References

Achkar J, Xian M, Zhao H, Frost JW (2005) Biosynthesis of phloroglucinol. J Am Chem Soc 127:5332-5333

Adachi K, Nakatani M, Mochida H (2002) Isolation of an endophytic diazotroph, *Klebsiella oxytoca*, from sweet potato stems in Japan. Soil Sci Plant Nutr 48:889-895

Afzal M, Khan QM, Sessitsch A (2014) Endophytic bacteria: prospects and applications for the phytoremediation of organic pollutants. Chemosphere 117:232-242

Ahmad F, Ahmad I, Khan MS (2008) Screening of free-living rhizospheric bacteria for their multiple plant growth promoting activities. Microbiol Res 163:173–181

Ahmed E, Holmström SJ (2014) Siderophores in environmental research: roles and applications. Microb Biotechnol 7:196-208

Alquéres S, Meneses C, Rouws L, Rothballer M, Baldani I, Schmid M, Hartmann A (2013) The bacterial superoxide dismutase and glutathione reductase are crucial for endophytic colonization of rice roots by *Gluconacetobacter diazotrophicus* PAL5. Mol Plant Microbe Interact, 26, 937-945.

Altschul SF, Gish W, Miller W, Myers EW, Lipman DJ (1990) Basic local alignment search tool. J Mol Biol 215:403-410

Aman M., Rai V R (2016) Antifungal activity of novel indole derivative from endophytic bacteria *Pantoea ananatis* 4G-9 against *Mycosphaerella musicola*. Biocont Sci Technol 26:476-491

Andreote FD, da Rocha UN, Araújo WL Azevedo JL, van Overbeek LS (2010) Effect of bacterial inoculation, plant genotype and developmental stage on root-associated and endophytic bacterial communities in potato (*Solanum tuberosum*). Antonie van Leeuwenhoek 97:389–399

Andreote FD, Gullo MJM, de Souza Lima AO, Junior WM, Azevedo JL, Araujo WL (2004) Impact of genetically modified *Enterobacter cloacae* on indigenous endophytic community of Citrus sinensis seedlings. J Microbiol 42:169-173

Araujo WL, Marcon J, Maccheroni W, van Elsas JD, van Vuurde JW, Azevedo JL (2002) Diversity of endophytic bacterial populations and their interaction with *Xylella fastidiosa* in citrus plants. Appl Environ Microbiol 68:4906-4914

Arnon DI (1949) Copper enzymes in isolated chloroplasts. Polyphenoloxidase in *Beta vulgaris*. Plant Physiol 24:1–15

Asis CA, Adachi K (2004) Isolation of endophytic diazotroph *Pantoea agglomerans* and nondiazotroph *Enterobacter asburiae* from sweetpotato stem in Japan. Lett Appl Microbiol 38:19-23

Bacilio-Jiménez M, Aguilar-Flores S, Ventura-Zapata E, Pérez-Campos E, Bouquelet S, Zenteno E (2003) Chemical characterization of root exudates from rice (*Oryza sativa*) and their effects on the chemotactic response of endophytic bacteria. Plant Soil 249:271-277

Backman PA, Sikora RA (2008) Endophytes: an emerging tool for biological control. Biol Control 46:1-3

Bai Y, Vorholt JA (2016) The Plant Microbiota: Systems-Level Insights and Perspectives. Annu Rev Genet 50: 211-234

Baldani J, Caruso L, Baldani VL, Goi SR, Döbereiner J (1997) Recent advances in BNF with non-legume plants. Soil Biol Biochem 29:911-922

Baldani JI, Baldani V, Seldin L, Döbereiner J (1986) Characterization of *Herbaspirillum seropedicae* gen. nov., sp. nov., a root-associated nitrogen-fixing bacterium. Int J Syst Evol Microbiol 36:86-93

Baldani JI, Baldani VLD (2005) History on the biological nitrogen fixation research in graminaceous plants: special emphasis on the Brazilian experience. An Acad Bras Cienc 77:549–5791

Balmer D, Planchamp C, Mauch-Mani B (2012) On the move: induced resistance in monocots. J Exp Bot 64:1249-61

Balsanelli E, Serrato RV, De Baura VA, Sassaki G, Yates MG, Rigo LU, Monteiro RA (2010) *Herbaspirillum seropedicae* rfbB and rfbC genes are required for maize colonization. Environ Microbiol., 12, 2233-2244

Barac T, Taghavi S, Borremans B, Provoost A, Oeyen L, Colpaert JV, van der Lelie D (2004) Engineered endophytic bacteria improve phytoremediation of water-soluble, volatile, organic pollutants. Nat Biotechnol 22:583

Beckers B, De Beeck MO, Weyens N, Boerjan W, Vangronsveld J (2017) Structural variability and niche differentiation in the rhizosphere and endosphere bacterial microbiome of field-grown poplar trees. Microbiome, 5:25

Belghit S, Driche EH, Bijani C, Zitouni A, Sabaou N, Badji B, Mathieu F (2016) Activity of 2, 4-Di-tert-butylphenol produced by a strain of *Streptomyces mutabilis* isolated from a Saharan soil against *Candida albicans* and other pathogenic fungi. J Mycol Med 26:160-169

Berg G (2009) Plant–microbe interactions promoting plant growth and health: perspectives for controlled use of microorganisms in agriculture. Appl Microbiol Biotechnol 84:11-18

Bhattacharjee RB, Singh A, Mukhopadhyay SN (2008) Use of nitrogen-fixing bacteria as biofertiliser for non-legumes: prospects and challenges. Appl Microbiol Biotechnol 80:199-209

Bhattacharyya PN, Jha DK (2012) Plant growth-promoting rhizobacteria (PGPR): emergence in agriculture. World J Microbiol Biotechnol 28:1327-1350

Bogas AC, Ferreira AJ, Araújo WL, Astolfi-Filho S, Kitajima EW, Lacava PT, Azevedo JL (2015) Endophytic bacterial diversity in the phyllosphere of Amazon *Paullinia cupana* associated with asymptomatic and symptomatic anthracnose. Springer Plus 4:258

Bonaldi M, Chen X, Kunova A, Pizzatti C, Saracchi M, Cortesi P (2015) Colonization of lettuce rhizosphere and roots by tagged *Streptomyces*. Front Microbiol 6:25

Boyer M, Bally R, Perrotto S, Chaintreuil C, Wisniewski-Dyé F (2008) A quorum-quenching approach to identify quorumsensing-regulated functions in *Azospirillum lipoferum*. Res Microbiol 159:699–708

Brader G, Compant S, Mitter B, Trognitz F, Sessitsch A (2014) Metabolic potential of endophytic bacteria. Curr Opin Biotechnol 27:30-37

Brazelton JN, Pfeufer EE, Sweat TA, McSpadden Gardener BB, Coenen C (2008) 2,4-diacetylphloroglucinol alters plant root development. Mol. Plant Microbe Interact 21:1349–1358

Brusamarello-Santos LCC, Pacheco F, Aljanabi SMM, Monteiro RA, Cruz LM, Baura VA, Wassem R (2012) Differential gene expression of rice roots inoculated with the diazotroph *Herbaspirillum seropedicae*. Plant Soil 356:113–125

Bruto M, Prigent-Combaret C, Muller D, Moënne-Loccoz Y (2014) Analysis of genes contributing to plant-beneficial functions in plant growth-promoting rhizobacteria and related *Proteobacteria*. Sci Rep 4:6261

Buch AD, Archana G, Naresh Kumar G (2009) Enhanced citric acid biosynthesis in *Pseudomonas fluorescens* ATCC 13525 by overexpression of the *Escherichia coli* citrate synthase gene. Microbiology 155:2620–2629

Buch AD, Archana G, Naresh Kumar G (2010) Broad-host-range plasmid-mediated metabolic perturbations in *Pseudomonas fluorescens* 13525. Appl Microbiol Biotechnol 88:209–218

Cabanás CGL, Schilirò E, Valverde-Corredor A, Mercado-Blanco J (2014) The biocontrol endophytic bacterium Pseudomonas fluorescens PICF7 induces systemic defense responses in aerial tissues upon colonization of olive roots. Front Microbiol 5:427

Cao H, Li X, Dong X (1998) Generation of broad-spectrum disease resistance by overexpression of an essential regulatory gene in systemic acquired resistance. Proceedings of the National Academy of Sciences 95:6531-6536

Carvalho TLG, Balsemão-Pires E, Saraiva RM, Ferreira PCG, Hemerly AS (2014) Nitrogen signalling in plant interactions with associative and endophytic diazotrophic bacteria. J Exp Bot 65:5631-5642

Chaiharn M, Chunhaleuchanon S, Lumyong S (2009) Screening siderophore producing bacteria as potential biological control agent for fungal rice pathogens in Thailand. World J Microbiol Biotechnol 25:1919-1928

Chanway CP, Shishido M, Nairn J, Jungwirth S, Markham J, Xiao G, Holl FB (2000) Endophytic colonization and field responses of hybrid spruce seedlings after inoculation with plant growth-promoting rhizobacteria. For Ecol Manage 133:81–88

Chaturvedi R, Archana G (2012) Novel 16S rRNA based PCR method targeting *Deinococcus* spp. and its application to assess the diversity of deinococcal populations in environmental samples. J Microbiol Methods 90:197–205

Chaudhary HJ, Peng G, Hu M, He Y, Yang L, Luo Y, Tan Z (2012) Genetic diversity of endophytic diazotrophs of the wild rice, *Oryza alta* and identification of the new diazotroph, *Acinetobacter oryzae* sp. nov. Microb Ecol 63:813-821

Cheng HP, Walker GC (1998) Succinoglycan is required for initiation and elongation of infection threads during nodulation of alfalfa by *Rhizobium meliloti*. J Bacteriol 180:5183–5191

Chomczynski P, Sacchi N (2006) The single-step method of RNA isolation by acid guanidinium thiocyanate–phenol–chloroform extraction: twenty-something years on. Nat Protoc 1:581-585

Cocking EC (2003) Endophytic colonization of plant roots by nitrogen-fixing bacteria. Plant Soil 252:169–175

Compant S, Clément C, Sessitsch A (2010) Plant growth-promoting bacteria in the rhizo- and endosphere of plants: Their role, colonization, mechanisms involved and prospects for utilization. Soil Biol Biochem 42:669–678

Compant S, Duffy B, Nowak J, Clément C, Barka EA (2005) Use of plant growth-promoting bacteria for biocontrol of plant diseases: principles, mechanisms of action, and future prospects. Appl Environ Microbiol 71:4951-4959

Compant S, Kaplan H, Sessitsch A, Nowak J, Barka EA, Clément C (2008) Endophytic colonization of *Vitis vinifera* L. by *Burkholderia phytofirmans* strain PsJN: from the rhizosphere to inflorescence tissues. FEMS microbiol ecol 63:84-93

Conn VM, Walker AR, Franco CMM (2008) Endophytic actinobacteria induce defense pathways in *Arabidopsis thaliana*. Mol Plant Microbe Interact 21:208-218

Coombs JT, Franco CM (2003) Visualization of an endophytic *Streptomyces* species in wheat seed. Appl Environ Microbiol 69:4260-4262

Coombs JT, Michelsen PP, Franco CM (2004) Evaluation of endophytic actinobacteria as antagonists of *Gaeumannomyces graminis* var. *tritici* in wheat. Biological Control 29:359-366

da Silva DAF, Cotta SR, Vollú RE, de Azevedo Jurelevicius D, Marques JM, Marriel IE, Seldin L (2014) Endophytic microbial community in two transgenic maize genotypes and in their near-isogenic non-transgenic maize genotype. BMC microbiol 14:332

Dahal B, NandaKafle G, Perkins L, Brözel VS (2017) Diversity of free-Living nitrogen fixing *Streptomyces* in soils of the badlands of South Dakota. Microbiol res 195:31-39

D'Alessandro MARCO, Erb M, Ton J, Brandenburg A, Karlen D, Zopfi J, Turlings TC (2014) Volatiles produced by soil-borne endophytic bacteria increase plant pathogen resistance and affect tritrophic interactions. Plant Cell Environ 37:813-826

de Jesus Sousa JA, Olivares FL (2016) Plant growth promotion by streptomycetes: ecophysiology, mechanisms and applications. Chemical and Biological Technologies in Agriculture 3:24

de Werra P, Huser A, Tabacchi R, Keel C, Maurhofer M (2011) Plant-and microbe-derived compounds affect the expression of genes encoding antifungal compounds in a pseudomonad with biocontrol activity. Appl Environ Microbiol 77:2807-2812

Döbereiner J, Baldani VLD, Reis VM (1995) Endophytic occurrence of diazotrophic bacteria in non-leguminous crops. In Fendrik I, del Gallo M, Vanderleyden J, de Zamaroczy M (eds), Azospirillum VI and related microorganisms, Springer, Berlin, Heidelberg, pp. 3-14

Duan C, Yu J, Bai J, Zhu Z, Wang X (2014) Induced defense responses in rice plants against small brown planthopper infestation. Crop J 2:55-62

Dunne C, Crowley JJ, Moënne-Loccoz Y, Dowling DN, De Bruijn FJ, O'Gara F (1997) Biological control of *Pythium ultimum* by *Stenotrophomonas maltophilia* W81 is mediated by an extracellular proteolytic activity. Microbiol 143, 3921–31

Dwivedi D, Johri BN (2003) Antifungals from fluorescent pseudomonads: biosynthesis and regulation. Curr Sci 85:1693-1703

El-Tarabily KA (2004) Suppression of *Rhizoctonia solani* diseases of sugar beet by antagonistic and plant growth-promoting yeasts. J Appl Microbiol 96:69-75

Estrada P, Mavingui P, Cournoyer B, Fontaine F, Balandreau J, Caballero-Mellado J (2002) A N_2-fixing endophytic *Burkholderia* sp. associated with maize plants cultivated in Mexico. Can J Microbiol 48:285-294

Feng Y, Shen D, Song W (2006) Rice endophyte *Pantoea agglomerans* YS19 promotes host plant growth and affects allocations of host photosynthates. J Appl Microbiol 100:938-945

Ferrando L, Mañay JF, Scavino AF (2012) Molecular and culture-dependent analyses revealed similarities in the endophytic bacterial community composition of leaves from three rice (*Oryza sativa*) varieties. FEMS microbiol ecol 80 696-708

Ferrando L, Scavino AF (2015) Strong shift in the diazotrophic endophytic bacterial community inhabiting rice (*Oryza sativa*) plants after flooding. FEMS Microbiol Ecol 91:fiv104

Fiedler HP, Bruntner C, Bull AT, Ward AC, Goodfellow M, Potterat O, Mihm G (2005) Marine actinomycetes as a source of novel secondary metabolites. Antonie van Leeuwenhoek 87:37-42

Flett F, Mersinias V, Smith CP (1997) High efficiency intergeneric conjugal transfer of plasmid DNA from *Escherichia coli* to methyl DNA-restricting streptomycetes. FEMS Microbiol Lett 155:223-229

Franche C, Lindström K, Elmerich C (2009) Nitrogen-fixing bacteria associated with leguminous and non-leguminous plants. Plant Soil 321:35-59

Fuentes-Ramirez L, Jimenez-Salgado T, Abarca-Ocampo, IR, Caballero-Mellado J (1993) *Acetobacter diazotrophicus*, an indoleacetic acid producing bacterium isolated from sugarcane cultivars of Mexico. Plant Soil 154:145-150

Fuqua WC, Winans SC, Greenberg EP (1994) Quorum sensing in bacteria: the LuxR-LuxI family of cell density-responsive transcriptional regulators. J Bacteriol 176:269–275

Gaby JC, Buckley DH (2012) A comprehensive evaluation of PCR primers to amplify the *nifH* gene of nitrogenase. PLoS ONE 7: e42149. doi:10.1371/journal.pone.0042149

Gaiero JR, McCall CA, Thompson KA, Day NJ, Best AS, Dunfield KE (2013) Inside the root microbiome: bacterial root endophytes and plant growth promotion. Am J Bot 100:1738-1750

Gao Z, Zhang B, Liu H, Han J, Zhang Y (2017) Identification of endophytic *Bacillus velezensis* ZSY-1 strain and antifungal activity of its volatile compounds against *Alternaria solani* and *Botrytis cinerea*. Biol Cont 105:27-39

Garbeva P, van Overbeek LS, van Vuurde JWL, van Elsas JD (2001) Analysis of endophytic bacterial communities of potato by plating and denaturing gradient gel electrophoresis (DGGE) of 16S rRNA based PCR fragments. Microb Ecol 41:369–383

Glick BR (2012) Plant growth-promoting bacteria: mechanisms and applications. Scientifica 2012

Glick BR (2014) Bacteria with ACC deaminase can promote plant growth and help to feed the world. Microbiol Res 169:30–39

Gond SK, Bergen MS, Torres MS, White Jr JF (2015) Endophytic *Bacillus* spp. produce antifungal lipopeptides and induce host defence gene expression in maize. Microbiol Res 172:79-87

Goudjal Y, Toumatia O, Yekkour A, Sabaou N, Mathieu F, Zitouni A (2014) Biocontrol of *Rhizoctonia solani* damping-off and promotion of tomato plant growth by endophytic actinomycetes isolated from native plants of Algerian Sahara. Microbiol Res 169:59-65

Govindasamy V, Franco CM, Gupta VV (2014) Endophytic actinobacteria: diversity and ecology. In: Verma VC, Gange A (eds) Advances in endophytic research. Springer, Germany, pp 27–59

Gtari M, Ghodhbane-Gtari F, Nouioui I, Beauchemin N, Tisa LS (2012) Phylogenetic perspectives of nitrogen-fixing actinobacteria. Arch Microbiol 194:3-11

Gupta G, Panwar J, Jha PN (2013) Natural occurrence of Pseudomonas aeruginosa, a dominant cultivable diazotrophic endophytic bacterium colonizing *Pennisetum glaucum* (L.) R. Br. Appl Soil Ecol 64:252-261

Gyaneshwar P, James EK, Mathan N, Reddy PM, Reinhold-Hurek B, Ladha JK (2001) Endophytic colonization of rice by a diazotrophic strain of *Serratia marcescens*. J Bacteriol 183:2634-2645

Gyaneshwar P, James EK, Mathan N, Reddy PM, Reinhold-Hurek B, Ladha JK (2001) Endophytic colonization of rice by a diazotrophic strain of *Serratia marcescens*. J Bacteriol 183:2634-2645

Gyaneshwar P, Kumar GN, Parekh, LJ (1998) Effect of buffering on the phosphate-solubilizing ability of microorganisms. World J Microbiol Biotechnol 14:669-673

Gyaneshwar P, Parekh LJ, Archana G, Poole PS, Collins MD, Hutson RA, Kumar GN (1999) Involvement of a phosphate starvation inducible glucose dehydrogenase in soil phosphate solubilization by *Enterobacter asburiae*. FEMS Microbiol Lett 171:223–229

Haas D, Défago G (2005) Biological control of soil-borne pathogens by fluorescent pseudomonads. Nat Rev Microbiol 3:307–319

Haas D, Keel C (2003) Regulation of antibiotic production in root-colonizing *Pseudomonas* spp. and relevance for biological control of plant disease. Annu Rev Phytopathol 41:117-153

Hammer Ø, Harper DAT, Ryan PD (2001) Past: paleontological statistics software package for education and data analysis. Palaeontologia Electronica 4:1–9

Hao Z, Wang L, Huang F, Tao R (2012) Expression of defense genes and antioxidant defense responses in rice resistance to neck blast at the preliminary heading stage and full heading stage. Plant Physiol Biochem 57:222–30

Hardoim PR, Andreote FD, Reinhold-Hurek B, Sessitsch A, van Overbeek LS, van Elsas JD (2011) Rice root-associated bacteria: insights into community structures across 10 cultivars. FEMS Microbiol Ecol 77:154-164

Hartmann A, Schmid M, Van Tuinen D, Berg G (2009) Plant-driven selection of microbes. Plant Soil 321:235-257

Hermans C, Hammond JP, White PJ, Verbruggen N (2006) How do plants respond to nutrient shortage by biomass allocation?. Trends Plant Sci 11, 610-617

Hester KL, Lehman J, Najar F, Song L, Roe BA, MacGregor CH, Hager PW, Phibbs PV, Sokatch JR (2000) Crc is involved in catabolite repression control of the *bkd* operons of *Pseudomonas putida* and *Pseudomonas aeruginosa*. J Bacteriol 182:1144–49

Himaman W, Thamchaipenet A, Pathom-aree W, Duangmal K (2016) Actinomycetes from Eucalyptus and their biological activities for controlling Eucalyptus leaf and shoot blight. Microbiol Res 188:42-52

Holt JG, Krieg NR, Sneath PHA, Staley JT, Williams ST (1994) Bergey's Manual of determinate bacteriology, 9th ed, Williams and Wilkins, Baltimore

Huang X, Zhang N, Yong X, Yang X, Shen Q (2012) Biocontrol of *Rhizoctonia solani* damping-off disease in cucumber with *Bacillus pumilus* SQR-N43. Microbiol Res 167:135-143

Hurek T, Handley LL, Reinhold-Hurek B, Piché Y (2002) *Azoarcus* grass endophytes contribute fixed nitrogen to the plant in an unculturable state. Mol Plant Microbe Interact 15: 233-242

Iavicoli A, Boutet E, Buchala A, Métraux JP (2003) Induced systemic resistance in *Arabidopsis thaliana* in response to root inoculation with *Pseudomonas fluorescens* CHA0. Mol Plant Microbe Interact 16:851–8

Ikeda S, Okubo T, Anda M, Nakashita H, Yasuda M, Sato S, Kaneko T, Tabata S, Eda S, Momiyama A, Terasawa K (2010) Community-and genome-based views of plant-associated bacteria: plant–bacterial interactions in soybean and rice. Plant Cell Physiol 51:1398-1410

Iniguez AL, Dong Y, Triplett EW (2004) Nitrogen fixation in wheat provided by *Klebsiella pneumoniae* 342. Mol Plant Microbe Interact 17:1078–1085

James EK, Gyaneshwar P, Mathan N, Barraquio WL, Reddy PM, Iannetta PPM, Ladha JK (2002) Infection and colonization of rice seedlings by the plant growth-promoting bacterium *Herbaspirillum seropedicae* Z67. Mol Plant Microbe Interact 15:894–906

Jimtha JC, Smitha PV, Anisha C, Deepthi T, Meekha G, Radhakrishnan EK, Remakanthan A (2014) Isolation of endophytic bacteria from embryogenic suspension culture of banana and assessment of their plant growth promoting properties. Plant Cell Tissue Organ Cult 118:57–66

Jin H, Yang XY, Yan ZQ, Liu Q, Li XZ, Chen JX, Qin B (2014) Characterization of rhizosphere and endophytic bacterial communities from leaves, stems and roots of medicinal *Stellera chamaejasme* L. Syst. Appl Microbiol 37:376-385

Johnston-Monje D, Mousa WK, Lazarovits G, Raizada MN (2014) Impact of swapping soils on the endophytic bacterial communities of pre-domesticated, ancient and modern maize. BMC Plant Biol 14:233

Joshi F, Chaudhari A, Joglekar P, Archana G, Desai A (2008) Effect of expression of *Bradyrhizobium japonicum* 61A152 *fegA* gene in *Mesorhizobium* sp., on its competitive survival and nodule occupancy on *Arachis hypogea*. Appl Soil Ecol 40:338–47

Julliany K, Silva P, Brunings A, Peres NA, Mou Z, Folta, KM (2015) The *Arabidopsis* NPR1 gene confers broad-spectrum disease resistance in strawberry. Transgenic res 24: 693

Kang SH, Cho HS, Cheong H, Ryu CM, Kim JF, Park SH (2007) Two bacterial entophytes eliciting both plant growth promotion and plant defense on pepper (*Capsicum annuum* L.). J Microbiol Biotechnol 17:96–103

Karthikeyan B, Joe MM, Islam MR, Sa T (2012) ACC deaminase containing diazotrophic endophytic bacteria ameliorate salt stress in *Catharanthus roseus* through reduced ethylene levels and induction of antioxidative defense systems. Symbiosis 56:77-86

Kembhavi AA, Kulkarni A, Pant A (1993) Salt-tolerant and thermostable alkaline protease from *Bacillus subtilis* NCIM No.64. Appl Biochem Biotechnol 38:83–92

Khan A, Geetha R, Akolkar A, Pandya A, Archana G, Desai AJ (2006) Differential cross-utilization of heterologous siderophores by nodule bacteria of *Cajanus cajan* and its possible role in growth under iron-limited conditions. Appl Soil Ecol 34:19–26

Khan AL, Waqas M, Kang SM, Al-Harrasi A, Hussain J, Al-Rawahi A, Lee IJ (2014) Bacterial endophyte *Sphingomonas* sp. LK11 produces gibberellins and IAA and promotes tomato plant growth. J Microbiol 52:689-695

Khatri BP, Bhattarai T, Shrestha S, Maharjan J (2015) Alkaline thermostable pectinase enzyme from *Aspergillus niger* strain MCAS2 isolated from Manaslu conservation area, Gorkha, Nepal. SpringerPlus 4:488

Kidarsa TA, Goebel NC, Zabriskie TM, Loper JE (2011) Phloroglucinol mediates cross-talk between the pyoluteorin and 2, 4-diacetylphloroglucinol biosynthetic pathways in *Pseudomonas fluorescens* Pf-5. Mol Microbiol 81:395-414

Kloepper JW, Ryu CM (2006) Bacterial endophytes as elicitors of induced systemic resistance. In: B. Schulz, C. Boyle, T. N. Sieber (eds.) Microbial root endophytes. Springer, Berlin, pp 33-52

Krause A, Ramakumar A, Bartels D, Battistoni F, Bekel T, Boch J, Linke B (2006) Complete genome of the mutualistic, N2-fixing grass endophyte *Azoarcus* sp. strain BH72. Nat Biotechnol, 24: 1385-91

Kruasuwan W, Thamchaipenet A (2016) Diversity of culturable plant growth-promoting bacterial endophytes associated with sugarcane roots and their effect of growth by co-inoculation of diazotrophs and Actinomycetes. J Plant Growth Regul 35:1074-1087

Kuklinsky-Sobral J, Araujo WL, Mendes R, Geraldi IO, Pizzirani-Kleiner AA, Azevedo JL (2004) Isolation and characterization of soybean-associated bacteria and their potential for plant growth promotion. Environ Microbiol 6:1244–1251

Larran S, Perello A, Simon MR, Moreno V (2002) Isolation and analysis of endophytic microorganisms in wheat (*Triticum aestivum* L.) leaves. World J Microbiol Biotechnol 18:683-686

Li HY, Wei DQ, Shen M, Zhou ZP (2012) Endophytes and their role in phytoremediation. Fungal Divers 54:1-18

Liu J, Wang XJ (2006) An integrative analysis of the effects of auxin on jasmonic acid biosynthesis in *Arabidopsis thaliana*. J Integr Plant Biol 48:99-103

Liu X, Jia J, Atkinson S, Cámara M, Gao K, Li H, Cao J (2010) Biocontrol potential of an endophytic *Serratia* sp. G3 and its mode of action. World J Microbiol Biotechnol 26:1465-1471

Liu X, Jia J, Popat R, Ortori CA, Li J, Diggle SP, Cámara M (2011) Characterisation of two quorum sensing systems in the endophytic *Serratia plymuthica* strain G3: differential control of motility and biofilm formation according to life-style. BMC Microbiol 11:26

Lorck H (1948) Production of Hydrocyanic acid by bacteria. Physiol Plant 1:142–146

Lucy M, Reed E, Glick BR (2004) Applications of free living plant growth-promoting rhizobacteria. Antonie Van Leeuwenhoek 86:1-25

Lugtenberg B, Kamilova F (2009) Plant-growth-promoting rhizobacteria. Annu Rev Microbiol 63, 541-556

Madhaiyan M, Alex THH, Te Ngoh S, Prithiviraj B, Ji L (2015) Leaf-residing *Methylobacterium* species fix nitrogen and promote biomass and seed production in *Jatropha curcas*. Biotechnol Biofuels 8:222

Madhaiyan M, Saravanan VS, Jovi DB, Lee H, Thenmozhi R, Hari K, Sa T (2004) Occurrence of *Gluconacetobacter diazotrophicus* in tropical and subtropical plants of Western Ghats, India. Microbiol Res 159:233–243

Mano H, Tanaka F, Nakamura C, Kaga H, Morisaki H (2007) Culturable endophytic bacterial flora of the maturing leaves and roots of rice plants (*Oryza sativa*) cultivated in a paddy field. Microbes Environ 22:175-185

Masand M, Jose PA, Menghani E, Jebakumar SRD (2015) Continuing hunt for endophytic actinomycetes as a source of novel biologically active metabolites. World J Microbiol Biotechnol 31:1863-1875

McGee JD, Hamer JE, Hodges TK (2001) Characterization of a PR-10 pathogenesis-related gene family induced in rice during infection with *Magnaporthe grisea*. Mol Plant Microbe Interact14:877-886

Meneses CH, Rouws LF, Simões-Araújo JL, Vidal MS, Baldani JI (2011) Exopolysaccharide production is required for biofilm formation and plant colonization by the nitrogen-fixing endophyte *Gluconacetobacter diazotrophicus*. Mol Plant Microbe Interact 24:1448-1458

Miché L, Battistoni F, Gemmer S, Belghazi M, ReinholdHurek B (2006) Upregulation of jasmonate-inducible defense proteins and differential colonization of roots of *Oryza sativa* cultivars with the endophyte *Azoarcus* sp. Mol Plant Microbe Interact 19:502–511

Minamisawa K, Nishioka K, Miyaki T, Ye B, Miyamoto T, You M, Sein T (2004) Anaerobic nitrogen-fixing consortia consisting of clostridia isolated from gramineous plants. Appl. Environ Microbiol 70:3096-3102

Misk A, Franco C (2011) Biocontrol of chickpea root rot using endophytic actinobacteria. BioControl 56:811-822

Monteiro RA, Balsanelli E, Wassem R, Marin AM, Brusamarello-Santos LC, Schmidt MA, Souza EM (2012) *Herbaspirillum*-plant interactions: microscopical, histological and molecular aspects. Plant Soil 356:175-196

Muller DB, Vogel C, Bai Y, Vorholt JA (2016) The plant microbiota: systems-level insights and perspectives. Annu Rev Genet 50:211-234

Nagpure A, Gupta RK (2013) Purification and characterization of an extracellular chitinase from antagonistic *Streptomyces violaceusniger*. J Basic Microbiol 53:429–439

Navarro L, Bari R, Achard P, Lisón P, Nemri A, Harberd NP, Jones JD (2008) DELLAs control plant immune responses by modulating the balance of jasmonic acid and salicylic acid signaling. Curr Biol 18: 650-655

Neilands JB (1995) Siderophores: structure and function of microbial iron transport compounds. J Biol Chem 270:26723-26726

Newman, LA, Reynolds CM (2005) Bacteria and phytoremediation: new uses for endophytic bacteria in plants. Trends Biotechnol 23:6-8

Nowak-Thompson B, Gould SJ, Kraus J, Loper JE (1994). Production of 2, 4-diacetylphloroglucinol by the biocontrol agent *Pseudomonas fluorescens* Pf-5. Can J Microbiol 40:1064-1066

Ogut M, Er F, Kandemir N (2010) Phosphate solubilization potentials of soil *Acinetobacter* strains. Biol Fertil Soils 46:707–715

Otieno N, Lally RD, Kiwanuka S, Lloyd A, Ryan D, Germaine KJ, Dowling DN (2015) Plant growth promotion induced by phosphate solubilizing endophytic Pseudomonas isolates. Front Microbiol 6:745

Palus JA, Borneman J, Ludden PW, Triplett EW (1996) A diazotrophic bacterial endophyte isloated from stems of *Zea mays* L. and *Zea luxurians* Itlis and Doebley. Plant Soil 186:135–142

Paulitz TC, Smiley RW, Cook RJ (2002) Insights into the prevalence and management of soilborne cereal pathogens under direct seeding in the Pacific Northwest, USA. Can J Plant Pathol 24:416-428

Paulsen IT, Press CM, Ravel J, Kobayashi DY, Myers GS, Mavrodi DV, Dodson RJ (2005) Complete genome sequence of the plant commensal *Pseudomonas fluorescens* Pf-5. Nat Biotechnol 23:873-878

Peng G, Wang H, Zhang G, Hou W, Liu Y, Wang ET, Tan Z (2006) *Azospirillum melinis* sp. nov., a group of diazotrophs isolated from tropical molasses grass. Int J Syst Evol Microbiol 56:1263-1271

Peng G, Zhang W, Luo H, Xie H, Lai W, Tan Z (2009) *Enterobacter oryzae* sp. nov., a nitrogen-fixing bacterium isolated from the wild rice species *Oryza latifolia*. Int J Syst Evol Microbiol 59:1650-1655

Piccoli P, Travaglia C, Cohen A, Sosa L, Cornejo P, Masuelli R, Bottini R (2011) An endophytic bacterium isolated from roots of the halophyte *Prosopis strombulifera* produces ABA, IAA, gibberellins A1 and A3 and jasmonic acid in chemically-defined culture medium. Plant Growth Regul 64:207-210

Pieterse CM, Leon-Reyes A, Van der Ent S, Van Wees SC (2009) Networking by small-molecule hormones in plant immunity. Nat Chem Biol 5:308-316

Pieterse CM, Zamioudis C, Berendsen RL, Weller DM, Van Wees SC, Bakker PA (2014) Induced systemic resistance by beneficial microbes. Annu Rev Phytopathol 52:347-375

Pillai P, Archana G (2008) Hide depilation and feather disintegration studies with keratinolytic serine protease from a novel *Bacillus subtilis* isolate. Appl Microbiol Biotechnol 78:643–650

Poly F, Monrozier L, Bally R (2001) Improvement in the RFLP procedure for studying the diversity of *nifH* genes in communities of nitrogen fixers in soil. Res Microbiol 152:95–103

Prakamhang J, Minamisawa K, Teamtaisong K, Boonkerd N, Teaumroong N (2009) The communities of endophytic diazotrophic bacteria in cultivated rice (*Oryza sativa* L.). App soil ecol 42: 141-149

Qin S, Xing K, Jiang JH, Xu LH, Li WJ (2011) Biodiversity, bioactive natural products and biotechnological potential of plant-associated endophytic actinobacteria. Appl Microbiol Biotechnol 89: 457-473

Raaijmakers JM, Weller DM, Thomashow LS (1997) Frequency of antibiotic-producing *Pseudomonas* spp. in natural environments. Appl Environ Microbiol 63:881-887

Ramesh R, Joshi AA, Ghanekar MP (2009) Pseudomonads: major antagonistic endophytic bacteria to suppress bacterial wilt pathogen, *Ralstonia solanacearum* in the eggplant (*Solanum melongena* L.). World J Microbiol Biotechnol 25:47-55

Rangjaroen C, Rerkasem B, Teaumroong N, Sungthong R, Lumyong S (2014) Comparative study of endophytic and endophytic diazotrophic bacterial communities across rice landraces grown in the highlands of northern Thailand. Arch Microbiol 196:35-49

Reinhold-Hurek B, Hurek T (2011) Living inside plants: bacterial endophytes. Curr Opin Plant Biol 14:435-443

Ren G, Zhang H, Lin X, Zhu J, Jia Z (2015) Response of leaf endophytic bacterial community to elevated CO_2 at different growth stages of rice plant. Front Microbiol 6:855

Reynolds HL, D'antonio C (1996) The ecological significance of plasticity in root weight ratio in response to nitrogen: opinion. Plant Soil 185:75-97

Richardson AD, Duigan SP, Berlyn GP (2002) An evaluation of noninvasive methods to estimate foliar chlorophyll content. New Phytol 153:185-194

Rodriguez H, Fraga R (1999) Phosphate solubilizing bacteria and their role in plant growth promotion. Biotechnol Adv 17:319–339

Román-Ponce B, Ramos-Garza J, Vásquez-Murrieta M S, Rivera-Orduña FN, Chen WF, Yan J, Wang ET (2016) Cultivable endophytic bacteria from heavy metal(loid)-tolerant plants. Arch Microbiol 198:941–956

Rosenblueth M, Martinez-Romero E (2006) Bacterial endophytes and their interactions with hosts. Mol Plant–Microbe Interact 19: 827–837

Rothballer M, Eckert B, Schmid M, Fekete A, Schloter M, Lehner A, Hartmann A (2008) Endophytic root colonization of gramineous plants by *Herbaspirillum frisingense*. FEMS Microbiol Ecol 66: 85–95

Ryan RP, Germaine K, Franks A, Ryan DJ, Dowling DN (2008) Bacterial endophytes: recent developments and applications. FEMS Microbiol Lett 278:1-9

Saha S, Roy RN, Sen SK, Ray AK (2006) Characterization of cellulase-producing bacteria from the digestive tract of tilapia, *Oreochromis mossambica* (Peters) and grass carp, *Ctenopharyngodon idella* (Valenciennes). Aquacult Res 37:380-388

Sambrook J, Russell DW (2001) Molecular Cloning: A Laboratory Manual, 3rd ed. Cold Springs Harbor Laboratory Press: Cold Springs Harbor, NY

Sang MK, Kim KD (2012) The volatile-producing *Flavobacterium johnsoniae* strain GSE09 shows biocontrol activity against *Phytophthora capsici* in pepper. J Appl Microbiol 113:383-398

Santoyo G, Moreno-Hagelsieb G, del Carmen Orozco-Mosqueda M, Glick BR (2016) Plant growth-promoting bacterial endophytes. Microbiol Res 183:92-99

Scavino AF, Pedraza RO (2013) The role of siderophores in plant growth-promoting bacteria. In: Maheshwari DK, Saraf M, Aeron A, (eds) Bacteria in Agrobiology: Crop Productivity. Berlin, Taylor & Francis, pp 265–285

Schenk PM, Carvalhais LC, Kazan K (2012) Unraveling plant–microbe interactions: can multi-species transcriptomics help?. Trends Biotechnol 30:177-184

Schulz B, Boyle C (2006) What are endophytes?. In: Schulz BJE, Boyle CJC and Sieber TN, (eds) Microbial Root Endophytes. Springer-Verlag, Berlin, pp 1–13

Schwyn B, Neilands JB (1987) Universal chemical assay for the detection and determination of siderophores. Anal Biochem 160:47-56.

Seghers D, Wittebolle L, Top EM, Verstraete W, Siciliano SD (2004) Impact of agricultural practices on the *Zea mays* L. endophytic community. Appl Environ Microbiol 70:1475-1482

Seghers D, Wittebolle L, Top EM, Verstraete W, Siciliano SD (2004) Impact of agricultural practices on the *Zea mays* L. endophytic community. Appl Environ Microbiol 70:1475-1482

Sessitsch A, Hardoim P, Döring J, Weilharter A, Krause A, Woyke T, Hurek T (2012) Functional characteristics of an endophyte community colonizing rice roots as revealed by metagenomic analysis. Mol Plant Microbe Interact 25:28-36

Sevilla M, Burris RH, Gunapala N, Kennedy C (2001) Comparison of benefit to sugarcane plant growth and $^{15}N_2$ incorporation following inoculation of sterile plants with *Acetobacter diazotrophicus* wild-type and Nif$^-$ mutant strains. Mol Plant Microbe Interact 14:358-366

Sharaff M, Archana G (2015) Assessment of microbial communities in mung bean (*Vigna radiata*) rhizosphere upon exposure to phytotoxic levels of copper. J Basic Microbiol 55:1299–1307

Sharaff M, Archana G (2016) Copper-induced modifications in early symbiotic signaling factors of *Ensifer* (*Sinorhizobium*) *Medicago* interactions. Arch Microbiol 198:701–709

Sharma V, Archana G, Naresh Kumar G (2011) Plasmid load adversely affects growth and gluconic acid secretion ability of mineral phosphate-solubilizing rhizospheric bacterium *Enterobacter asburiae* PSI3 under P limited conditions. Microbiol Res 166:36–46

Sharma V, Kumar V, Archana G, Kumar GN (2005) Substrate specificity of glucose dehydrogenase (GDH) of *Enterobacter asburiae* PSI3 and rock phosphate solubilization with GDH substrates as C sources. Can J Microbiol 51:477–482

Simon R, Priefer U, Pühler A (1983) A broad host range mobilization system for in vivo genetic engineering: Transposon Mutagenesis in gram negative bacteria. Nature Biotechnol 1:784–791

Spaepen S, Vanderleyden J, Remans R (2007) Indole-3-acetic acid in microbial and microorganism-plant signaling. FEMS Microbiol Rev 31:425-448

Spoel SH, Koornneef A, Claessens SM, Korzelius JP, Van Pelt JA, Mueller MJ, Van Loon LC (2003) NPR1 modulates cross-talk between salicylate-and jasmonate-dependent defense pathways through a novel function in the cytosol. Plant Cell 15:760-770

Srivastava S, Patel JS, Singh HB, Sinha A, Sarma BK (2015) *Streptomyces rochei* SM3 induces stress tolerance in chickpea against *Sclerotinia sclerotiorum* and NaCl. J Phytopathol 163:583-592

Suarez-Moreno ZR, Caballero-Mellado J, Venturi V (2008) The new group of non-pathogenic plant-associated nitrogen-fixing *Burkholderia* spp. shares a conserved quorum-sensing system, which is tightly regulated by the RsaL repressor. Microbiology 154:2048-2059

Subrahmanyam G, Archana G (2011) Plant growth promoting activity of *Enterobacter* sp. C1D in heavy metal contaminated soils. Proceedings of the 2nd Asian PGPR Conference August 21-24, 2011, Beijing, China, pp. 440-446

Subrahmanyam G, Archana G, Chamyal LS (2011) Microbial activity and diversity in the late Pleistocene paleosols of alluvial Mahi River basin, Gujarat, western India. Curr Sci 101:202–209

Sun J, Kelemen GH, Fernández-Abalos JM, Bibb MJ (1999) Green fluorescent protein as a reporter for spatial and temporal gene expression in *Streptomyces coelicolor* A3 (2). Microbiology 145:2221-2227

Sun L, Qiu F, Zhang X, Dai X, Dong X, Song W (2008) Endophytic bacterial diversity in rice (*Oryza sativa* L.) roots estimated by 16S rDNA sequence analysis. Microbial ecol 55:415-424

Sun LN, Zhang YF, He LY, Chen ZJ, Wang QY, Qian M, Sheng XF (2010) Genetic diversity and characterization of heavy metal-resistant-endophytic bacteria from two copper-tolerant plant species on copper mine wasteland. Bioresour Technol 101:501-509

Taghavi S, Barac T, Greenberg B, Borremans B, Vangronsveld J, van der Lelie D (2005) Horizontal gene transfer to endogenous endophytic bacteria from poplar improves phytoremediation of toluene. Appl Environ Microbiol 71:8500-8505

Tamura K, Stecher G, Peterson D, Filipski A, Kumar S (2013) MEGA6: molecular evolutionary genetics analysis version 6.0. Mol Biol Evol 30:2725-2729

Tanaka K, Shimizu T, Zakria M, Njoloma, J, Saeki Y, Sakai M, Akao S (2006) Incorporation of a DNA sequence Encoding green fluorescent protein (GFP) into Endophytic Diazotroph from sugarcane and sweet potato and the Colonizing ability of these bacteria in *Brassica oleracea*. Microbes Environ 21:122–128

Teather RM, Wood PJ (1982) Use of Congo red-polysaccharide interactions in enumeration and characterization of cellulolytic bacteria from the bovine rumen. Appl Environ Microbiol 43:777–780

Thomas P, Swarna GK, Roy PK, Patil P (2008) Identification of culturable and originally non-culturable endophytic bacteria isolated from shoot tip cultures of banana cv. Grand Naine. Plant Cell Tiss Org Cult 93:55–63

Tian F, Ding Y, Zhu H, Yao L, Du B (2009) Genetic diversity of siderophore-producing bacteria of tobacco rhizosphere. Braz J Microbiol 40:276–284

Tontou R, Gaggia F, Baffoni L, Devescovi G, Venturi V, Giovanardi D, Stefani E (2016) Molecular characterisation of an endophyte showing a strong antagonistic activity against *Pseudomonas syringae* pv. *actinidiae*. Plant Soil 405:97-106

Turner JG, Ellis C, Devoto A (2002) The jasmonate signal pathway. Plant Cell 14(Suppl): s153–s164

Vacheron J, Desbrosses G., Bouffaud ML, Touraine B, Moënne-Loccoz Y, Muller D, Prigent-Combaret C (2013) Plant growth-promoting rhizobacteria and root system functioning. Front Plant Sci 4: 356

van der Lelie D, Barac T, Taghavi S, Vangronsveld J (2005) Response to Newman: new uses of endophytic bacteria to improve phytoremediation. Trends Biotechnol 23:8-9

Van Loon LC (2007) Plant responses to plant growth-promoting rhizobacteria. Eur J Plant Pathol 119:243-254

Van Loon LC, Bakker PAHM, Pieterse CMJ (1998) Systemic resistance induced by rhizosphere bacteria. Annu Rev Phytopathol 36:453-483

Van Overbeek L, Van Elsas JD (2008) Effects of plant genotype and growth stage on the structure of bacterial communities associated with potato (*Solanum tuberosum* L.). FEMS Microbiol Ecol 64:283-296

Van Wees SC, De Swart EA, Van Pelt JA, Van Loon LC, Pieterse CM (2000) Enhancement of induced disease resistance by simultaneous activation of salicylate-and jasmonate-dependent defense pathways in *Arabidopsis thaliana*. Proceedings of the National Academy of Sciences, 97:8711-8716

Varsha KK, Devendra L, Shilpa G, Priya S, Pandey A, Nampoothiri KM (2015) 2, 4-Di-tert-butyl phenol as the antifungal, antioxidant bioactive purified from a newly isolated *Lactococcus* sp. Int J Food Microbiol 211:44-50

Verma SC, Ladha JK, Tripathi AK (2001) Evaluation of plant growth promoting and colonization ability of endophytic diazotrophs from deep water rice. J Biotechnol 91:127–141

Videira SS, De Araujo JLS, Rodrigues LDS, Baldani VLD, Baldani JI (2009) Occurrence and diversity of nitrogen-fixing Sphingomonas bacteria associated with rice plants grown in Brazil. FEMS Microbiol Lett 293:11-19

Villegas E, Ortega Martinez EI, Bauer R (1984) Chemical methods used at CIMMYT for determining protein quality in cereal grains. CIMMYT, Mexico

Walsh UF, Morrissey JP, O'Gara F (2001) *Pseudomonas* for biocontrol of phytopathogens: from functional genomics to commercial exploitation. Curr Opin Biotechnol 12:289-295

Wang Q, Garrity GM, Tiedje JM, Cole JR (2007) Naive Bayesian classifier for rapid assignment of rRNA sequences into the new bacterial taxonomy. Appl Environ Microbiol 73:5261-5267

Ward MH (2009) Too much of a good thing? Nitrate from nitrogen fertilizers and cancer. Rev Environ Health 24:357-363

Wei Z, Yang T, Friman VP, Xu Y, Shen Q, Jousset A (2015) Trophic network architecture of root-associated bacterial communities determines pathogen invasion and plant health. Nat Commun 6:8413

Wemheuer F, Wemheuer B, Kretzschmar D, Pfeiffer B, Herzog S, Daniel R, Vidal S (2016) Impact of grassland management regimes on bacterial endophyte diversity differs with grass species. Lett Appl Microbiol 62:323-329

Wilson RA, Talbot NJ (2009) Under pressure: investigating the biology of plant infection by *Magnaporthe oryzae*. Nat Rev Microbiol **7**:185–95

Wu CH, Bernard SM, Andersen GL, Chen W (2009) Developing microbe–plant interactions for applications in plant-growth promotion and disease control, production of useful compounds, remediation and carbon sequestration. Microb Biotechnol 2:428-440.

Xia Y, DeBolt S, Dreyer J, Scott D, Williams MA (2015) Characterization of culturable bacterial endophytes and their capacity to promote plant growth from plants grown using organic or conventional practices. Front Plant Sci 6: 490

Yang F, Cao Y (2012) Biosynthesis of phloroglucinol compounds in microorganisms-review. Appl Microbiol Biotechnol 93:487-95

Yang F, Cao Y (2012) Biosynthesis of phloroglucinol compounds in microorganisms—review. Appl Microbiol Biotechnol 93:487-495

Yanni YG, Rizk RY, Corich V, Squartini A, Ninke K, Philip-Hollingsworth S, Dazzo FB (1997) Natural endophytic association between *Rhizobium leguminosarum* bv. *trifolii* and rice roots and assessment of its potential to promote rice growth. Plant Soil 194:99–114

Yasuda M, Ishikawa A, Jikumaru Y, Seki M, Umezawa T, Asami T, Nakashita H (2008) Antagonistic interaction between systemic acquired resistance and the abscisic acid–mediated abiotic stress response in *Arabidopsis*. Plant Cell 20:1678-1692

Yi HS, Yang JW, Ryu CM (2013) ISR meets SAR outside: additive action of the endophyte *Bacillus pumilus* INR7 and the chemical inducer, benzothiadiazole, on induced resistance against bacterial spot in field-grown pepper. Front Plant Sci. 4:122

Yu H, Zhang L, Li L, Zheng C, Guo L, Li W, Sun P, Qin L (2010) Recent developments and future prospects of antimicrobial metabolites produced by endophytes. Microbiol Res 165:437-449.

Zakhia F, Jeder H, Willems A, Gillis M, Dreyfus B, De Lajudie P (2006) Diverse bacteria associated with root nodules of spontaneous legumes in Tunisia and first report for nifH-like gene within the genera *Microbacterium* and *Starkeya*. Microb Ecol 51:375-393

Zha W, Rubin-Pitel SB, Shao Z, Zhao H (2009) Improving cellular malonyl-CoA level in *Escherichia coli* via metabolic engineering. Metab Eng 11, 192-198

Zha W, Rubin-Pitel SB, Zhao H (2008) Exploiting genetic diversity by directed evolution: molecular breeding of type III polyketide synthases improves productivity. Mol Biosyst 4:246-248

Zinniel DK, Lambrecht P, Harris NB, Feng Z, Kuczmarski D, Higley P, Vidaver AK (2002) Isolation and characterization of endophytic colonizing bacteria from agronomic crops and prairie plants. Appl Environ Microbiol 68:2198–2208

Zouari I, Jlaiel L, Tounsi S, Trigui M (2016) Biocontrol activity of the endophytic *Bacillus amyloliquefaciens* strain CEIZ-11 against *Pythium aphanidermatum* and purification of its bioactive compounds. Biol Cont 100:54-62

Zúñiga A, Poupin MJ, Donoso R, Ledger T, Guiliani N, Gutiérrez RA, González B (2013) Quorum sensing and indole-3-acetic acid degradation play a role in colonization and plant growth promotion of *Arabidopsis thaliana* by *Burkholderia phytofirmans* PsJN. Mol Plant Microbe Interact 26:546-553