Dr. Muhammad Iqbal

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Educational Background

1990. Ph.D. Microbial Biotechnology, Department of Molecular Biology & Biotechnology, University of Sheffield, Sheffield, United Kingdom.

1985. M.Phil., Microbial Biotechnology, Department of Biological Sciences, Quaid-i-Azam University, Islamabad, Pakistan, Secured First Position in the University.

1980. M.Sc., Botany, Department of Botany, University of Karachi,Pakistan, Secured Second Position in the University.

1979. B.Sc.(Hons), Botany, Microbiology and Biochemistry, Department of Botany, University of Karachi, Karachi, Pakistan

1976. F.Sc., Science, Govt. Sind Muslim Science College, Karachi, Pakistan

1973. S.S.C., Science, Board of Secondary Education, Sargodha, Pakistan

Postdoctoral Research Positions

2006. Fulbright Postdoctoral Research Fellow
Water and Environmental Research Centre, University of Alaska Faribanks, Alaska, USA (October, 2006 todate).

2003. Postdoctoral Research Fellow
Environmental Biotechnology Group, Department of Chemical and Process Engineering, University of Sheffield, UK (September, 2002 to October, 2003).

1998. Alexander von Humboldt Postdoctoral Research Fellow
Environmental Biotechnology Group, Institute of Pharmaceutical Biology, Christian Albrechts University, Kiel, Germany, (August, 1996 to June, 1998)

Professional Positions

Biotechnology Research Centre, Pakistan Council of Scientific and Industrial Research, Lahore, Pakistan

January 2006–October 2006 Chief Scientific Officer
December 2000 –December 2005 Principal Scientific Officer
September 1990-November 2000 Senior Scientific Officer

Department of Biological Sciences, Quaid-i-Azam University Islamabad, Pakistan.

1983-1985. Junior Research Associate,
1982-1983. Research Fellow

Manuscript Reviewer

1. Process Biochemistry
2. Journal of Hazardous Materials
3. Separation and Purification Technology
4. FEBS Letter
5. Environment Technology

Honours and Awards

2006. Fulbright Postdoctoral Research Award
Bureau Of Educational and Cultural Affairs, United States Department of State and Council for International Exchange of Scholars, Washington DC, USA.

2005. Research Productivity Award **(cash award of Pak. Rs. 1,20,000)**
Pakistan Council for Science and Technology, Ministry of Science and Technology Government of Pakistan.

2004. Research Productivity Award **(cash award of Rs. 1,20,000)**
Pakistan Council for Science and Technology, Ministry of Science and Technology, Government of Pakistan.

2003. Research Productivity Award **(cash award of Rs. 60,000)**
Pakistan Council for Science and Technology, Ministry of Science and Technology, Government of Pakistan.

2002. Postdoctoral Research Award
Ministry of Science and Technology, Government of Pakistan for one year to study at the Department of Chemical and Process Engineering, University of Sheffield, UK.

2001. Research Productivity Award **(cash award of Rs. 1,20,000)**

Pakistan Council for Science and Technology, Ministry of Science and Technology, Government of Pakistan.

2000. Alexander von Humboldt Equipment Grant (DM 50,000)
Alexander von Humboldt Foundation Bonn, Germany in recognition of the research work carried out in the field of Environmental Biotechnology in Germany.

1996. AvH Postdoctoral Research Award
Alexander von Humboldt Foundation Bonn, Germany for 2 years Postdoctoral research in the University of Kiel, Kiel, Germany.

1995. TWAS-Young Scientist of the Year in South Asia (Biology) Award **(cash award US $ 2000)**
Third World Academy of Sciences, Italy

1986-1989. ORS Award UK (Three consecutive awards)
Committee of Vice Chancellors and Principals of the Universities of the United Kingdom, UK

1986.Science & Technology National Talent Scholarship Award
Ministry of Science and Technology, Government of Pakistan

1985. Academic Merit Certificate
University, Quaid-i-Azam University, Islamabad

1984. Certificate of Appreciation (Group Award)
U.S. Department of Agriculture, Office of International Cooperation and Development, United State Department of Agriculture, Washington D.C. for successful completion of the Cooperative Research Project PL-480.

1982. Academic Merit Certificate
University of Karachi, Karachi, Pakistan

RESEARCH PUBLICATIONS

i). Papers Published in Refereed Journals

1. **Iqbal, M.** and Saeed, A. 2007**.** Production of immobilized hybrid biosorbent for the sorption of Ni(II) from aqueous solution. *Process Biochemistry* **42:** 148–157.

2. Saeed, A. and **Iqbal, M**. 2006. Immobilization of blue green microalgae on loofa sponge to biosorb cadmium in repeated shake flask batch and continuous flow fixed bed column reactor system. *World Journal of Microbiology and Biotechnology* **22**: 775-782.

3. **Iqbal, M**. and Saeed, A. 2006. Entrapment of fungal hyphae in structural fibrous network of papaya wood to produce a unique biosorbent for the removal of heavy metals. *Enzyme and Microbial Technology* **39:** 996-1001.

4. Saeed, A., Aslam, A. and **Iqbal, M**. 2006**.** Studies on zinc(II)-biosorption capability of a filamentous green algal species (*Mougeotia viridis*) isolated from electroplating wastewater. *Pakistan Journal of Scientific and Industrial Research*, **49:** 97-102.

5. **Iqbal, M**., Saeed, A., Edyvean, R. G. J., O'Sullivan, B. and Styring, P. 2005. Production of fungal biomass immobilized loofa sponge (FBILS)-discs for the removal of heavy metal ions and chlorinated compounds from aqueous solution. *Biotechnology Letters*, **27:** 1319-1323.

6. **Iqbal, M**. and Edyvean, R. G. J. 2005. Loofa sponge immobilized fungal biosorbent: A robust system for cadmium and other dissolved metal removal from aqueous solution. *Chemosphere*, **61:** 510-518.

7. Saeed, A., **Iqbal**, **M**. and Akhtar, M. W. 2005. Removal and recovery of heavy metals from aqueous solution using papaya wood as a new biosorbent. *Separation and Purification Technology*, **45:** 25-31.

8. Saeed, A., **Iqbal**, **M**. and Akhtar, M. W. 2005. Removal and recovery of lead(II) from single and multimetal (Cd, Cu, Ni, Zn) solution by crop milling waste (black gram husk). *Journal of Hazardous Materials*, **B117** (1)**:** 64-67.

9. **Iqbal, M**. and Saeed, A. 2005. Novel method for cell immobilization and its application for production of organic acid. *Letters in Applied Microbiology*, **40** (3)**:** 178-182.

10. Saeed, A., Akhtar, M. W. and **Iqbal**, **M**. 2005. Affinity relationship of heavy metal biosorption by the husk of *Cicer arientinum* (chickpea var. black gram) with their atomic weights and structural features. *Fresenius Environment Bulletin* **14** (3)**:** 219-223.
11. Saeed, A., Aslam, A. and **Iqbal, M**. 2005. The fundamental concepts and mechanisms in the metal biosorption technology for the treatment of industrial wastewater. *Pakistan Journal of Scientific and Industrial Research*, **48:** 436-447.

12. **Iqbal, M**. and Edyvean, R. G. J. 2004. Alginate coated loofa sponge discs for the removal of cadmium from aqueous solution. *Biotechnology Letters*, **26:** 165-169.

13. **Iqbal, M**. and Edyvean, R. G. J. 2004. Biosorption of lead, copper and zinc ions on loofa immobilized biomass of *Phanerochaete chrysosporium. Mineral Engineering*, **17:** 217-223.

14. Akhtar, N., Iqbal, J. and **Iqbal, M**. 2004. Enhancement of lead(II) biosorption by microalgal biomass immobilized onto loofa (*Luffa cylindrica*) sponge. *Engineering Life Science*, **4:** 171-178.

15. Akhtar, N., Iqbal, J. and **Iqbal, M**. 2004. Removal and recovery of nickel(II) from aqueous solution by loofa sponge-immobilized biomass of *Chlorella sorokiniana*: Characterization studies. *Journal of Hazardous Materials*, **B108:** 85-94.

16. Saeed, **A.**, Akhtar, M. W. and **Iqbal, M**. 2004. A comparison study on cadmium biosorption characteristics of some microalgae. *Pakistan Journal of Biochemistry and Molecular Biology*, **37** (3)**:** 121-127.

17. Saeed, A. and **Iqbal, M**. 2003. Bioremoval of cadmium from aqueous solution by black gram husk (*Cicer arientinum*). *Water Research*, **37:** 3472-3480.

18. Akthar, N., Saeed, A. and **Iqbal, M**. 2003. *Chlorella sorokiniana* immobilized on the matrix of vegetable sponge of *Luffa cylindrica* a new system to remove cadmium from contaminated aqueous medium. *Bioresource Technology*, **88:** 163-165.

19. Akhtar N., Iqbal, J. and **Iqbal, M**. 2003. Microalgal-luffa sponge immobilized disc: a new efficient biosorbent for the removal of Ni(II) from aqueous solution. *Letters in Applied Microbiology*, **37:** 1149-153.

20. Iqbal, M., Saeed, A. and Akhtar, N. 2002. Petiolar felt-sheath of palm: a new biosorbent for the removal of heavy metals from contaminated water. *Bioresource Technology*, **81:** 151-153.

21. Iqbal, M. and Saeed, A. 2002. Removal of heavy metals from contaminated water by petiolar felt-sheath of palm. *Environmental Technology*, **23:** 1091-1098.

22. Saeed, A. and **Iqbal, M**. 2002. Application of biowaste materials for the sorption of heavy metals in contaminated aqueous medium. *Pakistan Journal of Scientific and Industrial Research*, **45**(3)**:** 206-211.

23. Akhtar, N., **Iqbal, M**., Zafar, S. I. and Iqbal, J. 2001. Use of microalgal biomass for the removal of heavy metals from aqueous system. *Pakistan Journal of Botany*, **33:** 773-778.

24. Iqbal, M. and Zafar, S. I. 2001. Uptake of Ni, Pb and Zn from aqueous solution by adsorption using petiolar felt sheath of palm. *Pakistan Journal of Botany*, **33:** 767-772.

25. Iqbal, M. and Zafar, S. I. 2000. Production of (∝-amylase and glucoamylase enzymes by *Aspergillus niger* immobilized within the vegetable sponge of *Luffa cylinderica*. *Pakistan Journal of Food Science*, **10:** 6-9.

26. Nasreen, Z., Abdullah, N., **Iqbal, M**. and Zafar, S. I. 2000. Removal of azo dyes from aqueous solution with cultures of white rot fungi. *Pakistan Journal of Biochemistry and Molecular Biology*, **33:** 28-31.

27. Iqbal, M. and Zafar, S. I. 1997. Palm petiolar felt-sheath as a new and convenient material for the immobilization of microalgal cells. *Journal of Industrial Microbiology and Biotechnology*, **19:** 139-141.

28. Nasreen, Z., Zafar, S. I. and **Iqbal, M.** 1999. Cultivation of the red microalga *Porphyridium cruentum* under natural outdoor conditions. *Pakistan Journal of Scientific and Industrial Research*, **42:** 39-43.

29. Nasreen, Z., **Iqbal, M**. and Zafar, S. I. 1996. The potential of microalgal polysaccharides in food industry. *Pakistan Journal of Food Science*, **6:** 71-74.

30. Akhtar, M. and **Iqbal, M**. 1997. Seasonal Fluctuations in nitrogen-fixing ability (C_2H_2 reduction) and hydrogen uptake by actinorhizal nodules of *Casurina glauca*, *Angew Botany*, **71:** 1-4.

31. Zafar, S. I., Abdullah, N., **Iqbal**, **M**. and Sheeraz, Q. 1996. Influence of nutrient amendment on the biodegradation of wheat straw during solid state fermentation with *Trametes versicolor*. *International Biodegradation and Biodeterioration* **38:** 83-87.

32. Abdullah, N., **Iqbal, M**. and Zafar, S. I. 1995. Potential of immobilized fungi as viable inoculum. *Mycologist*, **9:** 168-171.

33. Iqbal, M. and Zafar, S. I. 1995. Immobilization of *Aspergillus niger* within the vegetable sponge of *Luffa cylinderica* for the production of amylolytic enzymes. *Pakistan Journal of Biochemistry and Molecular Biology*, **28:** 173-178.

34. Iqbal M. and Zafar, S. I. 1995. *Porphyridium cruentum* biomass as a potential source of food colour. *Pakistan Journal of Food Science*, **5:** 41-46.

35. Iqbal, M. and Zafar S. I. 1994. Petiolar felt-sheath of palm: a new matrix for fungal immobilization. *Biotechnology Techniques*, **8:** 755-758.

36. Iqbal, M. and Zafar S. I. 1994. Vegetable sponge as a matrix to immobilize microbes: a trial study for hyphal fungi, yeast and bacteria. *Letters in Applied Microbiology*, **18:** 214-217.

37. Iqbal, M. and Zafar, S. I. 1993. Bioactivity of immobilized microalgal cells: application potential of vegetable sponge in microbial biotechnology. *Letters in Applied Microbiology*, **17:** 289-291.

38. Iqbal, M. and Zafar, S. I. 1993. Vegetable sponge: A new immobilizing medium for plant cells. *Biotechnology Techniques*, **7:** 323-324.

39. Iqbal, M. and Zafar, S. I. 1993. The use of fibrous network of matured dried fruit of *Luffa aegyptiaca* as immobilizing agent. *Biotechnology Techniques*, **7:** 15-18.

40. Iqbal, M. and Zafar, S. I. 1993. Strategies toward optimization of cultural conditions of *Porphyridium cruentum* for higher polysaccharide production. *Acta Microbiologca Polonica*, **42:** 71-82.

41. Iqbal, M. and Zafar, S. I. 1993. Effect of photon flux density, CO_2, inoculum density and aeration rate on growth and extracellular polysaccharides production by red alga *Porphyridium cruentum*. *Folia Microbiologca*, **38:** 509-514.

42. Iqbal, M., Zafar, S. I., Stepan-sarkissian, G. and Fowler, M. W. 1993. Indoor mass cultivation of red alga *Porphyridium cruentum* in different types of bioreactors: effect of scale-up and vessel shape. *Journal of Fermentation Bioengineering*, **75**: 76-78.

43. Iqbal M., Grey, D., Stepan-sarkissian, G. and Fowler, M. W. 1993. Interaction between unicellular red alga *Porphyridium cruentum* and associated bacteria. *European Journal of Phycology*, **28:** 63-68.

44. Iqbal M., Grey, D. Stepan-sarkissian, G. and Fowler, M. W. 1993. A flat-sided photobioreactor for culturing of microalgae. *Aquacultural Engineering*, **12:** 183-190.

45. Iqbal, M., Athar, M. and Chaudhary, A. H. 1993. Nitrogen fixation by actinorhizal root nodules of *Casuarina glauca*. *Nitrogen Fixing Tree Research Reports*, **11:** 73-75.

46. Iqbal M., Grey, D. and Stepan-sarkissian, G. 1992. Effect of nitrogen on growth, extracellular polysaccharide and intracellular phycoerythrin production by the unicellular red alga *Porphyridium cruentum. Acta Microbiologica Polonica*, **41**, 65-73.

47. Iqbal, M., Chaudhary, M. F. and Chaudhary, A. H. 1986. Isolation of five *Frankia* strains from actinorhizal nodules of *Casuarina glauca*. *Pakistan Journal of Botany*, **18:** 341-346.

ii). Papers Published in Edited Proceedings

1. Iqbal, M. and Saeed, A. (2005). Development of unique and low-cost biosorbent for the treatment of wastewater containing heavy metals. In: New Trends in Biotechnological and Geochemical Approaches for Sound Management of Hazardous Chemicals. Published by United Nation University and Gwangju Institute of Science and Technology, Korea. pp 138-139.

2. Iqbal, M. and Edyvean, R. G. J. (2003). Adsorption and desorption of cadmium by free and immobilized fungal biomass. In: Proceedings of European Metallurgical Conference EMC, **3:** 949-967.

3. Iqbal, M. and Saeed, A. (2003). Development of low cost biosorbent for the treatment of wastewater containing toxic metals. In: Proceedings of the Seminar on Strategies to Address the Present and Future Water Quality Issues., Kahlown, M. A., Chaudry, M. A., Tahir, M. A. and Yasmin, N. (eds.) Pakistan Council of Research in Water Resources, Islamabad. pp. 225-233.

4. Iqbal M. and Pohl, P. (1997). Biosorption of heavy metals by microalgae immobilized within vegetable sponge, *Luffa cylindrica* In: *Environmental Biotechnology* Part III, Verachtert, H. and Verstraete, W. (Eds.), Technologisch Institute, Antwerpen, Belgium, pp. 13-15.

5. Iqbal M. and Pohl, P. (1997). Recovery of heavy metals by immobilized algae. In: *Bioencapsulation VI* - From fundamentals to Industrial application, Proceedings of International Workshop, Universitat Autonoma de Barcelona, Spain, pp. 8.4.

6. Akhtar, N., **Iqbal, M**., Zafar, S. I., and Iqbal, J. (1997). Production of itaconic acid by *Aspergillus terreus* immobilized within vegetable sponge. *In:* F. Godia and D. Poncelet

(eds.), Proceeding. Intl. Bioencapsulation VI, From Fundamentals to Industrial Applications, Universitat Autonoma, Barcelona, Spain. pp. 61.

7. **Iqbal M.**, Shah, W. A. and Zafar, S. I. (1995). Biostructural materials: novel supports for cell immobilization. In: *Biotechnology for Sustainable Development*, Malik, K.A., Nasim, A. and Khalid, A.M. (eds.), National Institute of Biotechnology and Genetic Engineering, Faisalabad, pp. 393-400.

8. **Iqbal M.**, Grey, D., Stepan-sarkissian G., and Fowler, M. W. (1988). Growth and polysaccharide production by cell cultures of the red alga *Porphyridium cruentum.* In: *Biochemistry of Algae and Cyanobacteria*, Rogers, L.J. and Gallon, J.R. (eds.), Oxford University Press, Oxford. pp. 363-364.

9. Chaudhary, A. H., **Iqbal, M**. and Sandhu, G. R. (1985). The performance of *Casuarina* in problem soils of Pakistan. In: *Prospects for Biosaline Research*, Ahmad, R. and Pietro, A.S. (eds.) University of Karachi, Karachi. pp. 265-271.

Articles/Presentations to Conferences and Symposia

1. **Iqbal, M**. and Saeed, A. (2005). Development of unique and low-cost biosorbent for the treatment of wastewater containing heavy metals. IERC 3rd Workshop on Environment and Sustainable Development, November 2-4, 2005, United Nation University and Gwangju Institute of Science and Technology, Korea, Damyang, South Korea.

2. **Iqbal, M.** and Saeed, A. (2005). Biological wastematerials as metal biosorbent: a future technology for wastewater treatment. 2nd National Symposium on "Frontier in Chemistry" G.C. University Lahore, March 5, 2005.

3. Saeed, A. and **Iqbal, M.** (2005). Microbial treatment of metal pollution: Loofa sponge-immobilized fungal biomass discs as a ready to use biosorbent for heavy metals. 2nd National Symposium on "Frontier in Chemistry" G.C. University Lahore, March 5, 2005.

4. Aslam, A. and **Iqbal, M**. (2005). Mango waste-as a new biosorbent for the removal of toxic metal ions from wastewater. 2nd National Symposium on "Frontier in Chemistry" G.C. University Lahore, March 5, 2005.

5. **Iqbal, M.** and Edyvean, R.G.J. (2003). Production of fungal biomass immobilized loofa sponge (FBILS)-discs biosorbent for the removal of heavy metal ions from aqueous solution. International Mineral Engineering Conference-Processing and Disposal of Mineral Industry Wastes, June 18-20, 2003, Fallmouth, UK.

6. **Iqbal, M.** and Edyvean, R.G.J. (2003). Adsorption and desorption of cadmium by free and immobilized fungal biomass. European Mettallurgical Conference, September 16-19, 2003, Hannover, Germany.

7. **Iqbal, M**. and Edyvean, R.G.J. (2004). Fungal biomass immobilized on loofa sponge for the removal of heavy metal ions from aqueous solution. Paper presented in 4th International and 14th National Chemistry Conference held at PCSIR Laboratories Complex, Lahore, May 16-18, 2004.

8. Saeed, A., **Iqbal, M**. and Akhtar, M.W. (2004). Biosorption of heavy metals from aqueous solution by different types of biowaste materials. Paper presented in 4th International and 14th National Chemistry Conference held at PCSIR Laboratories Complex, Lahore, May 16-18, 2004.

9. Kalim, I. and **Iqbal. M**. (2004). Itaconic acid production by immobilized biomass of *Aspergillus terreus*. Paper presented in 4th International and 14th National Chemistry Conference held at PCSIR Laboratories Complex, Lahore, May 16-18, 2004.

10. **Iqbal, M.** and Saeed, A. (2002). Development of low cost biosorbents for the treatment of wastwewater containing toxic metals. Seminar on Strategies to Address the Present and Future Water Quality Issues, 6-7 March, 2002, Pakistan Atomic Energy Commission, Islamabad.

11. Akhtar, N., **Iqbal, M.** and Zafar, S.I. (2002). Screening of microalgae for the biosorption of lead from polluted water. Seminar on Strategies to Address the Present and Future Water Quality Issues, 6-7 March, 2002, Pakistan Atomic Energy Commission, Islamabad.

12. Akhtar, N., **Iqbal, M.**, Zafar, S.I. and Iqbal, J. (2002). Applications of immobilized microalgae for the removal of heavy metals from contaminated water. 1st National Conference of Biology, March 28-30, 2002, Department of Botany, Government College, Lahore.

13. Saeed, A. and **Iqbal, M.** (2002). Agrowaste as a biosorbent for toxic metals. 1st National Conference of Biology, March 28-30, 2002, Department of Botany, Government College, Lahore.

14. **Iqbal, M.** and Zafar, S.I. (2000). Petiolar felt-sheath of palm as a new biosorbent for the removal of heavy metals from industrial wastewater. 7th National Conference of Plant Scientists, 14-16 November, 2000, Department of Botany, University of Punjab, Lahore.

15. Akhtar, N. **Iqbal, M.**, Zafar, S.I. and Iqbal, J. (2000). The use of microalgal biomass for the removal of toxic metals from aqueous systems. 7th National Conference of Plant Scientists, 14-16 November, 2000, Department of Botany, University of Punjab, Lahore, Pakistan.

16. **Iqbal, M.**, Zafar, S.I. and Pohl, P. (2000). Application of immobilized unicellular microalgae for the removal of heavy metals from aqueous wastes. Third International Biennial Conference of Pakistan Society for Microbiology on Microbiology: Challenges for the new Millennium. 28-30 March, 2000, Lahore, Pakistan.

17. **Iqbal, M**. and Pohl, P. (1998). Biosorption of heavy metals by immobilized microalgae. International Workshop, Innovative Potential of Advanced Biological Systems for Remediation, 2-4 March, 1998, Technical University Hamburg-Harburg. Germnany.

18. **Iqbal, M.** and Pohl, P. (1998).The removal of heavy metals by microalgae immobilized within vegetable sponge (*Luffa cylinderica*). International Conference Biocatalysis - 98: Fundamentals & Applications 13-18 June, 1998, organized by M.V.Lomonosov Moscow State University Moscow at Puschino on the Oka, Russia.

19. **Iqbal, M**., Abdullah, N., Nasreen, Z. and Zafar, S.I. (1998) The removal of dyes from textile industrial effluents using microbial biomass. National Conference on Indigenous development of textile dyes and auxiliaries in Pakistan. 28-29 November, 1998, PCSIR Laboratories Complex, Lahore, Pakistan.

20. Iqbal, M. and Pohl, P. (1998). Uptake of heavy metals by microalgae immobilized within vegetable sponge, *Loofa cylindrica*, 6th National Conference of Plant Scientist, 20-22 Oct., 1998, Department of Botany, University of Peshawar.

21. **Iqbal, M.** and Zafar, S.I. (1998). Petiolar felt-sheath of palm: a new biosorbent for the removal of heavy metals from industrial wastewater. 6th National Conference of Plant Scientist, 20-22 Oct., 1998, Department of Botany, University of Peshawar.

22. **Iqbal M.** and Pohl, P. (1997). Biosorption of heavy metals by microalgae immobilized within vegetable sponge, *Luffa cylindrica*. International Symposium on Environmental Biotechnology, 21-23 April, 1997, Technological Institute, Oostende, Belgium.

23. **Iqbal M.** and Pohl, P. (1997). Recovery of heavy metals by immobilized algae. International Workshop on Bioencapsulation (vi), 30 August–1 Sept., 1997, Universitat Autonoma de Barcelona, Barcellona, Spain.

24. Nasreen, Akhtar., **Iqbal, M.,** and Zafar, S. I. Production of itaconic acid by *Aspergillus terreus* immobilized within vegetable sponge. International Workshop on Bioencapsulation (vi), 30 August–1 Sept., 1997, Universitat Autonoma de Barcelona, Barcellona, Spain.

25. **Iqbal M.** and Pohl, P. (1997). Biosorption of heavy metals by petiolar felt-sheath of palm. ISEB' 97 Meeting on Bioremediation, 24-27 Sept., 1997, organized by International Society of Environmental Biotechnology, USA at UFZ Centre for Environment Research Leipzig-Halle, Leipzig, Germany.

26. **Iqbal, M.** and Zafar, S.I. (1996). Use of biomatrix as an immobilization agent for enzyme production. International Workshop on Bioencapsulation V- From fundamental to Industrial Application, 23-25 September, 1996, University of Potsdam, Potsdam, Germany.

27. **Iqbal M.** and Zafar, S.I. (1995). Red alga *Porphyridium cruentum* as a source of extracellular polysaccharides. Fifth National Conference of Plant Scientist, 28-30 March, 1995, National Agriculture Research Centre, Islamabad, Pakistan.

28. Zafar, S.I. and **Iqbal, M.** (1995). Immobilization of microalgae in the petiolar felt-sheath of palm for the production of biopolymers. Fifth National Conference of

Plant Scientist, 28-30 March, 1995, National Agriculture Research Centre, Islamabad, Pakistan.

29. Nasreen, Z., **Iqbal, M.** and Zafar, S.I. (1995). Outdoor cultivation of microalgae under natural environmental conditions of Pakistan. Fifth National Conference of Plant Scientist, 28-30 March, 1995, National Agriculture Research Centre, Islamabad, Pakistan.

30. Sadiq, F. A., Zafar, S.I. and **Iqbal, M.** (1995). Production of proteinaceous coloured pigments by the red alga *Porphyridium cruentum*. Fifth National Conference of Plant Scientist, 28-30 March, 1995, National Agriculture Research Centre, Islamabad, Pakistan.

31. Abdullah, N., Zafar, S.I. and **Iqbal, M.** (1995). Studies on the biodegradation of sugarcane bagasse. Fifth National Conference of Plant Scientist, 28-30 March, 1995, National Agriculture Research Centre, Islamabad, Pakistan.

32. **Iqbal, M**. and Zafar, S.I. (1995). Immobilization of *Aspergillus niger* within vegetable sponge for the continuous production of amylase. Third National Meeting of Pakistan Society of Biochemists, 3-6 April, 1995, University of the Punjab, Lahore.

33. **Iqbal, M.**, Nasreen, Z. and Zafar, S.I. (1995). The potential of microalgal polysaccharides in food industry. 6th Annual General Meeting of the Pakistan Society of Food Scientists and Technologists, 20 December, 1995, PCSIR Laboratories Complex, Lahore, Pakistan.

34. **Iqbal M.** and Zafar, S.I. (1994). *Porphyridium cruentum* biomass as a potential source of food colour. 5th Annual General Meeting of the Society of Food Scientists and Technologists, 22 December, 1994, NWFP University of Agriculture, Peshawar, Pakistan.

35. **Iqbal M.**, Shah W.A. and Zafar, S.I. (1993). Biostructural Materials: novel supports for cell immobilization. International Symposium on Biotechnology for sustainable Development. 15-20 December, 1993, National Institute of Biotechnology and Genetic Engineering, Faisalabad, Pakistan.

36. **Iqbal, M.** and Zafar, S.I. (1993). Vegetable Sponge: A novel immobilization material for plant/algal cells. Fourth National Conference of Plant Scientists, 16-21 Feb., 1993, Faisalabad, Pakistan.

37. **Iqbal, M.** and Zafar, S.I. (1992). Mass Cultivation of *Porphyridium cruentum* for Biopolymer Production. All Pakistan Science Conference 16-21 March, 1992, Khanaspur, Pakistan.

38. **Iqbal M.**, Grey, D. and Stepan-sarkissian, G. (1990). A new photobioreactor for microalgal cultivation. 5th European Congress on Biotechnology, 9-12 July, 1990, Copenhagen, Denmark.

39. **Iqbal M.,** Stepan-sarkissian, G., Grey, D. and Fowler, M.W. (1989). Optimization of extracellular polysaccharide production in the microalga *Porphyridium*

cruentum. 113th Meeting of Society for General Microbiology, 4-7 April, 1989, University of Cambridge, Cambridge, UK.

40. Iqbal M., Stepan-sarkissian, G., Grey, D. and Fowler, M.W. (1989). Effect of light and carbon dioxide on biopolymer production by the unicellular red alga *Porphyridium cruentum*. International Conference on Biotechnology and Food, 20-24 Feb., 1989, Hohenheim University, Stuttgart, Germany.

41. Iqbal M., Stepan-sarkissian, G., Grey, D. and Fowler, M.W. (1988). Effect of nitrogen on biopolymer production by *Porphyridium cruentum* culture. International Symposium on Secondary Products from Plant Tissue Culture, 19-20 December, 1988, King's College London, London, UK.

42. Iqbal M., Grey, D., Stepan-sarkissian, G. and Fowler, M.W. (1988). Production of extracellular polysaccharides by *Porphyridium cruentum*. Third Annual American Society for Microbiology Conference on Biotechnology, 2-5 April, 1988, Washsington, D.C., USA.

43. Iqbal M., Grey, D., Stepan-sarkissian, G. and Fowler, M.W. (1987). Growth and polysaccharide production by cell cultures of the red alga *Porphyridium cruentum*. International Symposium on Biochemistry of Algae and Cyanobacteria, 7-9 April, 1987, University College Aberystwyth, Wales, UK.

44. Iqbal, M., Chaudhary, M.F. and Chaudhary, A.H. (1985). Characterization of five *Frankia* isolates from Actiorhizal nodules of *Casuarina glauca*. First National Congress of Soil Sciences, Managing Soil Resources to Meet National Challenges, 6-8 Oct., 1985, Lahore, Pakistan.

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Postgraduate Research Theses Supervision

Ph.D. Theses

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