

DAFTAR PUSTAKA

- Abd-Alla M.H. 1994. Solubilization of rock phosphates by Rhizobium and Bradyrhizobium. *Folia Microbiol* 39:53–56
- Abeles, F.B., Morgan., Saltveit, M.E. 1992. Regulation of ethylene production by internal, environmental and stress factors. Ethylene in Plant Biology, second ed. *Academic Press, San Diego*. CA56–119
- Agarwala, S.C., Nautiyal, B.D., Chatterjee, C., and Nautiyal, N. 1995. Variations in copper and zinc supply influence growth and activities of some enzymes in maize. *Soil Sci, Plant Nutr.*, 41: 329–335.
- Ahmad, E. Almos Z., Mohammad S.K., Mohammad O. 2012. *Heavy metal toxicity to symbiosis nitrogen fixing microorganism and host legume*. Department of Agricultural Microbiology. Faculty of Agricultural Sciences, Aligarh Muslim University: India
- Ahsan, N., Lee, D.G., Lee, S.H., Kang, K.Y., Lee, J.J., Kim, P.J., Yoon, H.S., Kim, J.S. and Lee, B.H. 2007. Excess copper induced physiological and proteomic changes in germinating rice seeds. *Chemosphere.*, 67: 1182–1193.
- Amaliyah, Rizki Nuri. 2011. Analisis kemampuan optimal tanaman bunga matahari (*Helianthus annuus* L.) mendegradasi PB dalam tanah melalui proses fitoremediasi. Universitas Jember. Jawa Timur.
- Andrade, S.A.L., Gratao, P., Azevedo, L., Silveira, R.A., Schiavinato, A.P.D., Mazzafera, M.A., Paulo, 2010. Biochemical and physiological changes in jack bean under Mycorrhizal symbiosis growing in soil with increasing Cu concentrations. *Environ. Exp. Bot.* 68: 198–207.
- Angle, J.S. and Chaney, R.L. 1991. Heavy metal effects on soil population and heavy metal tolerance of Rhizobium meliloti, nodulation and growth of alfalfa. *Water, Air, Soil Pollut.*, 57-58: 597–604.
- Ariansyah, K.A., Kiki, Y., Siti, H.R. 2012. *Analisis kandungan logam berat (Pb, Hg, Cu, dan As) pada kerupuk kemplang di desa tebing gerinting utara, kecamatan indralaya selatan, kabupaten ogan ilir*. Universitas Sriwijaya: Palembang
- Arora N.K., Kang S.C., Maheshwari D.K. 2001. Isolation of siderophore producing strains of Rhizobium meliloti and their biocontrol potential against *Macrophomina phaseolina* that causes charcoal rot of groundnut. *Curr Sci* 81:673–677

- Azcon, R., Peralvarez, M., del, C., Biro, B., Roldan, A., Ruiz-Lozano, J.M., 2009. Antioxidant activities and metal acquisition in mycorrhizal plants growing in a heavy-metal multicontaminated soil amended with treated lignocellulosic agrowaste. *Appl. Soil Ecol.* 41: 168–177
- Badan Standarisasi Nasional. 2009. *Batas Maksimum Cemaran Logam Berat dalam Pangan*. No. SNI 7387:2009. BSN. Jakarta.
- Balestrasse, K. B., Gardley, L., Gallego, S. M. & Tomaro, M. L. 2001. Response of Antioxidant Defence System in Soybean Nodules and Roots Subjected to Cadmium Stress. *Australian Journal of Plant Physiology*. 28: 497 – 504.
- Baker, K.H and Herson, D. S. 1994. *Bioremediation*. USA : McGraw-Hill, Inc. 1-5, 12-30, 180-181, 211-224
- Bargagli, R. 1998. *Trace elements in terrestrial plants ecophysiological approach to biomonitoring and biorecovery*. Springer. Berlin
- Baron Ayala, M., Sandmann, G. 1988. Activities of Cu containing proteins in Cu depleted pea leaves. *Plant. 72* : 801-806.
- Barr, R., Crane, F.L. 1974. A study of chloroplast membrane polypeptides from mineral deficient maize in relation to photosynthetic activity. *Proc Indiana Acad. Sci.* 83: 95-100
- Belimov A.A., Safronova, Sergeyeva T.A., Egorova T.N., Matveyeva V.A., Tsyganov V.E., Borisov A.Y., Tikhonovich I.A., Kluge C., Preisfeld A., Dietz K., Stepanok. 2001. Characterization of plant growth promoting rhizobacteria isolated from polluted soils and containing 1-aminocyclopropane-1-carboxylate deaminase. *Canadian Journal of Microbiology*, 47: 642–652.
- Berraho E.L., Lesueur D., Diem H.G., Sasson A. 1997. Iron requirement and siderophore production in *Rhizobium ciceri* during growth on an iron-deficient medium. *World J Microbiol Biotechnol* 13:501-510
- Bogino, P, Fiorella N., Erika B., Walter G. 2011. Increased competitiveness and efficiency of biological nitrogen fixation in peanut via in-furrow inoculation of rhizobia. *European Journal of Soil Biology* 47: 188-193
- Bondarenko O., Rahman P.K.S.M., Rahman T.J., Kahru A., Ivask A. 2010. Effects of rhamnolipids From *Pseudomonas aeruginosa* DS10-129 on

luminescent bacteria: toxicity and modulation of cadmium bioavailability. *Microbiol Ecol* 59: 588–600

Bouazizi, H., Jouili, H., Geitmann, A. and Ferjani, E.E.I. 2010. Copper toxicity in expanding leaves of *Phaseolus vulgaris* L.: antioxidant enzyme response and nutrient element uptake. *Ecotox. Environ. Safe.*, 73: 1304–1308.

Broughton, W.J. 1983. Nitrogen fixation Vol.3. *Clarendon Press. Oxford* 181: 2-4

Champbell, N.A., J.B. Reece., L.G. Mitchell. 2003. *Biology Addison Wesley Longman, Inc. California*

Cambroll J., Mateos-Naranjo E., Redondo-Gomez S., Luque-Palomo M.T., Figueroa M.E. 2011. Growth, reproductive and photosynthetic responses to copper in the yellow-horned poppy, *Glaucium Flavum* Crantz. *Environ. Exp. Bot.* 71: 57-64

Carlot, M., Giacomini, A., Casella, S., 2001. Aspects of plant-microbe interactions in heavy metal polluted soil. *Acta Biotechnol.* 22. 13–20.

Cartwright, B. and Hallsworth, E. G. 1970. Effect of copper deficiency on root nodules of subterranean clover. *Plant Soil* 33. 685: 698

Darmono. 1995. *Logam dalam Sistem Biologi Makhluk Hidup*. Universitas indonesia : Jakarta

Dary, M., Chamber-Pérez, M.A., Palomares, A.J., Pajuelo, E., 2010. In situ phytostabilisation of heavy metal polluted soils using *Lupinus luteus* inoculated with metal resistant plant-growth promoting rhizobacteria. *J. Hazard. Mater.* 177: 323–330

Dobermann, A. T. Fairhurst. 2000. *Rice Nutrient Disorders and Nutrient Management*. Oxford Graphic Printers Pte Ltd

Duham J.S., Dudeja S.S., Khurana A.L. 1998. Siderophore production in relation to N₂ fixation and iron uptake in pigeon pea–*Rhizobium* symbiosis. *Folia Microbiol* 43:421-426

Duponnois, R., Kisa, M., Assigbetse, K., Prin, Y., Thioulouse, J., Issartel, M., Moulin, P., Lepage, M., 2006. Fluorescent pseudomonads occurring in *Macrotermes sub-hyalinus* mound structures decrease Cd toxicity and improve its accumulation in sorghum plants. *Sci. Total Environ.* 370 : 391–400

Edi, S dan Mulyanti. 2003. *Serapan Hara dan Produksi Beberapa Varietas Kacang Tanah*. Seminar hasil penelitian dan pengembangan teknologi. Jambi. P.115.

- Fabiano E., Gualtieri G., Pritsch C., Polla G., Arias A. 1994. Extent of high-affinity iron transport systems in field isolates of rhizobia. *Plant Soil* 164:177-185
- Frausto Da Silva, J.J.R., and Williams, R.J.P. (eds.). 1991. *The biological chemistry of the elements, the inorganic chemistry of life*. Clarendon Press: Oxford.
- Fox, A. Marc. 2005. *Adaptation of Rhizobium to Enviromental Stress*. University of Reading School of Animal and microbial Sciences
- Gao, Y., Miao, C.Y., Mao, L., Zhou, Pei., Jin, Z.G., Shi, W.J., 2010. Improvement of phytoextraction and antioxidative defense in *Solanum nigrum* L. under cad-mium stress by application of cadmium-resistant strain and citric acid. *J. Hazard. Mater.* 181: 771–777
- Gardner, F.P., R.B. Pearce and R.L. Mitchel. 1991. *Fisiologi Tanaman Budidaya*. Diterjemahkan oleh Susilo, H. dan Subiyanto. Penerbit Universitas Indonesia, Jakarta. 428 hlm.
- Ginn, T., Sengor, S.S., Barua, S., Moberly, J., Peyton, B. 2006. Metal toxicity effects on microbial growth and degradation, in: *Slovenia and U.S. Workshop on Environmental Science and Engineering, Ljubljana, Slovenia*, pp. 39–40.
- Glick, B.R. 2010. Using soil bacteria to facilitate phytoremediation. *biotechnol. Adv.* 28: 367: 374
- Goncalves, J.F, Antes, F.G, Maldaner, J., Pereira, L.B., Tabaldi, L.A., Rauber, R., Rossato, L.V., Bisognin, D.A., Dressler, V.L., de Moraes Flores, E.M. and Nicoloso, F.T. 2009. Cadmium and mineral nutrient accumulation in potato plantlets grown under cadmium stress in two different experimental culture conditions. *Plant Physiol. Biochem.* 47: 814–821.
- Gugi, B., Orange N., Hellio F., Burini J.F., Guillou C., Leriche F, Guespin-Michel J.F .1991. Effect of growth temperature on several exported enzyme activities in the psychrotropic bacte-rium *Pseudomonas fluorescens*. *J. Bacteriol.* 173: 3814–3820
- Gundlur S.S. and Manjunathaih. 2002. Influence of copper ore tailing and copper sulphate on groundnut nodulation. *Karnataka J. Agric. Sci.*, 15 (3): 504-506.
- Halder A.K., Chakrabarty P.K. 1993. Solubilization of inorganic phosphate by *Rhizobium*. *Folia Microbiol.* 38: 325–330

- Hallsworth, E.G., Greenwood, E.A.N., Yates, M.G., 1964. Studies on the nutrition of forage legumes. III. The effect of copper on nodulation of *Trifolium subterraneum* L. and *Trifolium repens*. *Plant and Soil* 20: 17-33.
- Handayanto, E. and K. Hairiah. 2007. *Biologi tanah landasan Pengelolaan Tanah Sehat*. Pustaka Adipura. Yogyakarta.
- Hansch, R. and Mendel, R.R. 2009. Physiological functions of mineral micronutrients (Cu, Zn, Mn, Fe, Ni, Mo, B, Cl). *Curr. Opin. Plant. Biol.* 12: 259–266.
- Harrison, M.D., Jones, C.E., Dameron, C.T. 1999. Copper chaperones: function structure and copper-binding properties. *JBIC.*, 4: 145–153.
- Hellebust, J.A. and S.S Craigie. 1978. *Handbook of phycological methods and bop chemical methods*. Cambridge University Press: Australia
- Hirsch P.R., Jones M.J., McGrath S.P., Giller KE .1993. Heavy metals from past applications of sewage sludge decrease the genetic diversity of *Rhizobium leguminosarum* biovar trifolii populations. *Soil Biol. Biochem.* 25:1485–1490
- Huang J.W, Chen J. Berti W.B., Cunningham S.D. 1997. Phytoremediation of less contaminated soil ;role of synthetic chelates in lead phytoextraction. *Environ. Sci. technol.* 31: 800-805
- Kabata-Pendias A, Pendias H. 2001. *Trace elements in soils and plants*. CRC, London
- Keller, C., Hammer, D. 2005. Alternatives for Phytoremediation: Biomass Plants versus Hyperaccumulators. *Geophysical Research Abstract.* 7:32-85.
- Khan, A.A. and A.A. Khan. 1981. Effect of nitrate nitrogen on growth, nodulation and distribution of labelled photosyntates in Cowpea. *Plant and soil* 63: 141-147
- Khan, A.G., Kuek, C., Chaudrhry, C.S., Khoo, W.J., Hayes. 2000. Role of Plant, Mycorrhizae and Phytochelator in Heavy Metal Contaminated Land Remediation. *Chemosphere.* 21: 197-207.
- Kopittke, P.M., P.J Dart., N.W. Menzies.2006. Toxic effects of low concentrations of Cu on nodulation of cowpea (*Vigna unguiculata*). *Environmental Pollution.* 145: 309 -315
- Kopittke, P.M., Menzies, N.W., 2006. Effect of Cu toxicity on the growth of Cowpea (*Vigna unguiculata*). *Plant and Soil* 279: 287-296

- Kovacs, M. 1992. *Biological Indicator in Enviromenttal Protection*. Budapest: House of Hungarian Academy of Science.
- Kozłowski T.T., Kramer P.J., Palardy S.G. 1991. The physicolodical ecology of wody plants. Academic press inc. London
- Kupper, H., Kupper F. and Spiller M. 1996. Environmental relevance of heavy metal-substituted chlorophylls using the example of water plants. *J. Exp. Bot.*, 47: 259–266.
- Lahuddin. 2007. *Aspek unsur mikro dalam kesuburan tanah*. Pidato pengukuhan Jabatan Guru besar tetap dalam bidang ilmu kesuburan tanah fakultas pertanian Universitas Sumatra Utara: Medan.
- Li, W.C., Wong, M.H., 2012. Interaction of Cd/Zn hyperaccumulating plant (*Sedum alfredii*) and rhizosphere bacteria on metal uptake and removal of phenan-threne. *J. Hazard. Mater.* 209–210, 421–433.
- Lidon, F.C., Henriques F.S. 1993. Effect of copper toxicity on growth and the uptake and translocation of metals in rice plants. *J. Plant Nutr.*, 16: 1449–1464.
- Lolkema, P.C., Vooijs, R. 1986. Copper tolerance in *Silene cucubalus*: Subcellular distribution of copper and its effects on chloroplast and plastocyanin synthesis. *Planta*. 167: 30–36.
- Madejon P., Murillo J.M. , Maranon T., Cabrera F., Soriano M.A. 2003. Trace element and nutrient accumulation in sunflower plants two years after the Aznalcollar mine spill. *The Science of the Total Environment*. 307 : 239–257
- Ma, J.F., Hiradate, S., Nomoto, K., Iwashita, T., and Mattsumoto, H. 1997. Internal detoxification mechanism of Al^{3+} in hydrangea. Identification of Al form in the leaves. *Plants Physiol*. 113: 1033-3093.
- Malan, H.L., J.M. Farrant. 1998. Effect of the metal pollutions cadmium and nickel on soybean seed development. *Seed Science Research*. 8: 445:453
- Mamamril J.C., L.C. Trinidat, V.T. Capuno. 2000. *Heavy toxic metal Resistance of selected rhizobium strains*: University of the philipines los banos college, Laguna
- Manivasagaperumal R.; P. Vijayarengana; S. Balamurugari; G. Thiyagajani. 2011. Effect of copper on growth, dry matter yield and nutrient content of *Vigna radiata* (L) wilczek. *Journal of phytology phytophysiology* 3(3):53-62

- Marschner, H. 1995. Mineral nutrition of higher plants. Second edition. *Academic Press*. London. 236: 275-276.
- Matiru V. N., F. D. Dakora, Potential Use of Rhi-zobial Bacteria as Promoters of Plant Growth for In-creased Yield in Landraces of African Cereal Crops, *African Journal of Biotechnology*. Vol. 3, No. 1, 2004, pp. 1-7.
- McGrath J.W., Hammerschmidt F., Quinn J.P. 1998. Biodegradation of phosphonomycin by *Rhizobium huakuii* PMY1. *Appl Environ Microbiol* 64:356–358
- Mulyani, M.S. 1991. *Pengantar Ilmu Tanah*. P.T. Rineka Cipta, Jakarta
- Ogbuehi H.C., Onuh M.O., Ezeibekwe I.O. 2011. Effects of spent engine oil pollution on the nutrient composition and accumulation of heavy metal in cowpea (*Vigna unguiculata* (L.) Walp). *Australian journal of agricultural engineering*. 2(4):110-113
- O'Hara, G.W. 2001. Nutritional constraint on root nodule bacteria affecting symbiotic nitrogen fixation: a review. *Australian Journal of Experimental Agriculture*, 41: 417-433
- Oldroyd, G.E.D., and Downie, J.A. 2004. Calcium, kinases and nodulation signalling in legumes. *Nat. Rev. Mol. Cell. Biol.* 5 : 566-576
- Ouzounidou, G., Eleftheriou E.P., Karataglis S. 1992. Ecophysiological and ultrastructural effects of copper in *Thlaspi ochroleucum* (Curciferae). *Can. J. Bot.*, 70: 947–957.
- Ouzounidou, G., Ciamporova M., Moustakas M. and Karataglis S. 1995. Responses of maize (*Zea mays* L.) plants to copper stress I. Growth, mineral content and Ultra structure of roots. *Environ. Exp. Bot.*, 35: 167–176.
- Panjaitan, Y.G. 2009. Akumulasi Logam Berat Tembaga (Cu) dan Timbal (Pb) pada pohon *Avecennia marina* di Hutan mangrove. Universitas Sumatra Utara: Medan
- Pardo B. S., Pilar Z., 2014. Mitigation of Cu stress by legume–Rhizobiumsymbiosis in white lupin and soybean plants. *Ecotoxicology and Environmental Safety* 102 : 1–5
- Paton G.I., Palmer G., Burton M., Rattray E.A., McGrath S.P., Glover L.A., Killham K. 1997. Development of an acute chronic ecotoxicity assay using lux-marked *Rhizobium leguminosarum* biovartrifolii. *Lett Appl Microbiol* 24: 296–300

- Paudyal SP, Aryal RR, Chauhan SVS, Maheshwari DK .2007. Effect of heavy metals on growth of Rhizobium strains and symbiotic efficiency of two species of tropical legumes. *Sci World* 5:27–32
- Perez M. F., C. Alías-Villegas, R.A. Bellogin, P. del Cerro, M.R. Espuny,I. Jimenez-Guerrero, F.J. Lopez-Baena, F.J. Ollero, T. Cubo. 2014. Plant growth promotion in cereal and leguminous agricultural important plants: From microorganism capacities to crop production. *Microbiological Research* 169 : 325–336
- Poonguzhali, S., Madhaiyan, M., Sa, T.M., 2007. Quorum-sensing signals produced by plant-growth promoting Burkholderia strains under in vitro and in planta conditions. *Res. Microbiol.* 158: 287–294
- Preisig, O., Zufferey, R., Thony-Meyer, L., Appleby, C.A., and Hennecke, H. (1996). A high-affinity cbb3-type cytochrome oxidase terminates the symbiosis-specific respiratory chain of Bradyrhizobium japonicum. *J. Bacteriol.* 178: 1532-1538.
- Rao, N.S.S. 1994. *Soil Mikroorganisms and Plant Growth*. Oxford and IBM Publishing Co.
- Reed, M.L.E., Glick, B.R., 2005. Growth of Canola (*Brassica napus*) in the presence of plant growth promoting bacteria and either copper or polycyclic aromatic hydrocarbons. *Journal microbial* 51: 1061-1069
- Reichman, S.M. 2002. *The responses of plant to metal toxicity: A review of focusing on copper, manganese and zinc*. Australian Minerals and Energy Environment Foundation; Melbourne, Australia, pp. 7
- Reichman S.M.A. 2007. The potential use of the legume–Rhizobium symbiosis for the remediation of arsenic contaminated sites. *Soil Biol* 39: 2587–2593
- Rengel Z .1999. Mineral Nutrition of Crops Fundamental Mechanisms and Implications CRS Press. pp 399
- Rodelas B., Gonzalez–Lopez J., Martinez-Toledo M.V., Pozo C, Salmeron V.1999. Influence of Rhizobium/Azotobacter and Rhizobium/Azospirillum combined inoculation on mineral composition of faba bean (*Vicia faba* L.) *Biol Fert Soils* 29(2):165-169
- Rodrigues C., Laranjo M., Oliveira S. 2006. Effect of heat and pH stress in the growth of chickpea mesorhizobia. *Curr Microbiol* 53:1–7
- Rosmarkam, A dan Nasih, W.Y. 2002. Ilmu kesuburan tanah. Kanisius: Yogyakarta

- Rossiana N., S. Titin., S. Yayat. 2007. Fitoremediasi limbah cair dengan eceng gondok (*Eichhornia crassipes* (Mart) Solms dan limbah padat industri minyak bumi dengan sengon (*Paraserianthes falcataria* L. Nielsen) bermikoriza. Universitas padjajaran: Bandung
- Rubatzky, V. E., and Yamaguchi, M. 1997. World Vegetables: Principles Production, and Nutritive Values. *Thomson Publishing Inc.* 292p.
- Rubio, M.C., Becana, M., Sato, S., James, E.K., Tabata, S., and Spaink, H. 2007. Characterization of genomic clones and expression analysis of the three types of superoxide dismutases during nodule development in *Lotus japonicus*. *Mol. Plant Microbe Interact.* 20: 262-275.
- Sagiman, S., Anas, I., Djadjakirana, G. 2002. Isolasi dan Seleksi Galur Bradyrhizobium japonicum asal Tanah Gambut. *Hayati* hlm. 1-4
- Saharan B.S., V. Nehra. 2011. Plant Growth Promoting Rhizobacteria: A Critical Review. *Life Sciences and Medicine Research*, LSMR-21
- Salisbury, F.B. dan C.W. Ross. 1995. *Fisiologi Tumbuhan. Terjemahan dari: Plant physiology*. Penerjemah: Lukman, D.R. dan Sumaryono. Penerbit ITB, Bandung
- Samarakoon, A.B. and Rauser W.E. 1979. Carbohydrate levels and photoassimilate export from leaves of *Phaseolus vulgaris* exposed to excess cobalt, nickel and zinc. *Plant Physiol.*, 63: 1162–1169.
- Santamaria M.M., Marrero A.R.D., Hernandez J., Navarro A.M.G., Corzo J.2003. Effect of thorium on the growth and capsule morphology of Bradyrhizobium. *Environ Microbiol* 5: 916–924
- Sawhney, V., Sheoran I.S. and Singh R. 1990. Nitrogen fixation, photosynthesis and enzymes of ammonia assimilation and ureide biogenesis in nodules of mungbean (*Vigna radiata*) grown in presence of cadmium. *Ind. J. Exp. Biol.*, 28: 883–886.
- Seliga, H. 1993. The role of copper in Nitrogen fixation in *Lupinus luteus* L. *Plant Soil* 155/156: 349–352.
- Senthilkumar M., Madhaiyan M., Sundaram S.P., Kannaiyan S. 2009. Intercellular colonization and growth promoting effects of *Methylobacterium* p. with plant-growth regulators on rice (*Oryza sativa* L. CvCO-43). *Microbiol Res* 164:92–104
- Sheldon, A.R., Menzies, N.W., 2005. The effect of copper toxicity on the growth and root morphology of Rhodes grass (*Chloris gayana* Knuth.) in resin buffered solution culture. *Plant and Soil* 278: 341-349.

- Sheng, X.F., Xia, J.J., 2006. Improvement of rape (*Brassica napus*) plant growth and cadmium uptake by cadmium-resistant bacteria. *Chemosphere* 64: 1036-1042.
- Sheng, X., Leni S., Zhi H., Linyan H., Wenhui Z., Zhaojin C. 2012. Promotion of growth and Cu accumulation of bio-energy crop (*Zea mays*) by bacteria: Implications for energy plant biomass production and phytoremediation. *Journal of Environmental Management* 103: 58-64
- Shi, G.R., Cai, Q.S., Liu, Q.Q., Liu., and Wu, L. 2009. Salicylic acid mediated alleviation of cadmium toxicity in hemp plants in relation to cadmium uptake, photosynthesis and antioxidant enzymes. *Acta Physiol* 31: 989-977
- Simanjuntak, F., I Wayan A., Sumi Y. 2012. *Pengaruh tingkat pemberian kompos terhadap kebutuhan air tanaman beberapa jenis kacang*. Universitas Udayana: Bali
- Simms, E.L. and D.L. Taylor. 2002. Partner choice in nitrogen-fixation mutualisms of legumes and rhizobia. *Integ. Comp. Biol.* 42: 369 – 380.
- Skrary F.A., Cameron D.C. 1998. Purification and characterization of a *Bacillus licheniformis* phosphatase specific for D-alpha-glycerophosphate. *Arch Biochem Biophys* 349 : 27–35
- Slatni, T., Dellorto, M., Ben Salah, I., Vigani, G., Smaoui, A., Gouia, H., Zocchi, G., and Abdelly, C. 2012. Immunolocalization of H⁺-ATPase and IRT1 enzymes in N₂-fixing common bean nodules subjected to iron deficiency. *J. Plant Physiol.* 169: 242-248.
- Soetanto, R. 2002. *Penerapan Pertanian Organik Pemasyarakatan dan Pengembangannya*. Kanisius. Yogyakarta. 219 hal.
- Sonmez, S., Kaplan, M., Sonmez, N.K., Kaya, H. and Ilker, U.Z. 2006. High level of copper application to soil and leaves reduce the growth and yield of tomato plants. *Sci. Agric. (Piracicaba, Braz.)*, 63(3): 213–218.
- Sridevi M., Mallaiah K.V., Yadav N.C.S. 2007. Phosphate solubilization by Rhizobium isolates from *Crotalaria* species. *J. Plant Sci* 2:635-639
- Sridevi M., Kumar K.G., Mallaiah K.V. 2008. Production of catechol-type of siderophores by Rhizobium sp. isolated from stem nodules of *Sesbania procumbens* (Roxb.) W and A. *Res J. Microbiol* 3:282-287
- Srivastava, P.C. and Gupta U. C. 1996. *Trace elements in crop production*. Science Public, Inc. USA

- Stan V., Gament E., Corena C..P, Voaides C., Dusa M., Plopeanu. G. 2011. Effects of heavy metal from polluted soils on the Rhizobium diversity. *Not Bot Hort Agrobot Cluj* 39: 88–95
- Suwarni. Bambang G. Dan Jody M. 2000. Pengaruh herbisida glifosat dan legin terhadap perilaku nodulasi tanaman kacang tanah (*Arachis hypogaea* L.). *Agrosains* volume 2 no 2.
- Terry, R.E., Soerensen, K.U., Jolley, V.D., and Brown, J.C. (1991). The role of active Bradyrhizobium japonicum in iron stress response of soy-beans. *Plant Soil* 130: 225-230.
- Tisdale, S.L., W.L. Nelson, and J.D. Beaton. 1994. *Soil Fertility and Fertilizer*. New York: Macmilan Publishig Company
- Udvardi, M., and Poole, P.S. 2013. Transport and metabolism in legume-rhizobia symbioses. *Annu. Rev. Plant Biol.* 64: 781-805.
- Upadhyay, R.K. and Panda, S.K. 2009. Copper-induced growth inhibition, oxidative stress and ultrastructural alterations in freshly grown water lettuce (*Pistia stratiotes* L.). *C. R. Biologies.*, 332: 623–632.
- Ureta, A., Imperial, J., Ruiz-Argueso, T. and Palacios, J.M. 2005. Rhizobium leguminosarum Biovar viciae symbiotic hydrogenase activity and processing are limited by the level of nickel in agricultural soils. *Appl. Environ. Microb.*, 71(11): 7603–7606.
- Waldron, K.J., and Robinson, N.J. 2009. How do bacterial cells ensure that 487 metalloproteins get the correct metal. *Nat. Rev. Microbiol.* 7: 25-35.
- Wani, P.A., Khan, M.S., Zaidi, A. 2007. Cadmium, chromium and copper in greengram plants. *Agron. Sustain. Dev.* 27: 145–153.
- Wani P.A., Khan M.S., Zaidi A. 2008. Impact of zinc-tolerant plant growth promoting rhizobacteria on lentil grown in zinc-amended soil. *Agron Sustain Dev* 28:449-455
- Wang H., Ran X., Lumeng Y., Guangrong Z. 2013. Haracterization of Cu-tolerant bacteria and definition of their role in promotion of growth, Cu accumulation and reduction of Cu toxicity in Triticum aestivum L. *Ecotoxicology and Environmental Safety* 94 : 1–7
- Weisany, W. Yaghoub R., Kaveli H. 2013. Role of some of mineral nutrients in biological nitrogen fixation. *Bull. Env. Pharmacol. Life Science.* 4: 77-84

- Widyati, E. 2008. *Peranan mikroba tanah pada kegiatan rehabilitasi lahan bekas tambang*. Pusat Litbang Hutan dan Konservasi Alam : Bogor
- Wittenberg J.B., Wittenberg B.A., Day D.A., Udvardi M.K., Appleby C.A .1996. Siderophore bound iron in the peribacteroid space of soybean root nodules. *Plant Soil* 178:161-169
- Wu, S.C., Cheung, K.C., Luo, Y.M., Wong, M.H., 2006. Effects of inoculation of plant growth-promoting rhizobacteria on metal uptake by *Brassica juncea*. *Environ.Pollut.* 140: 124–135
- Xiong, Z., Liu, C. and Geng B. 2006. Phytotoxic effects of copper on nitrogen metabolism and plant growth in *Brassica pekinensis* Rupr. *Ecotox. Environ. Safe.*, 64: 273–280.
- Yruela, I., 2009. Copper in plants: acquisition, transport and interactions. *Funct.Plant Biol.* 36 : 409–430
- Zheng, Y.B, Wang, L.P. and Dixon, M.A. 2004. Response to copper toxicity for three ornamental crops in solution culture. *Hortscience.*, 39: 1116–1120.
- Zhu, B., Alva, A.K., 1993. Effect of pH on growth and uptake of copper by *Swingle citrumelo* seedlings. *Journal of Plant Nutrition* 16: 1837-1845.