hydrocarbon concentration, fertilizers, and incubation time. *Microbial Ecology* 53: 259–269.

- Margesin, R., Schinner, F. (2001) Bioremediation (natural attenuation and biostimulation) of diesel-oil-contaminated soil in an Alpine glacier skiing area. *Applied and Environmental Microbiology* 67, 3127–3133.
- Margesin, R., Zimmerbauer, A., Schinner, F. (2000). Monitoring bioremediation by soil biological activities. *Chemosphere* 40:339–346.
- Marley, M.C., Hazebrouck, D.J., Walsh, M.T. (1992). The application of in situ air sparging as an innovative soils and groundwater remediation technology, *Groundwater Monitor and Remediation* 12 (2): 137–144.
- Marmioli, N., Marmioli, M., Maestri, E. (2006). Phytoremediation and phytotechnologies: A review for the present and the future. In: Twardowska, I., Allen, H.E, and Haggblom, M.H. (eds). *Soil and water pollution monitoring, protection and remediation*. Springer, Netherland.
- Martin, A. R., Calva-Calva, G., Avelizapa, N. R., Diaz-Cervantes, M. D., Vazquez, R. R. (2007). Solid culture amended with small amounts of raw coffee beans for the removal of petroleum hydrocarbon from weathered contaminated soil. *International Biodeterioration and Biodegradation* 60: 35 – 39.
- Masterson, W. D., Dzou, L. I. P., Holba, A. G., Fincannon, A. L. and Ellis, L. (2001). Evidence for biodegradation and evaporative fractionation in West Sak, Kuparuk and Prudhoe Bay field areas, North Slope, Alaska. *Organic Geochemistry* 32:411 – 441.
- McCahey, S., McMullan, J.T., Williams, B.C. (2003). Consideration of spent mushroom compost as a source of energy. *Developments in Chemical Engineering and Mineral Processing* 11 (1–2), 43–53.
- Meagher, R.B. (2000). Phytoremediation of toxic elemental and organic pollutants, *Current Opinion on Plant Biology* 3: 153–162.

- Mench M, Vangronsveld H, Clisters N, Lepp W, Edwards R (2000): In situ metal immobilization and phytostabilization of contaminated Soils. In: Terry N, Banuelos G (eds), Phytoremediation of Contaminated Soil and Water. Lewis Publishers, Boca Raton, FL.
- Michel, F. C., Quensen, J. and Reddy, C. A. (2001). Bioremediation of PCB-contaminated soil via composting. *Compost Science Utilization* 9: 274 – 284.
- Miller, B.M., Litsky, W. (1976) *Industrial Microbiology*. McGraw-Hill. New York.
- Millioli, V.S., Servulo, E.L.C., Sobral, L.G.S., DE Carvalho, D.D. (2009) Bioremediation of crude oil bearing soil: evaluating the effect of rhamnolipid addition to soil toxicity and to crude oil biodegradation efficiency. *Global NEST Journal* 11(2): 181 – 188.
- Mishra, S., Jyot, J., Kuhad, R.C., Lal, B. (2001). Evaluation of inoculum addition to stimulate *in situ* Bioremediation of oily–sludge–contaminated soil. *Applied Environmental Microbiology* 67(4): 1675–1681.
- Molina L. B, Rodriguez R. V, Hernandez M. V, Vega C. J, Zapata O. P, Mendoza A. C, Albores A. (2004) Diesel removal from contaminated soils by biostimulation and supplementation with crop residues. *Applied Soil Ecology* 27: 165 – 175.
- Mollea, C., Bosco, F., Ruggeri, B., (2005). Fungal biodegradation of naphthalene: microcosms studies. *Chemosphere* 60: 636–643.
- Moody, J.D., Freeman, J.P., Fu, P.P. & Cerniglia, C.E. (2004). Degradation of benzo[a]pyrene by *Mycobacterium vanbaalenii* PYR-1. *Applied and Environmental Microbiology* 70, 340-345.
- Moore, D., Chiu, S.W., 2001. Filamentous fungi as food. In: Pointing, S.B., Hyde, D. (Eds.), *Exploitation of Filamentous Fungi*. Fungal Diversity Press, Hong Kong, pp. 223– 252.
- Morais, E. B., Tornisielo, S. M. (2009) Biodegradation of oil refinery residues using mixed-culture of microorganisms isolated from a landfarming. *Brazilian Archives of Biology and Technology* 52(6): 1571 – 1578.

- Moretto LM, Silvestri S, Ugo P, Zorzi G, Abbondanzi F, Baiocchi C, Iacondini B (2005) Polycyclic aromatic hydrocarbons degradation by composting in a soot-contaminated alkaline soil. *Journal of Hazardous Materials* 126:141–148.
- Mulligan, C. N, Yong, R. N. (2004) Natural attenuation of contaminated soils. *Environment International* 30:587 – 601.
- Mun, H.W., Hoe, A.L., Koo, L.D. (2008) Assessment of Pb uptake, translocation and immobilization in Kenaf (*Hibiscus cannabinus* L.) for phytoremediation of sand tailings. *Journal of Environmental Sciences* 20: 1341 – 1347.
- Muratova, A. Y, Turkovskaya, O. V, Hubner, T, Kusch, P. (2003) Studies of the efficacy of alfalfa and reed in the phytoremediation of hydrocarbon polluted soil. *Applied Biochemistry and Microbiology* 39:599 – 605.
- Mussatto, S.I., Dragone, G., Roberto, I.C. (2006) Brewer's spent grain: generation, characteristics and potential applications. *Journal of Cereal Science* 43: 1 – 14.
- Nadim, F., Hoag, G.E., Liu, S., Carley, R.J., Zack, P. (2000). Detection and remediation of soil aquifer systems contaminated with petroleum products: an overview. *Journal of Petroleum Science and Engineering* 26: 169 – 178.
- Nakasaki, K, Yaguchi, H, Sasaki, Y, Kubota, H (1992). Effect of C/N ratio on thermophilic composting of garbage. *Journal of Fermentation and Bioengineering* 73:43–45.
- Namkoong, W., Hwang, E.Y., Park, J.S., Choi, J.Y. (2002) Bioremediation of diesel-contaminated soil with composting. *Environmental Pollution* 119: 23–31.
- National Oceanic and Atmospheric Administration (NOAA). Damage Assessment and Restoration Program. August 1995 .Injury Guidance Document for Natural Resources and Services under the Oil Pollution Act of 1990 (Public Review Draft). Prepared by M.T. Huguenin, D.H. Haury, and J.C. Weiss (Industrial

Economics, Inc.); D. Helton, C. Manen, and E. Reinharz (NOAA); and J. Michel (Research Planning, Inc.).

Nedwell, D.B. (1999). Effect of low temperature on microbial growth: lowered affinity for substrates limits growth at low temperature. *FEMS Microbiology and Ecology* 30: 101–111.

Niehaus, F., Bertoldo, C., Kähler, M., Antranikian, G. (1999). Extremophiles as a source of novel enzymes for industrial application. *Applied Microbiology and Biotechnology* 51: 711–729.

Nishino T, Hirao K, Kotera M, Nakamae K, Inagaki H. (2003). Kenaf reinforced biodegradable composite. *Composite Science Technology* 63: 1281–1286.

Northcott, G.L., Jones, K.C. (2000). Experimental approaches and analytical techniques for determining organic compound bound residues in soil and sediment. *Environmental Pollution* 108: 19–43.

Nzungu, V.A., Wolfe, L.N., Rennels, D.E., McCutcheon, S.C., Wang, C. (1999). Use of aquatic plants and algae for decontamination of waters polluted with chlorinated alkanes. *International Journal of Phytoremediation* 1: 203–226.

O'Dell, R., Silk, W., Green, P., Claasen, V., (2007) Compost amendment of Cu-Zn minespoil reduces toxic bioavailable heavy metals concentrations and promotes establishment and biomass production of *Bromus carinatus* (Hook and Arn). *Environmental Pollution* 148: 115 – 124.

Obuekwe, C.O., Zamy, K.A., Esmail, S.A. (2009) Hydrocarbon degradation in relation to cell-surface hydrophobicity among bacterial hydrocarbon degraders from petroleum-contaminated Kuwait desert. *International Biodeterioration and Biodegradation* 63:273 – 279.

- Ogboghodo, I.A., Iruaga, E.K., Osemwota, I.O., Chokor, J.U. (2004) An assessment of the effects of crude oil pollution on soil properties, germination and growth of maize (*Zea mays*) using two crude types-forcados light and escravos light. *Environmental Monitor and Assessment* 96: 143–52.
- Okoh, A.I. (2003). Biodegradation of Bonny light crude oil in soil microcosm by some bacterial strains isolated from crude oil flow stations saver pits in Nigeria. *Afr. J. Biotech.* 2(5): 104-108.
- Okoh, A.I, Ajisebutu, S., Babalola, G.O., Trejo – Hernandez, M.R. (2002). “Biodegradation of Mexican heavy crude oil (*Maya*) by *Pseudomonas aeruginosa*”. *J. Trop. Biosci.* 2(1): 12-24.
- Okoh, A.I., Ajisebutu, S., Babalola, G.O., Trejo-Hernandez, M.R. (2001). Potentials of *Burkholderia cepacia* strain RQ1 in the biodegradation of heavy crude oil. *Intl. Microb.* 4: 83-87.
- Okoh, A.I., Trejo-Hernandez, M.R. (2006) Remediation of petroleum polluted systems: Exploiting the bioremediation strategies. *African Journal of Biotechnology* 5(25): 2520 – 2525.
- Okoh, I.O. (2006). Biodegradation alternative in the cleanup of petroleum hydrocarbon pollutants. *Biotechnology and Molecular Biology Review* 1(2):38-50.
- Okolo J.C, Amadi E.N, Odu C.T.I. (2005). Effects of soil treatments containing poultry manure on crude oil degradation in a sandy loam soil. *Appl. Ecol. Environ. Res.* 3(1): 47-53.
- Oleszczuk P. (2008) Phytotoxicity of municipal sewage sludge composts related to physicochemical properties, PAHs and heavy metals, *Ecotoxicology and Environmental Safety* 69: 496–505.
- Olson, P.E, Reardon, K.F., Pilon-Smits, E.A.H. (2003) Ecology of rhizosphere bioremediation. In: *Phytoremediation: Transformation and Control of*

Contaminants, S.C. McCutcheon, J.L. Schnoor, (ed.). Wiley, New York, pp. 317–54.

Openshaw, K. (2000) A review of *Jatropha curcas*: an oil plant of unfulfilled promise. *Biomass and Energy* 19: 1 – 15.

Organization for Economic Cooperation and Development (2002) Proposal for updating guideline 201: Freshwater alga and cyanobacteria, growth inhibition test. OECD guideline for testing of chemicals, Paris, France.

Otten, A., Alphenaar, A., Pijls, C., Spuij, F., de Wit. H. (1997). In-situ soil remediation. Kluwer Academic Publishers, Boston, MA.

Oudot J, Merlin FX, Pinvidic P (1998). Weathering rates of oil components in a bioremediation experiment in estuarine sediments. *Marine Environmental Research* 45: 113-125.

Pala, D. M., de Carvalho, D. D., Pinto, J. C., & Sant'Anna Jr., G. L. (2006). A suitable model to describe bioremediation of a petroleum-contaminated soil. *International Biodeterioration & Biodegradation*, 58(3–4): 254–260.

Palittapongarnpim, M., Pokethitiyook, P., Upatham, E. S. and Tangbanluekal, L. (1998). Biodegradation of crude oil by soil microorganisms in the tropics. *Biodegradation*. 9: 83-90.

Pallasser, R. J. (2000). Recognizing biodegradation in gas/oil accumulations through the data C-13 compositions of gas components. *Organic Geochemistry* 31:1363-1373.

Palmer, S.E. (1993). Effect of biodegradation and water washing on crude oil composition. In: S.A. Macko and M.H. Engel (ed.), *Organic Geochemistry*. Plenum Press, New York, pp. 511-534.

Palmroth M. R. T, Koskinen P. E. P, Pichtel J, Vaajasaari K, Joutti A, Tuhkanen A. T, Puhakka A. J. (2006) Field-scale assessment of phytotreatment of soil contaminated

- with weathered hydrocarbons and heavy metals. *Journal of Soil and Sediments* 6(3): 128 – 136.
- Palmroth, M.R.T., Pichtel, J. Puhakka, J.A. (2002) Phytoremediation of subarctic soil contaminated with diesel fuel. *Bioresource Technology* 84: 221 – 228.
- Pancirov, R.J., Searl, T.D., Brown, R.A. (1980). Methods of Analysis for Polynuclear Aromatic Hydrocarbons in Environmental Samples. In: *Petroleum in the Marine Environment*; edited by L. Petrakis and F.T. Weiss. American Chemical Society, Washington, DC.
- Parish, Z. D, Banks, M. K, Schwab, A. P. (2004) Effectiveness of phytoremediation as a secondary treatment for polycyclic aromatic hydrocarbons (PAHs) in composted soil. *International Journal of Phytoremediation* 6:119 – 137.
- Paul, E.A., Clark, F.E. (1989). Occurrences and distribution of soil organics. p. 8184.
- Pelletier E., Delille D, Delille B (2004). Crude oil bioremediation in sub- Antarctic intertidal sediments: chemistry and toxicity of oiled residues. *Marine Environmental Research* 57: 311-327.
- Perelo L. W. (2010) Review: In situ and bioremediation of organic pollutants in aquatic sediments. *Journal of Hazardous Materials* 177: 81 – 89.
- Peters, K.E. and Moldowan, J.M. (1993). *The Biomarker guide: Interpreting Molecular Fossil in Petroleum and Ancient Sediment*. Prentice Hall, Eaglewood, New Jersey.
- petroleum contaminated soil: sensitivity analysis. *International Journal of Phytoremediation* 5:125–136.
- Pichtel, J., Bradway, D.J. (2008) Conventional crops and organic amendments for Pb, Cd and Zn treatment at severely contaminated site. *Bioresource Technology* 99: 1242 – 1251.

- Piehl, M.F., Swistak, J.G., Pinckney, J.L., Paerl, H.W. (1999) Stimulation of diesel fuel biodegradation by indigenous nitrogen fixing bacterial consortia. *Microbial Ecology* 38: 69–78.
- Pilon-Smits, E. (2005) Phytoremediation. *Annual Review of Plant Biology* 56: 15 – 39.
- Plaza, G., Nalecz-Jawecki, G., Ulfig, K., Brigmon, R.L. (2005). The application of bioassays as indicators of petroleum contaminated soil remediation. *Chemosphere* 59: 289 – 296.
- Plohl, K., Leskovišek, H., Bricelj, M. (2002) Biological degradation of motor oil in water. *Acta Chim Slov* 49:279–289
- Pope, D.F., Jones, J. N. (1999) Monitored natural attenuation of petroleum hydrocarbons. US EPA Remedial Technology Fact Sheet. EPA/600/F-98/021.
- Potin, O., Rafin, C., Veignie, E., (2004). Bioremediation of an aged polycyclic aromatic hydrocarbons (PAHs)-contaminated soil by filamentous fungi isolated from the soil. *International Biodeterioration & Biodegradation* 54: 45–52.
- Prenafeta-Boldu X.F, Kuhn A, DMAM L, Anke H, J.W Van Groenestijn, JAM De Bont (2001). Isolation and Characterization of fungi growing on volatile aromatic hydrocarbons as their sole carbon and energy source. *Mycological Res.* 4: 477–484.
- Propst T.L., Lochmiller, R.L., Qualis, Jr. C.W., McBee, K. (1999). *In situ* (mesocosm) assessment of immunotoxicity risks to small mammals inhabiting petrochemical waste sites. *Chemosphere.* 38: 1049–1067.
- Providenti, M.A., Lee, H., Trevors, J.T., (1993). Selecting factors limiting de microbial degradation of recalcitrant compounds. *Journal of Industrial Microbiology* 12:379–395.
- Pulford, I. D, Watson C. (2003): Phytoremediation of heavy metal-contaminated land by trees – A review. *Environmental International* 29: 529–540.

- Raghavan, P. U. M. and Vivekanandan, M. (1999). Bioremediation of oil-spilled sites through seeding of naturally adapted *Pseudomonas putida*. *International Biodeterioration & Biodegradation*. 44: 29-32.
- Rahman, K.S.M., Thahira-Rahman, J., Lakshmanaperumalsamy, P., Banat, I.M. (2002) Towards efficient crude oil degradation by a mixed bacterial consortium. *Bioresource Technology* 85: 257 – 261.
- Rainswell, R.W., Bimblecombe, P., Dent, D. L and Liss, P.S. (1992). *Environmental Chemistry: The Earth- Air-water –Factory*. Edward Arnold Publishers, Kent, pp. 15-149.
- Reardon, K. F., Mosteller, D. C., Rogers, J. B., DuTeau, N. M., Kee-Hong, K. (2002). Biodegradation kinetic of aromatic hydrocarbon mixtures by pure and mixed bacterial cultures. *Environmental Health Perspectives* 110(12): 1005–1012.
- Reddy, K.R., Kosgi, S. Zhou, J. (1995). A review of in situ air sparging for the remediation of VOC-contaminated saturated soils and groundwater, *Journal of Hazardous Materials* 12 (2): 97–118.
- Renner, J. D. (1998) Intrinsic remediation under the microscope. *Environmental Science Technology* 32(7):180A – 182A.
- Rentz, J. A, Alvarez, P. J. J, Schnoor, J. L (2005) Benzo[a]pyrene co-metabolism in the presence of plant root extracts and exudates: Implications for phytoremediation. *Environmental Pollution* 136: 477–484.
- Ribbons, D.W., Eaton, R.W. (1982). Chemical transformations of aromatic hydrocarbons that support the growth of microorganisms. In: Chakrabarty, A.M. Editor, 1982. *Biodegradation and Detoxification of Environmental Pollutants* CRC-Press, Florida.

- Riffaldi, R., Levi-Minzi, R., Cardelli, R., Palumbo, S., Saviozzi, A., 2006. Soil biological activities in monitoring the bioremediation of diesel oil- contaminated soil. *Water Air and Soil Pollution* 170: 3–15.
- Riser-Roberts, E., (1998). *Remediation of Petroleum Contaminated Soils (Biological, Physical and Chemical Process)*. Lewis Publishers, pp. 277–292.
- Robinson, S. L, Novak, J. T, Widdowson, M. A, Crosswell, S. B, Fetterolf, G. D. (2003) Field and laboratory evaluation of the impact of tall fescue on polyaromatic hydrocarbon degradation in an aged creosote-contaminated surface soil. *Journal of Environmental Engineering ASCE* 129:232 – 240.
- Roling, W. F. M., Milner, M. G., Jones, D. M., Fratepietro, F., Swannell, R. P. J., Daniel, F., Head, I. M. (2004) Bacterial community dynamics and hydrocarbon degradation during a field-scale evaluation of bioremediation on a mudflat beach contaminated with buried oil. *Applied and Environmental Microbiology* 70(5): 2603 – 2613.
- Roling, W. F. M., Milner, M. G., Jones, D. M., Lee, K., Daniel, F., Swannell, R. P. J. and Head, I. M. (2002) Robust hydrocarbon degradation and dynamics of bacterial communities during nutrient-enhanced oil spill bioremediation. *Applied Environmental Microbiology* 68(11): 5 537–5 548.
- Roling, W.F., Head, I. M., Larter, S.R. (2003) The microbiology of hydrocarbon degradation in subsurface petroleum reservoirs: Perspectives and prospects. *Research in Microbiology* 154: 321-328.
- Rončević, S., Dalmacija, B., Ivančev-Tumbas, I., Petrović, O., Klašnja, M., Agbaba, J. (2005). Kinetics of degradation of hydrocarbons in the contaminated soil layer. *Archives of Environmental Contamination and Toxicology*, 49(1), 27– 36.
- Rosenberg, E, Legmann, R, Kushmaro, A, Taube, R, Adler, E, Ron, E. Z. (1992) Petroleum bioremediation—a multiphase problem, *Biodegradation* 3: 337–350.

- Ross, S.M. (1994). Toxic metals in soil-plant systems. Wiley, England, pp. 459
- Rowland, A.P., Lindley, D.K., Hall, M.J., Rossall, M.J., Wilson, D.R., Benham, D.G., Harrison, A.F., Daniels, R.E. (2000). Effects of beach sand properties, temperature and rainfall on the degradation rates of oil in buried oil/ beach sand mixtures. *Environmental Pollution* 109: 109–118.
- Salimen, J. M, Tuomi, P. M, Suortti, A. M, Jørgensen, K. S. (2004) Potential of aerobic and anaerobic biodegradation of hydrocarbons in boreal subsurface. *Biodegradation* 15:29 – 39.
- Sameshima, K. (2000). Improvement of kenaf core oil absorption property by heat treatment at 200–500 °C. *Proceedings of the 3rd annual American Kenaf Society Conference, Corpus Christi, TX, February*, pp. 64 -72
- Sang-Hwan L, Bang-II O, Jeong-gyu K. (2008) Effect of various amendments on heavy mineral oil bioremediation and soil microbial activity. *Bioresource Technology* 99: 2578 – 2587.
- Sang-Hwan L, Seokho L, Dae-Yeon K, Jeong-gyu K. (2007) Degradation characteristics of waste lubricants under different nutrient conditions. *Journal of Hazardous Materials* 143: 65 – 72.
- Sanscartier, D., Laing, T., Reimer, K., Zeeb, B. (2009) Bioremediation of weathered petroleum hydrocarbon soil contamination in the Canadian high arctic: Laboratory and field studies. *Chemosphere* 77: 1121 – 1126.
- Santos, M., Jimenez, J.J., Bartolome, B., Gomez-Cordoves, C., del Nozal, M.J. (2003) Variability of brewer's spent grain within a brewery. *Food Chemistry* 80: 17 – 21.
- Santosh, K. V., Juwarkar, A. A., Kumar, G. P., Thawale, P. R., Singh, S. K., Chakrabarti, T. (2009) Bioaccumulation and phyto-translocation of arsenic, chromium and zinc

- by *Jatropha curcas* L.: Impact of dairy sludge and biofertilizer, *Bioresource Technology* 100: 4616 – 4622.
- Sasek, V., Bhatt, M., Cajthaml, T., Malachova, K. and Lednicka, D. (2003) Compost mediated removal of polycyclic aromatic hydrocarbons from contaminated soil. *Archive of Environmental Contamination and Toxicology* 44:336 – 342.
- Saterbak, A., Toy, R.J., Wong, D.C.L., McMMain, B.J., Williams, M.P., Dorn, P.B., Brzuzy, L.P., Chai, E.Y., Salanitro, J.P. (1999) Ecotoxicological and analytical assessment of hydrocarbon-contaminated soils and application to ecological risk assessment. *Environmental Toxicology and Chemistry* 18:1591 – 1607.
- Schaefer, M., Juliane, F. (2007) The influence of earthworms and organic additives on the biodegradation of oil contaminated soil. *Applied Ecology* 36: 53–62.
- Schmidt, B, Faymonville, T, Gembé, E, Joußen, N, Schuphan. I. (2006) Comparison of the biotransformation of the 14C-labelled insecticide carbaryl by non-transformed and human CYP1A1, CYP1A2-, and CYP3A4-transgenic cell cultures of *Nicotiana tabacum*. *Chemical Biodiversity* 3:878–96.
- Schnoor, J. L, Licht, L. A, McCutcheon, S. C, Wolfe, N. L, Carreira, L. H (1995) Phytoremediation of organic and nutrient contaminants. *Environmental Science and Technology* 29:318–323.
- Schroder, P. (2007) Exploiting plant metabolism for the phytoremediation of organic xenobiotics. In: Willey N, editor. *Phytoremediation: methods and reviews*. Humana Press Inc. Totowa, NJ.
- Schwab, A. P, Banks, M. K. (1994) Biologically mediated dissipation of polyaromatic hydrocarbons in the root zone. In: Anderson TA, Coats JR, editors. *Bioremediation through rhizosphere technology*. American Chemical Society, Washington DC.
- Schwartz, E., Scow, K.M. (2001). Repeated inoculation as a strategy for the remediation of low concentrations of phenanthrene in soil. *Biodegradation* 12: 201–207.

- Scragg, A. (2005) Bioremediation. *Environmental Biotechnology* 173–229.
- Seabra, P. N., Linhares, M. M., Santa Anna, L. M. (1999). Laboratory study of crude oil remediation by bioaugmentation. In: B. C. Alleman, & A. Leeson (Eds.), *In situ bioremediation of polycyclic hydrocarbons and other organic compounds*. Battelle, Columbus. pp. 421–426.
- Seklemova, E., Pavlova, A. and Kovacheva, K. (2001). Biostimulation-based bioremediation of diesel fuel: Field demonstration. *Biodegradation*. 12: 311-316.
- Semple, K.T., Dew, N.M., Doick, K.J., Rhodes, A.H. (2006) Can mineralisation be used to estimate microbial availability of organic contaminants in soil? *Environmental Pollution* 140, 164–172.
- Semple, K.T., Reid, B.J., Fermor, T.R. (2001) Impact of composting strategies on the treatment of soils contaminated with organic pollutants: a review. *Environmental Pollution* 112, 269–283.
- Setti, L., Mazzieri, S. and Pifferi, P. G. (1999). Enhanced degradation of heavy oil in an aqueous system by a *Pseudomonas* sp. in the presence of natural and synthetic sorbents. *Bioresource Technology*. 67: 191-199.
- Sikkema, J., de Bont, J.A., Poolman, B. (1995) Mechanisms of membrane toxicity of hydrocarbons. *Microbiological Review* 59:201 – 222.
- Singer, A. C, Thompson, I. P, Bailey, M. J. (2004) The tritrophic trinity: a source of pollutant degrading enzymes and its implication for phytoremediation. *Current Opinion in Microbiology* 7: 239 – 244.

- Singer, A.C., van der Gast, C.J., Thompson, I.P. (2005) Perspectives and vision for strain selection in bioaugmentation. *Trends Biotechnology* 23:74–77.
- Siu-Wai C, Ting G, Cissy S. C, Carmen K. H (2009) Removal of spilled petroleum in industrial soils by spent compost of mushroom *Pleurotus pulmonarius*. *Chemosphere* 75: 837 – 842.
- Sleep, B. E., Ma, Y. (1997): Thermal variation of organic fluid properties and impact on thermal remediation feasibility. *Journal of Soil Contamination* 6(3): 281-30
- Soeze, C.I. (2002) Environmental pollution, degradation and the environment. www.nigerdeltacongress.com/earticles/environmental_pollution_degradat.htm (Accessed on 20th August, 2010).
- Song, R, Hua, Z, Li, H, Chen, J. (2006) Biodegradation of petroleum hydrocarbons by two *Pseudomonas aeruginosa* strains with different uptake modes. *Journal of Environmental Science and Health Part A* 41: 733–748.
- Steffen, K., Hatakka, A. and Hofrichter, M. (2002). Removal and mineralization of polycyclic aromatic hydrocarbons by litter-decomposing basidiomycetous fungi. *Applied Microbiology and Biotechnology* 60:212 – 217.
- Stotzky, C. (1965). Determination of Carbon Dioxide. In: C.A.B. Madison (ed.), *Methods of Soil Analysis*, Part 2 – chemical and microbiological properties, American Society of Agronomy Inc.
- Straube, W. L., Nestler, C. C., Hansen, L. D., Ringleberg, D., Pritchard P. H. and Jones-Meehan, J. (2003). Remediation of polyaromatic hydrocarbons (PAHs) through landfarming with biostimulation and bioaugmentation. *Acta Biotechnologica*. 23: 179 – 196.
- Sung, K., Corapcioglu, M. Y., Drew, M. C., Munster, C. L. (2001) Plant contamination by organic pollutants in phytoremediation. *Journal of Environmental Quality* 30: 2081 – 2090.

- Susarla, S, Medina, V. F, McCutcheon, S. C (2002) Phytoremediation: an ecological solution to organic chemical contamination. *Ecological Engineering* 18:647–658
- Sutherland, J.B. (1992). Detoxification of polycyclic hydrocarbons by fungi. *Journal of Industrial Microbiology* 9: 53-62.
- Sutherland, T. D., Horne, I., Lacey, M. J., Harcourt, R. L., Russell, R. J. and Oakeshott, J. G. (2000). Enrichment of an endosulfan-degrading mixed bacterial culture. *Applied Environmental Microbiology* 66: 2822 – 2828.
- Tauscher, W. (1988) The option for re-cycling and re-utilizing used petroleum oils. *Natural Resources and Development* 28: 100–107.
- Teschner, M., Wehner, H. (1985) Chromatographic investigations on biodegraded crude oil. *Chromatographia* 20 (7): 407–416.
- Thieman, W.J., Palladino, M.A. (2009). *Introduction to biotechnology*, 2nd edition. Pearson, New York, pp 209 – 222.
- Tisdale, S., Nelson, W. (1975) *Soil fertility and fertilizers*. 3rd ed. Macmillan Pub. Co. Inc. New York
- Tordoff, G.M., Baker, A.J.M., Willis, A.J. (2000) Current approaches to the revegetation and reclamation of metalliferous mine wastes. *Chemosphere* 41:219 – 228.
- Trejo-Hernandez, M.R., Lopez-Munguia, A. R. and Ramirez, Q. (2001). Residual compost of *Agaricus bisporus* as a source of crude laccase for enzymatic oxidation of phenolic compounds. *Process Biochemistry*. 36: 635–639.

- Trindade, P.V.O., Sobral, L.G., Rizzo, A.C.L., Leite, S.G.F., Soriano, A.U. (2005) Bioremediation of a weathered and a recently oil-contaminated soils from Brazil: a comparison study. *Chemosphere* 58: 515-522.
- U.S. Army Corps of Engineers (2003). *Agriculturally Based Bioremediation of Petroleum-Contaminated Soils and Shallow Groundwater in Pacific Island Ecosystems*, May 2003.
- U.S. Coast Guard. 1986 - November 29, 1993. Emergency Response Notification System (ERNS) FACT Sheet. ERNS is a national computer database used to store information on releases of oil and hazardous substances. It includes a summary of most spilled petroleum and non-petroleum products in U.S. waters by notification and volume as reported to the National Response Center (NRC). For more information, contact the Office of Solid Waste and Emergency Response, Washington, D.C.
- Upshall, C., Payne, J.F., Hellou, J. (1992). Induction of MFO enzymes and production of bile metabolites in rainbow trout (*Oncorhynchus mykiss*) exposed to waste crankcase oil. *Environmental Toxicology and Chemistry* 12: 2105-2112.
- US EPA (1994) Using toxicity tests in ecological risk assessment, Publication #9345.0-05I *Eco-Update 2*: 1-4.
- US EPA. (1997). *Proceedings of the Symposium on Natural Attenuation of Chlorinated Organics in Ground Water*. United States Environmental Protection Agency, Office of Research and Development, Washington D.C. EPA/540/R-97/504.
- US EPA (1996) Recycling Used Oil: What Can You Do? Cooperation Extension Services ENRI-317: 1-2.
- Vaajasaari, K., Joutti, A., Schultz, E., Selonen, S., Westerholm, H. (2002). Comparison of terrestrial and aquatic bioassays for oil-contaminated soil toxicity. *Journal of Soil and Sediments* 4: 194 – 202.

- Van Deuren, J., Wang, Z., Ledbetter, J. (1997) Remediation technologies screening matrix and reference Guide. third ed. Technology Innovation Office, EPA /<http://www.epa.gov/tio/remed.htm>.
- Van Hamme J.D., Singh A., Ward O.P. (2003). Recent Advances in Petroleum Microbiology. *Microbiology and Molecular Biology Review* 67(4): 503–549.
- Venosa AD, Zhu X (2003). Biodegradation of Crude Oil Contaminating marine shorelines and freshwater wetlands. *Spill Sci. Tech. Bull.* 8(2):163-178.
- Venosa, A., Suidan, M., Wrenn, B., Strohmeier, K., Haines, J., Eberhart, B. (1996) Bioremediation of an experimental oil spill on the shoreline of Delaware Bay. *Environmental Science and Technology*, 30(5): 1764–1775.
- Verdin, A., Loune`s-Hadj Sahraoui, A., Durand, R., (2004). Degradation of benzo[a]pyrene by mitosporic fungi and extracellular oxidative enzymes. *International Biodeterioration & Biodegradation* 53: 65–70.
- Verstraete, W., Vanlooche, R., DeBorger, R. and Verlinde, A. (1976). Modelling of the breakdown and the mobilization of hydrocarbons in unsaturated soil layers, In: J. MSharpley and A. M. Kaplan (ed.), *Proceedings of the 3rd International BiodegradationSymposium*. Applied Science Publishers Ltd., London. p. 99-112.
- Vidali, M. (2001) Bioremediation: An overview. *Pure and Applied Chemistry* 73(7): 1163 - 1172.
- Vogel TM (1996) Bioaugmentation as a soil bioremediation approach. *Curr Opin Biotechnol* 7:311–316.
- Vouillamoz, J., Milke, M.W. (2009) Effect of compost in phytoremediation of diesel-contaminated soils. *Water Science Technology* 43(2): 291 – 295.

- Wackett L. P (1996). Co-metabolism: is the emperor wearing any clothes? *Current Opinion in Biotechnology* 7:321-325.
- Wackett, L.P., Hershberger, C.D. (2001) *Biocatalysis and biodegradation: Microbial transformation of organic compounds*. ASM Press, Washington, D.C.
- Walker, J.D., Petrakis, L., Colwell, R.R. (1978) Degradation of petroleum by pure cultures of bacteria, algae, yeasts and filamentous fungi. *Archives of Microbiology* 30:79-81
- Walker, D.J., Clemente, R., Bernal, M.P. (2004) Contrasting effects of manure and compost on soil Ph, heavy metal availability and growth of *Chenopodium album* L. in a soil contaminated by pyretic mine waste. *Chemosphere* 57:215 – 224.
- Walworth, J., Pond, A., Snape, I., Rayner, J., Ferguson, S., Harvey, P., (2007). Nitrogen requirements for maximizing petroleum bioremediation in a sub- Antarctic soil. *Cold Region Science and Technology* 48: 84–91.
- Webber, C. L. III, Bhardwaj, H .L., Bledsoe, V. K. (2002). Kenaf production: Fiber, feed, and seed. In: *Trends in New Crops and New Uses* (Janick J., Whipkey A., eds.) Virginia: ASHS Press. 327–339.
- Webber, C. L. III, Bledsoe, R. E., (1993). Kenaf: Production, harvesting, processing, and products. In: *New Crops* (Janick J., Simon J. E., eds.). New York: Wiley. 416 – 421.
- Wenger, L.M., Davis, C.L. and Isaksen, G.H. (2002). Multiple controls on petroleum biodegradation and impact on oil quality. *SPE Reservoir Evaluation Engineering* 5:375-383.
- Wenzel, W. W (2009) Rhizosphere processes and management in plant-assisted bioremediation (phytoremediation) of soils. *Plant Soil* 321: 385 – 408.

- Whelan, J.K., Brooks, J.M., Schumacher and Eglinton, L.B. (1994). Organic geochemical indicators of dynamic fluid-flow process in petroleum basins. *Organic Geochemistry* 22: 587-615.
- Whipps, J. M. (1990) Carbon economy. In: J. M. Lynch (Ed.), *The rhizosphere*. Wiley, New York, pp 59 – 97.
- Whisman, M.L., Goetzinger, J.W., Cotton, F.O., (1974). Waste lubricating oil research. In: *An Investigation of Services Re-refining Methods*. Bureau of Mine, Bartlesville, Energy Research Center.
- Whiticar M. J. (1994). Correlation of natural gases with their sources. In: L.B. Magoon and W.G. Dow (ed.), *The Petroleum System – from Source to Trap*. AAPG memoir 60. American Association of Petroleum Geologist, Tulsa, Okla, pg. 261-283.
- Whyte, L.G., Bourbonniere, L., Bellerose, C., Greer, C.W. (1998). Biodegradation of variable-chain-length alkanes at low temperatures by a psychrotrophic *Rhodococcus* sp. *Applied Environmental Microbiology* 64: 2578–2584.
- Widada, J., Nojiri, H., and Omori, T. (2002). Recent development in molecular techniques for identification and monitoring of xenobiotic-degrading bacteria and their catabolic genes in bioremediation. *Appl. Microbiol. Biotechnol.* 60: 45 – 49.
- Widdel, F., and Rabus, R. (2001). Anaerobic biodegradation of saturated and aromatic hydrocarbons. *Curriculum Opinion on Biotechnology* 12:259-276.
- Wiedemeier, T.H., M.A. Swanson, D.E. Moutoux, E.K. Gordon, J.T. Wilson, B.H. Wilson, D.H. Kampbell, P.E. Haas, R.N. Miller, J.E. Hansen, and F.H. Chapelle. (1998). *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water*. United States Environmental Protection Agency, Office of Research and Development, Washington D.C. EPA/600/R-98/128.

- Wilkes, H., Kuhner, S., Bolm, C., Fischer, T., Classen, A., Widdel, F. and Rabus, R. (2003). Formation of n-alkane and cycloalkane-derived organic acids during anaerobic growth of a denitrifying bacterium with crude oil *Organic Geochemistry* 13:13-1323.
- Wilkinson, S., Nicklin, S. and Faull, J.L. (2002). Biodegradation of fuel oils and lubricants: Soil and water bioremediation options. In: V.P. Singh and R.D. Stapleton (eds), *Biotransformation: Bioremediation Technology for Health and Environmental Protection*. Elsevier Sciences. Pg 69 – 100.
- Wilson, S. C. and Jones, K. C. (1993). Bioremediation of soil contaminated with polynuclear aromatic hydrocarbons (PAHs): A review. *Environmental Pollution*. 81(3): 229-249.
- Winningham, J., Britto, R., Patel, M., & McInturff, F. (1999). A landfarming field study of creosote-contaminated soil. In: A. Leeson, & B. C. Alleman (Eds.), *Bioremediation technologies for PAH compounds*. Battelle, Columbus pp. 37–42
- Wodzinski, R.S., Bertolini, D. (1972) Physical state in which naphthalene and dibenzyl are utilized by bacteria. *Applied Microbiology* 23: 1077 – 1081.
- Wolfe, N. L, Ou, T. Y, Carreira, L (1993) Biochemical remediation of TNT contaminated soils. Tech. Rep. prepared for the U.S. Army Corps Eng. U.S. Army Eng. Waterways Exp. Stn., Vicksburg, MS, USA.
- Wrenn, B. A. (1998) Biodegradation of aromatic hydrocarbons. www.enche.umd.edu/eseagren/bioAHC97.htm (accessed on 25th April, 2009).
- WS Atkins Environment. (2002). Genetically modified organisms for the bioremediation of organic pollutants. Final report. Online at: <http://www.defra.gov.uk>. (accessed on 10th March, 2009).

- Yateem, A., Balba, M.T., Al-Awadhi, N., El-Nawawy, A.S., (1998). White rot fungi and their role in remediating oil-contaminated soil. *Environment International* 44: 181–187.
- Yeung, P. Y., Johnson, R. L., Xu, J. G. (1997). Biodegradation of petroleum hydrocarbons in soil as affected by heating and forced aeration. *Journal of Environmental Quality* 26: 1511–1576.
- Ying T, Yongming L, Mingming S, Zengjun L, Zhengo L, Peter C.(2010) Effect of bioaugmentation by *Paracoccus* sp. strain HPD-2 on the soil microbial community and removal of polycyclic aromatic hydrocarbon from aged contaminated soil. *Bioresource Technology* 101: 3437 – 3443.
- Zahra, E., Giti, E., Sharareh, P. (2006) Removal of dibenzothiophene, biphenyl and phenol from waste by *Trichosporon* sp. *Scientific Research and Essay* 1(3): 72 – 76.
- Zajic, E., Supplisson, B. (1972). Emulsification and degradation of “Banker C” fuel oil by microorganisms. *Biotechnology and Bioengineering* 14: 331–343.
- Zengler, K.H., Richnow, H.H., Rossello-Mora, R., Michaelis, W. and Widdel, F. (1999). Methane formation from long-chain alkanes by anaerobic microorganisms. *Nature* 401:266-269.
- Zhang, G., Wu, Y., Qian, X., Meng, Q. (2005) Biodegradation of crude oil by *Pseudomonas aeruginosa* in the presence of rhamnolipids. *Journal of Zhejiang University Science* 6(8): 725 – 730.
- Zheng, H. L., Chen, J. and Deng, W. J. (2004). Polychlorinated biphenyls in soil environment and remediation of PCBs contaminated soil. *Soils (in Chinese)*. 36(1): 16-20.
- Zhuang, X, Chen, J, Shim, H, Bai, Z. (2007) New advances in plant growth-promoting rhizobacteria for bioremediation. *Environment International* 33: 406 – 413.