

The "Environmental Microbiology" Group at CIBNOR

Final 2014

(Numbers in parenthesis adjacent a journal's name are the impact factor, 2013)

SUMMARY

- Original publications in peer-reviewed journals with Impact factor
- Published and "in press" - 7
- Submitted papers - 5
- Publications of chapters in books - 4
- Invited presentations at conferences/seminars 12
- Voluntary presentation at conferences 2
- Review of manuscripts for international and national journals and funding agencies 63

=====

- Total productivity (without conferences, reviews and websites) for 2014: 16

- **Average "Impact Factor" of all published papers in 2013: 2.508**

PUBLISHED AND "IN PRESS" PUBLICATIONS IN PEER-REVIEWED JOURNALS WITH AN IMPACT FACTOR

1. Bashan, Y., de-Bashan, L.E., Prabhu, S.R., and Hernandez, J.-P. 2014. Advances in plant growth-promoting bacterial inoculant technology: formulations and practical perspectives (1998-2013). (A Marschner Review). **Plant and Soil** 378: 1-33 (3.235)
2. Palacios, O.A., Bashan, Y., and de-Bashan, L.E. 2014. Proven and potential involvement of vitamins in interactions of plants with plant growth-promoting bacteria—an overview. **Biology and Fertility of Soils** 50: 415-432 (3.396)
3. Choix, F.J., Bashan, Y., Mendoza, A., and de-Bashan, L.E. 2014. Enhanced activity of ADP glucose pyrophosphorylase and formation of starch induced by *Azospirillum brasilense* in *Chlorella vulgaris*. **Journal of Biotechnology** 177: 22-34 (2.884)
4. Ramírez-Eliás, M.A., Ferrera-Cerrato, R., Alarcón, A., Almaráz, J.J., Ramírez-Valverde, G., de-Bashan, L.E., Esparza-García, F.J., and García-Barradas, O. 2014. Identification of culturable microbial functional groups isolated from the rhizosphere of four species of mangroves and their biotechnological potential. **Applied Soil Ecology** 82: 1-10 (2.206)
5. Leyva, L.A., Bashan Y., Mendoza, A., and de-Bashan, L.E. 2014. Accumulation of fatty acids in *Chlorella vulgaris* under heterotrophic conditions in relation to activity of acetyl-CoA carboxylase, temperature, and co-immobilization with *Azospirillum brasilense*. **Naturwissenschaften** 101:819–830 (1.971)

6. Leyva, L.A., Bashan Y., and de-Bashan, L.E. 2014. Activity of acetyl-CoA carboxylase is not directly linked to accumulation of lipids when *Chlorella vulgaris* is co-immobilised with *Azospirillum brasilense* in alginate under autotrophic and heterotrophic conditions. **Annals of Microbiology** (in press) DOI 10.1007/s 13213-014-0866-3 (1.039)
7. Meza, B., de-Bashan, L.E., and Bashan, Y. 2014. Involvement of indole-3-acetic acid produced by *Azospirillum brasilense* in accumulating intra-cellular ammonium in *Chlorella vulgaris*. **Research in Microbiology** (accepted for publication) (2.826)

CHAPTERS IN BOOKS

8. Perez-Garcia, O., and Bashan, Y. 2014. Microalgal heterotrophic and mixotrophic culturing for bio-refining: From metabolic routes to techno-economics. Algal Biorefineries II: Products and Biorefinery Design. Bajpai, R., Prokop, A., Zappi, M. (Eds). Springer, New York, Berlin, Germany (accepted)
9. de-Bashan, L.E., Hernandez, J.-P., and Bashan, Y. 2014. Interaction of *Azospirillum* spp. with microalgae; a basic eukaryotic--prokaryotic model and its biotechnological applications. In: Handbook for *Azospirillum*. Technical issues and protocols. Cassán F., Okon Y., Creus C. (Eds). Springer, Berlin, Heidelberg, Germany (Accepted)
10. Bashan, Y., and de-Bashan, L.E. 2014. Inoculants for *Azospirillum*. In: Handbook for *Azospirillum*. Technical issues and protocols. Cassán F., Okon Y., Creus C. (Eds). Springer, Berlin, Heidelberg, Germany (Accepted)
11. de-Bashan, L. E., and Bashan, Y. 2014. Microorganisms used for recovery of eroded soils and degraded ecosystems in Mexico. [Microorganismos utilizados en la recuperación de suelos erosionados y ecosistemas degradados en México.]. In: Microbial biodiversity in Mexico [Biodiversidad Microbiana de México]. (Eds): Álvarez Sánchez J., Rodríguez Guzmán, P. and Alarcón, A. Chapter 24. Published by: Editorial Trillas, Mexico City, Mexico. (In Spanish) (in press)

SUBMITTED PUBLICATIONS

SCIENTIFIC INTERNATIONAL REVIEWED JOURNALS

1. Meza, B., de-Bashan, L.E., Hernandez, J.-P., and Bashan, Y. 2014. Accumulation of intra-cellular polyphosphate in *Chlorella vulgaris* cells is related to indole-3-acetic acid produced by *Azospirillum brasilense*. **Research in Microbiology** (2.826)
2. Palacios, O.A., Bashan, Y., Schmid, M., Hartmann, A., de-Bashan L. E. 2014. Enhancement of thiamine release by the interaction of *Chlorella vulgaris* and *Azospirillum brasilense* in alginate beads under stress of pH, light intensity, and nitrogen starvation. **Enzyme and Microbial Technology** (2.966)

3. Figueroa-López, A.M., de-Bashan, L.E. and Maldonado-Mendoza, I.E. 2014. Assessing the potential role of endophytic bacterial chitinases in fungal phytopathogen control. **Plant And Soil** (3.235)
4. Palacios, O.A., Choix, F.J., Bashan, Y., de-Bashan, L.E. 2014. Indole-3-acetic acid produced by *Azospirillum* spp. affects activity of the main enzymes of starch metabolism in *Chlorella vulgaris* under heterotrophic conditions. **Applied Microbiology and Biotechnology** (3.425)
5. Bashan Y., Lopez, B.R., Huss, V.A.R., Amavizca, E. and de-Bashan, L.E. 2014. *Chlorella sorokiniana* UTEX 2714 (formerly *C. vulgaris* UTEX 2714) a non-thermo tolerant microalgae species useful for biotechnological applications and as a reference strain. **Journal of Applied Phycology**

PRESENTATIONS AT CONFERENCES: (the invitee and the presenter = in bold)

1. **Bashan, Y.** 2014. Who is an author or co-author of a scientific paper? In: Weekly seminar of the Academy of Biotechnology. The Northwestern Center for Biological Research (CIBNOR). February 6, 2014. La Paz, Mexico. (**Invited lecture**).
2. **de-Bashan L.E. and Bashan Y.** 2014. Interaction of microalgae and bacteria in alginate spheres: from basic studies of plant–bacteria interaction to potential biotechnological applications. In: NASA Ames ASL Bio Seminar. April 25, 2014, NASA Ames, California, USA (**Shared invited lecture**).
3. **Bashan, Y.,** de-Bashan, L.E. and Choix, F.J. 2014. Inoculants for cereals. In: Symposium: Beneficial microbes for agriculture and the climate change challenge. May 20-21, 2014. Madrid, Spain. (**Invited lecture**).
4. **Bashan, Y.,** de-Bashan, L.E. 2014. Advanced inoculants for plant growth-promoting bacteria aimed for the 21st century Mexican agriculture [Inoculantes avanzados para bacterias promotoras del crecimiento de plantas destinados a la agricultura mexicana del siglo 21]. In: Cycle of conferences in Conmemoración por la fundación del área de Microbiología, Colegio de Postgraduados en Ciencias Agrícolas, June 23, 2014, Montecillo, Estado de Mexico, Mexico. (**Key-note speaker**)
5. **Bashan, Y.,** Lopez, B.R., and de-Bashan, L.E. 2014. Use of rhizobacteria for mineral solubilization. In: 5th National Symposium and 4th International Symposium of Plant Pathogenic Bacteria and 1st mini-symposium on plant beneficial Bacteria. 22-26.9.2019, Guadalajara, Mexico (**Key-note speaker**).
6. **Gonzalez de-Bashan, L. E,** Bashan, Y, Hernandez, J-P., Lopez, B., Leyva, L., Choix, F., and Galaviz, C. 2014. Utilización de Bacterias promotoras de crecimiento vegetal y microalgas para el biotratamiento de aguas residuales y recuperación de suelos desérticos erosionados. In: 3rd Simposio Nacional de Biotecnología y Agricultura Sustentable, 23–26.9.2014, Zacatecas, Mexico. (**Key-note speaker**)
7. **Palacios, O.A.,** Choix, F.J., Bashan, Y., de-Bashan, L.E. 2014. Indole-3-acetic acid production by *Azospirillum* spp. affects the main enzyme of starch metabolism of *Chlorella vulgaris* growing under heterotrophic conditions. 2do. Taller latinoamericano sobre rizobacterias promotoras del desarrollo vegetal. 21-26 de Septiembre, La Falda, Argentina.
8. **Palacios, O.A.,** Bashan, Y., Hartmann, A., Schmid. M., de-Bashan, L.E. 2014. Extrusion of thiamine during the interaction of *Chlorella vulgaris* and *Azospirillum brasilense* in alginate beads under different culturing conditions. 2do Taller latinoamericano sobre rizobacterias promotoras del desarrollo vegetal. 21 - 26 de Septiembre, La Falda, Argentina.

9. **Bashan, Y.**, Lopez, B., de-Bashan, L.E., Moreno, M., Hernandez, J-P., Galaviz, C., and Garcia, E. 2014. Restauración de suelos aridos degradados, con ayuda de microorganismos benéficos. 17th Congreso Colombiano de la Ciencia del Suelo. 8-11.10.2014. Popayan, Colombia. p 2. (**Key-note speaker**)
10. **Bashan, Y.** and de-Bashan, L.E. 2014. Introduction to plant growth-promoting bacteria in the environment. 17th Congreso Colombiano de la Ciencia del Suelo. 8-11.10.2014. Popayan, Colombia (**Invited lecture+ Discussion**).
11. **Bashan, Y.** and de-Bashan, L.E. 2014. Inoculantes avanzados para bacterias promotoras del crecimiento de plantas destinados a la agricultura del siglo 21. 17th Congreso Colombiano de la Ciencia del Suelo. 8-11.10.2014. Popayan, Colombia (Invited lecture+ Discussion).
12. **de-Bashan, L. E.**, Hernandez, J-P., Moreno, M. and Bashan, Y. 2014. Fitoestabilización de relaves mineros con ayuda de bacterias promotoras de crecimiento en plantas. 17th Congreso Colombiano de la Ciencia del Suelo. 8-11.10.2014. Popayan, Colombia, P 6. (**Invited lecture+ Discussion**).
13. **de-Bashan, L.E.**, Bashan, Y., Hernandez, J.-P., Lopez, B., Leyva, L., Choix, F., Galaviz C. 2014. Utilizacion de Bacterias Promotoras de Crecimiento Vegetal y mejoramiento de la fertilidad de suelos erosionados. 8-11.10.2014. Popayan, Colombia (**Invited lecture+ Discussion**).
14. **Hernandez, J. P.** 2014. Sistema de bacterias y microalgas para la eliminación de nutrientes de las aguas residuales domésticas. In: Weekly seminar of the Academy of Biotechnology. The Northwestern Center for Biological Research (CIBNOR). November 27, 2014. La Paz, Mexico. (**Invited lecture**).

DOMESTIC OUTREACH AND COMMUNITY SERVICES

1. **Strategic line of research of CIBNOR.** The use of plant growth-promoting bacteria to solve environmental problems in the desert. (Prof. Yoav Bashan, Dr. Luz de-Bashan, and Dr. Macario Bacilio; Dr. Alejandro Lopez-Cortes) (CIBNOR internal code: P.C. 6.0)

SCIENTIFIC RECOGNITION AND INTERNATIONAL SERVICES

1. **International agreement** of cooperation between Auburn University, the Alabama agriculture experiment station, Auburn Alabama, USA and the Northwestern Center for Biological Research (CIBNOR), Mexico for the period 2014-2019. The agreement was signed May 1, 2014.
2. **Invitation as section editor of the international journal "Plant and Soil"** (Springer) for 2014-2016 (Prof. Yoav Bashan).
3. **Invitation as editorial board member of the international journal "Revista Argentina de Microbiologia"** (Elsevier) for 2014-2015 (Dr. Luz de-Bashan).

4. Review of manuscripts for journals, funding agencies and foreign universities: Total: 63

Reviewer	Journal, University or Funding Agency	Country	Number of manuscripts
Yoav Bashan	European Journal of Soil Biology	The Netherlands	1
	European Journal of Plant Pathology	The Netherlands	1
	Applied Soil Ecology	The Netherlands	4
	Journal of Hazardous Materials	The Netherlands	1
	Geoderma	The Netherlands	1
	PlosOne	USA	1
	Industrial Biotechnology	USA	1
	International Journal of Renewable Energy & Biofuels	USA	1
	Desalinization and Water Treatment	USA	2
	Symbiosis	Germany	1
	Plant and Soil	Germany	11
	Biology and Fertility of Soils	Germany	2
	Journal of Applied Phycology	Germany	3
	Environmental Science and Pollution Research	Germany	1
	World Journal of Microbiology and Biotechnology	Germany	1
	Annals of Microbiology	Germany	1
	International Journal of Molecular Sciences	Switzerland	2
	Critical Reviews in Environmental Science and Technology	UK	1
	Ciencias Marinas	Mexico	1
	Central America Agency for Accreditation of Graduate Schools	Honduras	1
African Journal of Agricultural Research	Nigeria	1	
University of Sydney (PhD Thesis)	Australia	1	
Luz de-Bashan	Biology and Fertility of Soils	Germany	5
	Journal of Applied Phycology	Germany	4
	Plant and Soil	Germany	1
	Bioresource Technology	The Netherlands	1
	European Journal of Soil Biology	The Netherlands	2
	Applied Soil Ecology	The Netherlands	1
	Scientia Horticulturae	The Netherlands	2
	Water, Air and Soil Pollution	The Netherlands	1
	Journal of Biotechnology	The Netherlands	1
	Revista Argentina de Microbiologia	The Netherlands	1
	International Journal of Scientific Research in Environmental Sciences	Malaysia	1
	MITASC-Elevate postdoctoral fellowship program	Canada	1
	Central America Agency for Accreditation of Graduate Schools	Honduras	1
	University of Antioquia (M.Sc. thesis)	Colombia	1

EXTERNAL RESEARCH PROJECTS

(total: \$ 8,854,000 pesos)(= US\$ 681,076) (13 Mexican pesos = 1 USD).

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

Funding: MN\$4,380,000; Funded by CONACYT (investigacion basica)

Duration: Four years (2011–2015).

PI: Prof. Yoav Bashan

Co-PI: Dr. Luz E. de-Bashan and Prof. Martin Heil (CINVESTAV, Irapuato)

"Asociación microalga- bacterias promotoras de crecimiento vegetal—Efecto de la ficosfera y exudados bacterianos en el establecimiento y mantenimiento de la interacción cuando están inmovilizadas en esferas de alginato."

Funding: MN\$650,000; Funded by CONACYT (investigacion basica)

Duration: 3 years (2012–2015)

PI: Dr. Luz de-Bashan

Co-PI: Prof. Yoav Bashan

"Searching for bacteria living in the rhizosphere of native desert plants in the Sonoran Desert that restore soil fertility to degraded land in Baja California".

Funding: MN\$307,000. Funded by UC-Mexus

Duration: 18 months (July 2013–June 2015)

PIs: Dr. Luz de-Bashan (Mexico); Prof. Ann Hirsch (UCLA, USA)

Co-PI: Prof. Yoav Bashan

"Extending shelf life of bacterial inoculant".

Funding: 37,850 US\$. Funded by: Laboratorio Farroupilha. Brazil

Duration: 12 months (March 2014-April 2015)

PI: Dr. Luz de-Bashan and Prof. Yoav Bashan

Participant: Dr. Francisco Choix; M.Sc. Juan-Pablo Hernandez

"Detection of *Bacillus subtilis* EA-CB0575 by FISH (Fluorescent in situ hybridization)".

Funding: 2350 US\$. Funded by Universidad EAFIT Medellín-Colciencias, Colombia

Duration: 6 months (March 2014-September 2014)

PI: Dr. Luz de-Bashan

Participants: M.Sc. Luisa Fernanda Posada Uribe and Dr. Valeska Villegas Escobar

"Pilot plant for validation of biotechnological platform of microencapsulation of bio-drugs against viral diseases in aquaculture".

Funding: MN\$ \$2,995,000; Funded by CONACYT (Fondo sectorial de innovación, FINNOVA)

Duration: 1 year (2014–2015)

PI: Dr. Luz de-Bashan

Co-PI: Prof. Yoav Bashan; Dr. Umberto Mejia.

PERSONNEL IN 2014

(SNI-National academic ranking according to the National Research System of Mexico; Candidate<1< 2< 3; H-index and citations according to Google Scholar, December 22, 2014)

Researchers (full time)

1. Dr. Luz Gonzalez de-Bashan (SNI level 2; H-index-28; Citations- 3,725)
2. Prof. Yoav Bashan (SNI level 3; H-index-56; Citations- 11,970)
3. Dr. Macario Bacilio (SNI level 1)

Research Associate (full time)

4. Dr. Blanca Lopez (SNI level 1, H-index-5; Citations- 69)

Research staff (full-time)

5. M.Sc. Juan-Pablo Hernandez (SNI level 1; H-index-15; Citations- 957)
6. M.Sc. Manuel Moreno
7. M.Sc. Edgar Amavizca

Post-Doctoral fellows (full time)

8. Dr. Esmeralda Lopez (To July 30, 2014) (SNI level candidate)
9. Dr. Francisco Choix (To July 30, 2014)

Graduate students (Research, full time)

10. Dr. Francisco Choix. D.Sc. Graduated 31.1.2014. (CIBNOR, La Paz, Mexico). (With Prof. Yoav Bashan and Dr. Luz de-Bashan).
11. Dr. Luis Leyva. D.Sc. Graduated 27.3.2014 (CIBNOR, La Paz, Mexico). (With Prof. Yoav Bashan and Dr. Luz de-Bashan).
12. Emmanuel Vidaña, M.Sc. Graduated 7.3.2014. (CIBNOR), La Paz, Mexico. (With Prof. Yoav Bashan).
13. Edgar Amavizca, M.Sc. Graduated 13.3.2014. (CIBNOR), La Paz, Mexico. (With Dr. Luz de-Bashan).
14. M.Sc. Oskar Palacios, D.Sc. Student, since 2011. (CIBNOR) La Paz, Mexico. (With Prof. Yoav Bashan and Dr. Luz de-Bashan).
15. Eng. Cristina Galaviz. M.Sc student, since 2012 (CIBNOR), La Paz, Mexico. (With Prof. Yoav Bashan).
16. Biol. Edisa Garcia. M.Sc student, since 2012 (CIBNOR), La Paz, Mexico (With Prof. Yoav Bashan).
17. Biol. Paulina Adams. M.Sc student since 2013. (CIBNOR), La Paz, Mexico. (With Dr. Luz de-Bashan).
18. M.Sc. Alejandro Figueroa. D.Sc. Student, since 2013. (CIIDIR-IPN), Guasave, Sinaloa, Mexico (With Dr. Luz de-Bashan).
19. cBiol. Edgar Gonzalez. B.Sc. student since 2014 (Universidad del Bosque), Bogota, Colombia (With M.Sc. Juan-Pablo Hernandez)

Visiting scholar

20. cDr. Luisa Posada. University of EAFIT, Medellin, Colombia. (With Dr. Luz de-Bashan).

Webmaster-in-Chief

M.Sc Juan-Pablo Hernández

INTERNATIONAL AND NATIONAL COLLABORATIONS IN 2014

(in: projects, publications and supervising of graduate students in chronological order of cooperation)

1. **Prof. Hani Antoun**. Laval University, Quebec (**Canada**). Water Bioremediation.
2. **Dr. S.R. Prabhu**, TerraBioGen Technologies. Vancouver (**Canada**). Inoculant information from developing countries.
3. **Prof. Anton Hartmann and Dr. Michael Schmid**. German Research Center for Environmental Health, München, (**Germany**). FISH and plant-bacteria interactions.
4. **Prof. Martin Heil**, CINVESTAV (Guanajuato, **Mexico**). Mutualism between microalgae and bacteria.
5. **Dr. Michael Cohen** –Sonoma State University, California (**USA**). Enzymatic and molecular mechanisms of fatty acids in microalgae and tertiary wastewater treatment.
6. **Dr. Alberto Mendoza**- CBG-IPN, Reynosa, Tamaulipas (**Mexico**). Enzymatic and molecular mechanisms of fatty acids in microalgae.
7. **Prof. Chris Rensing**- University of Copenhagen (**Denmark**). Enzymatic and molecular mechanisms of fatty acids in microalgae.
8. **Prof. Felipe Ascencio** CIBNOR, La Paz, (**Mexico**). Enzymatic and molecular mechanisms of fatty acids in microalgae.
9. **Prof. Jesus Cordova**, University of Guadalajara (**Mexico**). Carbohydrate and starch production by microalgae.
10. **Prof. Gustavo Hernandez-Carmona**, IPN-CICIMAR, La Paz, (**Mexico**). Scaling up wastewater treatment. (not active in 2014)
11. **Prof. Joseph Kloepper and M.Sc. John McInroy**, Auburn University, Auburn (**USA**). PGPB.
12. **Dr. Cecilia Creus**, University of Mar de Plata, Balcarce (**Argentina**). Signal molecules in *Azospirillum*. (not active in 2014)
13. **Prof. Gabriela Olmedo**, CINVESTAV (Guanajuato, **Mexico**). Mutualism between microalgae and bacteria.
14. **Dr. Fabricio Cassan**. University of Rio Cuarto, **Argentina**. Synthetic inoculants for plant growth-promoting bacteria. (not active in 2014)
15. **Dr. Gracia Gomez** –CIBNOR (**Mexico**). Genetic manipulation of microalgae.
16. **Prof. Ann Hirsh**, University of California-Los Angeles (**USA**). Microorganisms of the desert.
17. **Dr. Choong-Min Ryu**. Korean Institute of Bioscience and Biotechnology, Daejeon, (**Korea**). Volatiles in *Azospirillum*.
18. **Dr. S. Y. Park**. Korean Institute of Bioscience and Biotechnology, Daejeon, (**Korea**). Molecular biology of desert bacilli.
19. **Prof. Rainer Borriss**. Humboldt University (**Germany**). Molecular biology of desert bacilli.
20. **Dr. Alan Pamella**. Laboratorio Farroupilha. (**Brazil**). Improvements of commercial inoculants.
21. **Dr. Cesar Arriagada**. University of la Frontera (**Chile**). Bioremediation of mine tailings.(Not active in 2014)
22. **Dr. Lily Pereg**. University of New England, (**Australia**). Specificity and affinity of *Azospirillum* for plants.
23. **Dr. Valeska Villegas Escobar**. Universidad EAFIT, Medellín (**Colombia**). Detection of *Bacillus subtilis* by FISH.
24. **Dr. Brad Bebout**. NASA-Ames, California (**USA**). Interactions among microalgae and bacteria.

25. **Dr. Xavier Myali**. Lawrence Livermore National Laboratory, California (**USA**). Study of microalgae-bacteria interaction using nanoSIMS.
26. **Dr. Peter Weber**. Lawrence Livermore National Laboratory, California (**USA**). Study of microalgae-bacteria interaction using nanoSIMS.
27. **Dr. Octavio Perez-Garcia**. University of Auckland, (**New Zealand**). Heterotrophic and Mixotrophic growth of microalgae
28. **Dr. Volker Huss**. University of Erlangen-Nürnberg (**Germany**). Systematics of *Chlorella*.