

The Group of "Environmental Microbiology"- CIBNOR

Final 2010

(Numbers in parenthesis near journal's name are the *impact factor, 2010*)

Summary

- Original publications in peer-reviewed journals	
Published and "in press" -	9
- Submitted papers -	7
- Publications in books -	10
- Publication in website -	1
- Invited presentations in conferences	14
- Voluntary presentations in conferences	3
- Review of manuscripts for international and national journals and funding agencies	60
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- Total productivity (without conferences and websites) for 2010	26

- **Average "Impact Factor" of all published papers in 2010: 3.033**

PUBLISHED AND "IN PRESS" PUBLICATIONS

PUBLICATIONS IN SCIENTIFIC INTERNATIONAL REVIEWED JOURNALS

1. de-Bashan, L.E., and Bashan, Y. 2010. Immobilized microalgae for removing pollutants: Review of practical aspects. **Bioresource Technology** **101**: 1611–1627 (**4.365**)
2. de-Bashan, L.E., Hernandez, J.-P., Bashan, Y., and Maier, R. M. 2010. *Bacillus pumilus* ES4: Candidate plant growth-promoting bacterium to enhance establishment of plants in mine tailings. **Environmental and Experimental Botany** **69**: 343–352 (**3.164**) (**2.699**)
3. Bashan, Y., and de-Bashan, L.E. 2010. How the plant growth-promoting bacterium *Azospirillum* promotes plant growth-a critical assessment. **Advances in Agronomy** **108**: 77-136 (**3.64**)
4. Perez-Garcia, O., de-Bashan, L.E., Hernandez, J.-P., and Bashan, Y. 2010. Efficiency of growth and nutrient uptake from wastewater by heterotrophic, autotrophic, and mixotrophic cultivation of *Chlorella vulgaris* immobilized with *Azospirillum brasilense*. **Journal of Phycology** **46**: 800-812 (**2.239**)

5. de-Bashan, L. E., Hernandez, J.-P., Nelson, K.N., Bashan, Y., and Maier, R. M. 2010. Growth of quailbush in acidic, metalliferous desert mine tailings: effect of *Azospirillum brasilense* Sp6 on biomass production and rhizosphere community structure. **Microbial Ecology** 60: 915-927. (2.875)
6. Perez-Garcia, O., Escalante, F.M.E., de-Bashan L.E., and Bashan, Y. 2011. Heterotrophic cultures of microalgae: Metabolism and potential products. **Water Research** 45: 11-36 (4.546)
7. Bacilio, M., Vazquez, P., and Bashan, Y. 2011. Water versus spacing: A possible growth preference among young individuals of the giant cardon cactus of the Baja California Peninsula. **Environmental and Experimental Botany** 70: 29-36 (2.699)
8. Vovides, A.G., Bashan, Y., López-Portillo, J.A., and Guevara R. 2011. Nitrogen fixation in preserved, reforested, naturally regenerated and impaired mangroves as an indicator of functional restoration in mangroves in an arid region of Mexico. **Restoration Ecology** (1.972) (In press) doi: 10.1111/j.1526-100X.2010.00713.x
9. Perez-Garcia, O., Bashan, Y., and Puente M.E. 2011. Organic carbon supplementation of sterilized municipal wastewater is essential for heterotrophic growth and removing ammonium by the microalga *Chlorella vulgaris*. **Journal of Phycology** 46: DOI: 10.1111/j.1529-8817.2010.00934.x (2.239) (In press)

PUBLICATIONS IN INTERNATIONAL BOOKS

1. Bashan, Y., and de-Bashan, L.E. 2010. Microbial populations of arid lands and their potential for restoration of deserts. In: **Soil biology and agriculture in the tropics**. Dion, P. (ed). Soil Biology Series 21. Chapter 6. Springer, Berlin, Heidelberg, Germany. pp. 109 -137.
2. Bashan, Y. 2010. Reality and challenges in microbial ecology of tropical soils - Forward. In: **Microbial Ecology of Tropical Soil**. (eds.) Ferreira de Araújo, A.S. and Figueiredo M.d.V.B., Nova Science Publishers, Hauppauge, New York, USA. pp.1-3.
3. Bashan, Y., de-Bashan, L.E. and Toledo G. 2010. Mangrove restoration encouraged by plant-microbe interactions in the arid environment of Baja California Sur, Mexico. In: **World Atlas of Mangroves**. Spalding, M., Kainuma, M., and Collins, L. (Eds). p. 203. Published by: Earthscan, London, Washington DC.

PUBLICATIONS IN NATIONAL BOOKS

4. Holguin G., Vázquez P., Sánchez J., Lopez de Los Santos Y., Flores A.L., Melgarejo L. M., Vanegas J., Galindo T., Dávila A., Polanía J. and Ruiz, M. 2010. Microbiología del manglar In: **Los manglares de la Península de Baja California**. (Eds.) Serviere-Zaragoza, E., Felix-Pico, E.F., Riosantena-Rodriguez, R., Leon de la Luz, J.L. (*in Spanish*)(accepted) (no Publisher so far).
5. de-Bashan, L.E., and Bashan, Y. 2010. Microorganismos utilizados en la recuperación de suelos erosionados y ecosistemas degradados en México. In: **Biodiversidad Microbiana de México**. (Eds): Álvarez Sánchez J., Rodríguez Guzmán, P. and Alarcón, A. Chapter 24. Published by: SAGARPA, Mexico City, Mexico, (*in Spanish*) (accepted)

PUBLICATIONS IN CONFERENCE BOOKS

6. Bashan, Y., Trejo, A., Lopez, B.R., , de-Bashan, L.E., Moreno, M., Bacilio, M., Vazquez, P., and Hernandez, J.-P. 2010. Encapsulated plant growth-promoting bacteria for agriculture and the environment. In: 18th International Conference on Bioencapsulation, October 1-2, 2010, Porto, Portugal. pp. 70-71.
7. de-Bashan, L.E., Hernandez, J.-P., Covarubias, S.A., Cruz, I., and Bashan, Y. 2010. Polymer-immobilized microalgae for removing nitrogen and phosphorus from water. In: 18th International Conference on Bioencapsulation, October 1-2, 2010, Porto, Portugal. pp. 74-75.
8. Covarrubias S. A., de-Bashan, L.E. and Bashan, Y. 2010. Immobilization of microorganisms in alginate beads as protection against hostile conditions when treating wastewater. In: 18th International Conference on Bioencapsulation, October 1-2, 2010, Porto, Portugal. pp. 146-147.
9. de-Bashan, L.E., Hernandez, J.-P., Moreno, M., and Bashan, Y. 2010. Phytoremediation of mine tailings aided by plant growth-promoting bacteria. In: International workshop on rhizosphere, biodiversity and sustainable agriculture (TIRBAS-2010). Garcia de Salomone, I.E., and Cassan, F.D. (eds), Orientacion Grafica Editora, Buenos Aires, Argentina. pp. 45-46.
10. Bashan, Y., Trejo, A., de-Bashan, L. E., and Hernandez J.-P. 2010. Enhanced fertility of eroded arid soil using recycled waste debris of wastewater treatment containing microalgae and *Azospirillum brasilense* as inoculant. In: International workshop on rhizosphere, biodiversity and sustainable agriculture (TIRBAS-2010). Garcia de Salomone, I.E., and Cassan, F.D. (eds), Orientacion Grafica Editora, Buenos Aires, Argentina. pp. 55-56.

PUBLICATION IN WEBSITE

1. Bashan, Y., Toledo, G., and de-Bashan L.E. 2010. Flat-top decay syndrome of the giant cardon cactus (*Pachycereus pringlei*) of the Baja California Peninsula, Mexico. At: <http://www.bashanfoundation.org/flat/flat.html>.

SUBMITTED PUBLICATIONS

PUBLICATIONS IN SCIENTIFIC INTERNATIONAL REVIEWED JOURNALS

1. Bashan, Y., Salazar, B., Moreno, M., Lopez, B.R., and Linderman, R.G. 2010. Reforestation of eroded desert soil with native trees: effects of inoculation with plant growth-promoting microorganisms, limited amounts of compost and water and plant density. **Forest Science** (1.444)
2. Lopez, B.R., Bashan, Y., and Bacilio, M., 2010. Endophytic bacteria of *Mammillaria fraileana*, an endemic rock colonizing cactus of the Southern Sonoran Desert. **Archives of Microbiology** (1.927)
3. Lopez, B.R., Tinoco, C., Bacilio, M., and Bashan, Y., 2010. Endophytic bacteria of the rock-dwelling cactus *Mammillaria fraileana* affect plant growth and mobilization of elements from rocks. **Journal of Ecology** (4.69)
4. Trejo, A., de-Bashan, L.E., Hartmann, A., Hernandez, J.-P., Rothballer, M., Schmid, M., and Bashan Y. 2010. Recycling waste debris of immobilized microalgae and plant growth-promoting bacteria from wastewater treatment as potential resource to improve quality of severely eroded arid soil and promote plant growth. **Soil Biology and Biochemistry** (2.98)
5. Bashan Y., Trejo, A., and de-Bashan, L.E., 2010. Two culture media for mass cultivation of *Azospirillum* sp. and for inoculants to increase plant growth. **Biology and Fertility of Soils** (1.757)
6. Vovides, A.G., López-Portillo, J.A., and Bashan, Y. 2010. N₂-fixation along a gradient of a long term disturbance in tropical mangrove forest of the Gulf of Mexico. **Biology and Fertility of Soils** (1.757)
7. de-Bashan, L.E., Rothballer, M., Schmid, M. Hartmann A., and Bashan Y., 2010. Cell-cell interaction in the eukaryote-prokaryote model using the microalgae *Chlorella vulgaris* and the bacterium *Azospirillum brasilense* immobilized in polymer beads. **Journal of Phycology** (2.27)

PRESENTATIONS IN CONFERENCES

1. Bashan, Y., Salazar B., Moreno M., de-Bashan L.E., Bacilio M., Hernández J.-P., and Lopez, B.R. 2010. Plant growth-promoting bacteria for "face-lifting" extreme cases of desertification. In: 3rd International Symposium towards the Prevention of Desertification. 18-19.2. 2010, La Paz, Mexico (**invited lecture**).
2. Trejo, A. 2010. Reutilización del sistema microalga-bacteria empleado para el tratamiento terciario de agua residuales domesticas: su aplicación como inoculante en suelos de zonas aridas. Special seminar in: Group of Food Biochemistry, CIBNOR, 23.2.2010. La Paz, Mexico. (**Invited lecture**).
3. Bashan, Y. Salazar B., Moreno M., de-Bashan L.E., Bacilio M., Hernández J.-P., and Lopez, B.R. 2010. Plant growth-promoting bacteria as a tool for restoring extreme cases of desertification. In: Special seminar in the graduate school of the University of Queretaro, 2.3.2010, Queretaro, Mexico (**invited lecture**).
4. Bashan, Y., and de-Bashan, L.E. 2010. Use of *Azospirillum* (nitrogen fixing) bacteria in farming. In: 8th Soil Health Symposium of the USDA-NRCS (Natural Resources Conservation Service).10.3.2010. Indio, California, USA (**Key-note lecture**).
5. de-Bashan, L.E., Bashan, Y. Hernández. J.-P., Trejo, A., Perez-Garcia, O., and Hernandez, S.A. 2010. Immobilized microalgae in alginate for wastewater treatments. In: Departmental seminar in: Department for Development of Technologies, National Polytechnique Institute-CICIMAR, 18.3.2010. La Paz, Mexico (**Invited lecture**).
6. de-Bashan, L.E., Hernandez, J.-P., Trejo, A., Perez, O., Covarrubias, S.A., Cruz, I., and Bashan, Y. 2010. Immobilized algae and bacteria for elimination of nitrogen and phosphorus from wastewater. 18th International Conference on Bioencapsulation, October 1-2, 2010, Porto, Portugal (**Invited speaker and Chairman of session 8: Agriculture, Environment and Biotechnology**)
7. Bashan, Y., Hernandez, J.-P., Trejo, A., de-Bashan, L.E., Lopez, B.R., Moreno, M., Bacilio, M., Vazquez, P., and 2010. Encapsulated plant growth-promoting bacteria for agriculture and the environment. In: 18th International Conference on Bioencapsulation, October 1-2, 2010, Porto, Portugal (**Invited speaker and Chairman of session 9: Agriculture, Environment and Biotechnology**)

8. Covarrubias S. A., de-Bashan, L.E. and Bashan, Y. 2010. Immobilization of microorganisms in alginate beads as protection against the hostile conditions when treating wastewater. In: 18th International Conference on Bioencapsulation, October 1-2, 2010, Porto, Portugal
9. Bashan, Y., de-Bashan, L.E., Hernandez, J.-P. Trejo, A., Lopez, B.R., Moreno, M., Bacilio, M., and Vazquez, P. 2010. Bioremediation of eroded soils and water in arid zones. 7th Conference on Biotechnology of the National Polytechnique Institute (VII Encuentro de Biotecnología del IPN), October 11-13, 2010, Mazatlan, Sinaloa, Mexico (**Conferencia Magistral**)
10. Bashan, Y., Moreno M., de-Bashan L.E., Lopez, B.R., Bacilio M., Vazquez, P., and Hernández J.-P. 2010. Conservation and re-vegetation of arid eroded soils. In: 12th Argentinean Congress of Microbiology. 18-20.10.2010, Buenos Aires, Argentina (**invited lecture**).
11. de-Bashan, L.E., Hernandez, J.-P., Moreno, M., and Bashan, Y. 2010. Phytoremediation of mine tailings aided by plant growth-promoting bacteria. In: International Workshop on rhizosphere, biodiversity and sustainable agriculture (TIRBAS-2010), October 21-22, 2010. Buenos Aires, Argentina. (**Invited lecture**)
12. Bashan, Y., Trejo, A., de-Bashan, L. E., and Hernandez J.-P. 2010. Enhanced fertility of eroded arid soil using recycled waste debris of wastewater treatment containing microalgae and *Azospirillum brasilense* as inoculant. In: International Workshop on rhizosphere, biodiversity and sustainable agriculture (TIRBAS-2010), October 21-22, 2010. Buenos Aires, Argentina. (**Invited lecture**)
13. Hernandez, J. P. 2010. Las bacterias, base de la recuperación ambiental del siglo XXI. Special videoconference in: Universidad del Bosque, Facultad de Biología, October 28, 2010. Bogota, Colombia. (**Invited lecture**)
14. Vovides, A., Lopez-Portillo, J., Bashan, Y., and Vasquez, V. 2010. Nitrogen fixation along a gradient of impairment in Tampamachoco Lagoon, Veracruz (Fijación de Nitrogeno a lo largo de un gradiente de perturbación en la Laguna de Tampamachoco, Tuxpan, Veracruz) In: First Mexican Congress on mangrove ecosystems (Primer congreso Mexicano de ecosistemas de manglar). October 25 – 29, 2010, Merida, Yucatan, Mexico
15. Vovides, A., Lopez-Portillo, J., Bashan, Y., and Guevara, R. 2010. Nitrogen fixation as an indicator of functional restoration in reforested mangroves of an arid zone of Mexico (La fijación de nitrógeno como indicador de restauración funcional en manglares reforestados de zonas áridas de México) In: First Mexican Congress on mangrove ecosystems (Primer congreso Mexicano de ecosistemas de manglar). October 25 – 29, 2010, Merida, Yucatan, Mexico

16. Hernandez J. P. 2010. Uso de Bacterias y microalgas para el tratamiento biologico de agua residual. Semana de la Ciencia 2010. Escuela Normal Superior del Estado de Baja California Sur, November 12, 2010, La Paz, Mexico (**Invited lecture**)
17. Cruz-Santander I. 2010. Tratamiento terciario de agua residual doméstica evaluando el sistema inmovilizado *Chlorella vulgaris*-*Azospirillum brasilense* bajo condiciones autotróficas y heterotróficas en escala semipiloto. Special videoconference in: Universidad del Bosque, Facultad de Biología, November 18, 2010. Bogota, Colombia. (**Invited lecture**).

DOMESTIC OUTREACH AND COMMUNITY SERVICES

1. **Plant growth-promoting bacteria to solve environmental problems in the desert. Strategic line of research of CIBNOR** (Dr. Yoav Bashan, Dr. Luz de-Bashan, and Dr. Macario Bacilio) (P.C. 6.0)

SCIENTIFIC RECOGNITION AND INTERNATIONAL SERVICES

1. Invited to serve on the **Society Board of Advisors of the Asian PGPR** (plant growth promoting rhizobacteria - biofertilizers and biofungicides) **Society for Sustainable Agriculture**. Auburn University, Alabama, USA. (Yoav Bashan)

2. Review of manuscripts for national and International Journals and funding agencies: Total: 60

Reviewer	Journal, or funding agency	Country	Number of manuscripts
Yoav Bashan	Applied and Environmental Microbiology	USA	2
	Journal of Phycology	USA	3
	The Open Forest Science Journal	USA	1
	Journal of Biomedicine and Biotechnology	USA	1
	Journal of Experimental Marine Biology and Ecology	USA	1
	Desalinization and Water Treatment	USA	2
	Biology and Fertility of Soils	Germany	9
	Archives of Microbiology	Germany	1
	FEMS Microbiology Letters	Germany	1
	Biodegradation	Germany	1
	Journal of Hazardous Materials	The Netherlands	2
	Environmental Experimental Botany	The Netherlands	1
	Plant and Soil	The Netherlands	4
	European Journal of Soil Biology	The Netherlands	1
	Applied Soil Ecology	The Netherlands	2
	Bioresource Technology	The Netherlands	1
	Desalinization	The Netherlands	1
	Applied Microbiology and Biotechnology	The Netherlands	1
	Scientia Horticulturae	The Netherlands	1
	Science of the Total Environment	The Netherlands	1
	Research in Microbiology	France	1
	Environmental Technology	Hong Kong	3
	Journal of Applied Phycology	Australia	1
	Brazilian Journal of Microbiology	Brazil	1
	Polibotanica	Mexico	1
	CONACYT-Basic Research	Mexico	2
	CONACYT-Germany bilateral cooperation fund	Mexico-Germany	1
	Ministry of Health-Applied studies	Mexico	2
Israel Science Foundation	Israel	1	
Luz de-Bashan	Biology and Fertility of Soils	Germany	5
	European Journal of Soil Biology	The Netherlands	1
	Bioresource Technology	The Netherlands	2
	CONACYT-Basic Research	Mexico	1
	Ministry of Health-Applied studies	Mexico	1

RESEARCH STAY ABROAD

Department of Environmental Sciences, University of California, Riverside, USA.
November 2009 to November 2010 (Dr. Macario Bacilio).

FOREIGN VISITORS

Prof. Joseph Kloepper and M.Sc John McInroy, Dept. of Entomology and Plant Pathology, Auburn University, Alabama, USA. Short, hand on workshop in Fluorescence *in situ* hybridization (FISH) of roots. December 17-20, 2010.

EXTERNAL PROJECTS (total:\$7,563,000)(615,000 U\$S) (12.3 pesos=1 USD).

Physiological and genetic mechanisms in the establishment and maintenance of mutualisms of plants with different partners.

Funding: \$4,380,000.00; Financed by CONACYT-investigacion basica

Duration: Four years (2011-2014).

PI: Dr. Yoav Bashan

Co-PI: Dr. Luz Estela de-Bashan and Dr. Martin Heil (CINVESTAV)

Co-researchers: M.Sc Juan Pablo Hernández.

Cellular mechanisms controlling the combined growth of microalgae and microalgae growth-promoting bacteria and their contribution to eliminate nutrients (N and P) from wastewater.

Funding: \$1,383,000.00; Financed by CONACYT-investigacion basica

Duration: Three years (2007-2010).

PI: Dr. Yoav Bashan

Co-PI: Dr. Luz Estela de-Bashan

Co-researchers: M.Sc Juan Pablo Hernández.

Escalamiento de una novedosa tecnologia para el tratamiento terciario de aguas residuales combinado con la recuperacion de suelos erosionados de zonas aridas, utilizando microalgas y bacterias coinmovilizadas.

Funding: \$1,800,000.00; Financed by SEMARNAT-CONACYT

Duration: Four years (2008-2011).

PI: Dr. Yoav Bashan

Co-PI: Dr. Luz Estela de-Bashan

Co-researcher: M.Sc Juan Pablo Hernández.

STAFF AND COLLABORATIONS IN 2010

Researchers (full time)

1. Dr. Yoav Bashan
2. Dr. Macario Bacilio

Staff, research (full time)

3. Dr. Luz Gonzalez de-Bashan
4. M.Sc Juan-Pablo Hernández
5. Biol. Mar. Patricia Vazquez
6. M.Sc. Manuel Moreno
7. M.Sc. Adan Trejo (to June 2010)

Post-Doctoral fellow

8. Dr. Blanca Romero-Lopez

Students (Research)

9. **Adan Trejo, M.Sc. Graduated 12.3. 2010** (CIBNOR, La Paz, Mexico).
(Directors: Dr. Luz de-Bashan and Dr. Yoav Bashan).
10. Biol. Alejandra Vovides. – **D.Sc.** Student since 2004 (Instituto de Ecologia, Xalapa, Mexico). (with Dr. Jorge Lopez-Portillo and Dr. Yoav Bashan).
11. M.Sc. Luis Leyva. **D.Sc.** Student since 2009 (CIBNOR, La Paz, Mexico).
(with Dr. Yoav Bashan).
12. Biol. Sergio Hernandez - **M.Sc** student since 2008 (CIBNOR, La Paz, Mexico). (with Dr. Luz de-Bashan and Dr. Yoav Bashan)
13. M.Sc. Francisco Choix. **D.Sc.** Student. 2010. (CIBNOR, La Paz, Mexico).
(with Dr. Yoav Bashan and Dr. Luz de-Bashan).
14. Eng. Ivonne Cruz. **M.Sc** student. 2010. (CIBNOR, La Paz, Mexico). (with Dr. Yoav Bashan and Dr. Luz de-Bashan).
15. Eng. Beatrice Meza. **M.Sc** student. 2010. (CIBNOR, La Paz, Mexico). (with Dr. Yoav Bashan and Dr. Luz de-Bashan).
16. cEng. Raina Romero. (**Social service**). 2010. (ITSON, Ciudad Obregon, Sonora, Mexico). (with cDr. Luis Leyva).
17. cEng. Noga Bashan (**Research stay**). 2010. (Technion, Israel Institute of Technology, Haifa, Israel) (with Dr. Luz de-Bashan and M.Sc Juan-Pablo Hernandez).
18. Eng. Cyntia Chavez. **M.Sc** student. 2010. (CIBNOR, La Paz, Mexico). (with Dr. Yoav Bashan and Dr. Luz de-Bashan).
19. cEng. Alfredo Orrala. **Residency** in Ing. en Sistemas Computacionales. 2010. (Instituto Tecnológico de La Paz, Mexico) (with M.Sc Juan-Pablo Hernandez).
20. M.Sc. Miguel Ramirez. **D.Sc.** student. 2010. (Colegio de Postgraduados, Montecillo, Mexico) (with Dra. Luz E. de-Bashan, co-tutor).

Group's administrator

In search of candidate

FOREIGN AND NATIONAL COLLABORATIONS IN 2010 (in: projects, publications and supervising graduate students)

1. Prof. Hani Antoun. Laval University, Quebec (Canada). Water Bioremediation and phosphate solubilization.
2. Prof. Raina M. Maier, and M.Sc. Julie Nielsen, University of Arizona (USA). Phytostabilization of mine tailings.
3. Dr. Humberto Suzan. University of Queretaro (Mexico). Ecology the Iron wood tree.
4. Dr. S.R. Prabhu, International Bio Recovery Corporation (Canada). Inoculant information from developing countries.
5. Dr. Horst Vierheilig. Superior council of research (Spain). Mycorrhizae of desert plants. (Not active in 2010)
6. Dr. Drona Kaplan. University of Ben Gurion in the Negev (Israel). Re-use of water in arid zone. (Not active in 2010)
7. Dr. Robert Linderman- Plant Health Inc. Private sector, Corvallis, Oregon (USA). Reforestation of desert eroded lands.
8. Dr. Jorge Lopez-Portillo and Dr. Roger Guevara, Institute of Ecology, Xalapa (Mexico). Nitrogen fixation in mangroves.
9. Dra. Concepcion Lara- CIBNOR (Mexico). Heterotrophic growth of microalgae.
10. Prof. Anton Hartmann, Dr. Michael Schmid and Dr. Michael Rothballer. German Research Center for Environmental Health, München, (Germany). FISH analysis of plant-bacteria interactions.
11. Dr. David Crowley, Environmental Sciences Dep. University of California- Riverside (USA). Mitigation of salinity effects by PGPB.
12. Dr. Martin Heil, CINVESTAV (Guanajuato, Mexico). Mutualism between microalgae and bacteria.
13. Dr. Michael Cohen –Sonoma State University, California (USA). Enzymatic and molecular mechanisms of fatty acids in microalgae.
14. Dr. Alberto Mendoza- IPN Reynosa, Tamaulipas (Mexico). Enzymatic and molecular mechanisms of fatty acids in microalgae.
15. Dr. Chris Rensing- University of Arizona, Tucson (USA). Enzymatic and molecular mechanisms of fatty acids in microalgae.
16. Dr. Felipe Ascencio (CIBNOR), La Paz, Mexico. Enzymatic and molecular mechanisms of fatty acids in microalgae.
17. Lic. Frank Estrada (Algoil S.A. Nicaragua). Massive propagation of *Chlorella*.
18. Dr. Jesus Cordova and Dr. Yolanda Gonzalez, University of Guadalajara (Mexico). Ethanol production from microalgae.
19. Dr. Gustavo Hernandez-Carmona, IPN-CICIMAR, La Paz, (Mexico). Scaling up wastewater treatment.
20. Prof. Joseph Kloepper and M.Sc. John McInroy, Auburn University, Auburn (USA). FISH techniques for detection of PGPB.
21. Dr. Beatriz Baca, Autonomous University of Puebla (Mexico). Indole-3-acetic acid regulation in *Azospirillum*.
22. Dr. Cecilia Creus, University of Mar de Plata, Balcarce (Argentina). Signal molecules in *Azospirillum*.