

## REFERENCES

- Acinas, S. G., Marcelino, L. A., Klepac-Ceraj, V. and Polz, M. F., 2004., Divergence and redundancy of 16S rRNA sequences in genomes with multiple *rrn* operons. *J. Bacteriol.*, **186**: 2629-2635.
- Ahmad, A., Mukherjee, P., Senapati, S., Mandal, D., Khan, M. I., Kumar, R. and Sastry M., 2003. Extracellular biosynthesis of silver nanoparticles using the fungus *Fusarium oxysporum*. *Colloids Surf. B.*, **28**: 313-8.
- Ahmad, A., Senapati, S, Khan, M. I, Kumar R. and Sastry M., 2003(a). Extracellular biosynthesis of monodisperse gold nanoparticles by a novel extemo-philic actinomycete, *Thermomonospora sp.* *Langmuir.*, **19**: 3550-3.
- Ahmad, A., Senapati, S., Khan, M. I., Ramani, R., Srinivas, V. and Sastry, M. 2003(b). Intracellular synthesis of gold nanoparticles by a novel alkalotolerant actinomycete, *Rhodococcus sp.* *Nanotechnol.*, **14**: 824-8.
- Ahmad, R., Shahverdi, Sara Minaeian, Hamid Reza Shahverdi, Hossein Jamalifar and Ashraf-Asadat Nohi., 2007. Rapid synthesis of silver nanoparticles using culture supernatants of *Enterobacteria: A novel biological approach.* *Process Biochem.*, **42**:919–923.
- Ahmad, Z., Pandey, R., Sharma, S. and Khuller, G. K., 2005. Alginate nanoparticles as antituberculosis drug carriers: formulation development, pharmacokinetics and therapeutic potential. *Ind J Chest Dis Allied Sci .*, **48**: 171–6.
- Ajitha, S., Sridhar, M., Sridhar, N., Singh, I. S. B. and Varghese, V., 2004. Probiotics effects of lactic acid bacteria against *Vibrio alginolyticus* in *Penaeus* (Fenneropenaeus) *indicus* (H.Milne Edwards). *Asian Fisheri. Sci.*, **17**: 71-80.
- Akiyama, D. M., Dominy, W. G. and Lawrence, A. L., 1992. Penaeid shrimp nutrition. In: Fast, A.L., Lester, L.J. (Eds.), *Marine Shrimp Culture: Principles and Practices*. Elsevier Science Publishing Inc., New York, NY, USA, pp. 535–568.
- Alander, M., Satokari, R., Korpela, R., Saxelin, M., Vilpponen-Salmela, T., Mattila- Sandholm, T. and von Wright, A., 1999. Persistence of colonization of human colonic mucosa by a probiotic strain, *Lactobacillus rhamnosus* GG, after oral consumption. *Appl. Environ. Microbiol.*, **65**: 351–354.

- Albrecht, M. A., Evan, C. W. and Raston, C. L., 2006. Green chemistry and the health implications of nanoparticles. *Green Chem.*, **8**: 417–32.
- Alexopolus, C. J., 1941. Studies in antibiosis between bacteria and fungi II. Species of actinomycetes inhibiting the growth of *Colletotrichum gloesporioides* penz. *In culture. Ohio. J. Sci.*, **41**: 425-430.
- Anderson, A. S. and Wellington, E. M. H., 2001. The taxonomy of *Streptomyces* and related genera. *Int. J. Syst. Evol. Microbiol.*, **51**: 797-814.
- Andreyuk, K. I., Valagurova, H. V. and Myatilkova, K. A., 1990. *Streptomyces* of sandy biotopes at various stages of natural overgrowth. *Actinomycetes.*, **1 (3)**: 75-78.
- AOAC. 1995. Official Methods of Analysis. 15<sup>th</sup> ed. Association of Official Analytical Chemists, Washington, DC.
- Asmathunisha Nabikhan., Kathiresan Kandasamy., Anburaj Raj., Nabeel. M. and Alikunhi., 2010. Synthesis of antimicrobial silver nanoparticles by callus and leaf extracts from saltmarsh plant, *Sesuvium portulacastrum* L. *Colloids Surf. B: Biointerfaces.*, **79**: 488-493.
- Augustine, S. K., Bhavasar, S. P. and Kapadhis, B. P., 2005. A non-polyene antifungal antibiotics from *Streptomyces albidoflavus* (PU 23). *J. Biosci.*, **30 (2)**: 201-211.
- Augustine, S. K., Bhavasar, S. P., Baserisallhi, M. and Kapadhis, B. P., 2004. Isolation, characterization and optimization of antifungal activity of actinomycetes of soil origin. *Indian J. Biol.*, **42**: 928-932.
- Austin, B., Stuckey, L. E., Robertson, P. A. W., Effendi, I. and Griffith, D. R. W., 1995. A probiotic strain of *Vibrio alginolyticus* effective in reducing disease caused by *Aeromonas Salmonicida*, *Vibrio anguillarum* and *Vibrio ordalli*. *J. fish Dis.*, **18**: 93-96.
- Backus, E. J., Duggar, B. M. and Campell, T. H., 1954. Variation in *Streptomyces aureofaciens*. *Ann. New York Acad. Sci.*, **60**: 86-102.
- Balagurunathan, R. and Subramanian, A., 2001. Antagonistic *Streptomyces* from marine sediments. *Adv. Biosci.*, **20 (2)**: 71-76.
- Balagurunathan, R., 1992. Antagonistic actinomycetes from Indian shallow sea sediments, Ph.D., Thesis, Annamalai University, Tamil Nadu, India, pp-72.

- Balaji, D. S., Basavaraja, S., Deshpande, R., Mahesh, D. B., Prabhakar, B. K. and Venkataraman, A., 2009. Extracellular biosynthesis of functionalized silver nanoparticles by strains of *Cladosporium cladosporioides* fungus. *Colloids Surf. B. Biointerfaces.*, **68** (1): 88–92.
- Barabas, G., Sorkhoh, N. A., Fardoon, F. and Radwan, S. S., 1995. N-alkane utilization by oligocarbophilic actinomycetes strains from oil polluted Kuwaiti desert soil. *Actinomycetologica.*, **9**: 13-18.
- Basavaraja, S., Balaji, S. D., Lagashetty, A., Rajasab, A.H. and Venkataraman, A., 2008. Extraction biosynthesis of silver nanoparticles using the fungus *Fusarium semitectum*. *Mat. Resear. Bull.*, **43**: 1164-1170.
- Beamseak, K., Kook, H. B., Kim, B. S. and Hwang, B. K., 1997. Isolation and numerical identification of *Streptomyces libani* with antifungal activity from sea-mud soils. *Korean J. Pl. Pathol.*, **13** (6): 377-385.
- Beijerinck, M. W., 1900. Ueber chinonbildung durch *Streptothrix chromgena* und leben sweise dises Mikroben. *Centr. Bakteriolog. Parasitenk. Abtr.*, **II**, **6**: 2-12.
- Bellinger, C. G. and Conway, H., 1970. Effects of silver nitrate and sulfamylon on epithelial regeneration. *Plast Reconstr Surg.*, **45**: 582–5.
- Benedict, R. G., Pridham, T. G., Lindenfelser, L. A., Hall, H. H. and Jackson, R. W., 1995. Further studies in the evaluation of carbohydrate utilization tests as aids in the differentiation of species of *Streptomyces*. *Appl. Microbiol.*, **3**:1-6.
- Bentley, S. D., Chater, K. F., Cerdeno-Tarraga, A. M., Challis, G. L., Thomson, N. R., James, K. D., Harris, D. E., Quail, M. A., Kieser, H. and Harper, D., 2002. Complete genome sequence of the model actinomycete *Streptomyces coelicolor* A3 (2). *Nature.*, **417**: 141-147.
- Berdy, J., 2005. Bioactive microbial metabolites, a personal view. *J. Antibiotics.*, **58**:1-26.
- Berger, J. and Batcho, A. D., 1978. Coumarin-glycoside antibiotics. *J. Chromatogr. Libr.*, **15**:101-158.
- Bernan, V. S., Greenstein, M. and Maiese, W. M., 1997. Marine microorganisms as a source of new natural products. *Adv. Appl. Microbiol.* **43**: 57-90.

- Bernan, V. S., Montenegro, D. A., Korshalla, J. D., Maiese, W. M., Steinberg, D. A. and Greenstein, M., 1994. Bioxalomycins, new antibiotics produced by the marine *Streptomyces* sp. LL-31F508; taxonomy and fermentation. *J. Antibiot.*, **47** (12): 1417-1424.
- Bertrand, C. B., Chundell, D. R. and Brendley, B., 2004. Searching for narrow spectrum antibiotic microbes in soil from Presque Isle, Pennsylvania. *J. Young Investigators.*, **4**: 1-10.
- Bhainsa, K. C. and D'Souza, S. F., 2006. Extracellular biosynthesis of silver nano-particle using the fungus *Aspergillus fumigates*. *Colloids Surf. B Biointerfaces.*, **47**: 160-4.
- Bharde, A., Rautaray, D., Bansal, V., Ahmad, A., Sarkar, I. and Yusuf, S. M., 2006. Extracellular biosynthesis of magnetite using fungi. *Small.*, **2** (1): 135-41.
- Bharde, A., Wani, A., Shouche, Y., Pattayil, A., Bhagavatula, L. and Sastry, M., 2005. Bacterial aerobic synthesis of nanocrystalline magnetite. *JACS.*, **127**: 9326-7.
- Bhattacharya, D. and Rajinder, G., 2005. Nanotechnology and potential of microorganisms. *Crit. Rev. Biotechnol.*, **25**: 199– 204.
- Biyela, P. T., Lin, J. and Bezuidenhout, C. C., 2004. The role of aquatic ecosystems as reservoirs of antibiotic resistant bacteria and antibiotic resistance genes. *Water Sci. Technol.*, **50**: 45–50.
- Bonde, M. R. and Mc Intyre, G. A., 1968. Isolation and biology of a *Streptomyces* sp. causing potato scab in soils below pH  $5 \pm 0$ . *Am. J. Potato.*, **45**: 273-278.
- Bordoloi, G. N., Kumarim, B., Guha, A., Bordoloi, M., Yadav, R. N., Roy, M. K. and Bora, T. C., 2001. Isolation and structure elucidation of a new antifungal and antibacterial antibiotic produced by *Streptomyces* sp. 201. *Biosci. Biotechnol. Biochem.*, **65** (8): 1856-1858.
- Braydich-Stolle., L., Hussain, S., Schlager, J. and Hofmann, M. C., 2005. *In vitro* cytotoxicity of nanoparticles in mammalian germ line stem cells. *Toxicol. Sci.*, **88**: 412–9.
- Brenner, D. J., Stairy, J. T. and Krieg, N. R., 2001. Classification of prokaryotic organisms and the concept of bacterial speciation. In Bergey's Manual of Systematic Bacteriology, 2<sup>nd</sup> ed. Boone, D. R. and Castenholz, R. W. (Eds.), Springer-verlag, Newyork, Berlin, Heidelberg, **Vol.1**: pp 27-48.

- Buchanan, R. E and Gibbons, N. E. 1974. Bergeys manual of determinative bacteriology, (Eighth edition), The Williams and Wilkins Co. *Baltimore.*, 747-84.
- Bull, A. T., Goodfellow, M. and Slater, J. H., 1992. Biodiversity as a search of innovation in Biotechnology. *Ann. Rev. Microbiol.*, **46**: 219-252.
- Carwajal, F., 1946. Studies on the *Streptomyces* of *Streptomyces griseus*. *Mycologia.*, **38**: 587-595.
- Castellano, J. J., Shafii, S. M., Ko, F., Donate, G., Wright, T. E. and Mannari, R. J., 2007. Comparative evaluation of silver-containing antimicrobial dressings and drugs. *Int. Wound J.*, **4 (2)**: 114–22.
- Chakraborty, D., Mondal, B., Pal, S. C. and Sen, S. K., 1995. Characterization and identification of broad spectrum antibiotics producing *Streptomyces hygroscopicus* DI.5. *Hind. Antibiot. Bull.*, **37(1-4)**: 37-43.
- Chandrasekharan, N. and Kamat, P. V., 2000. Improving the photoelectrochemical performance of nanostructured TiO<sub>2</sub> films by adsorption of gold nanoparticles. *J. Phys. Chem. B.*, **104**: 10851-10857.
- Chater, K. F., 1998. Taking a genetic scalpel to the *Streptomyces* colony. *Microbiol.*, **114**: 1465-1478.
- Chaurasia, B., Pandey, A., Palni, L. M. S., Trivedi, P., Kumar, B. and Colvin, N., 2005. Diffusible and volatile compounds produced by an antagonistic *Bacillus subtilis* strain cause structure deformations in pathogenic fungi in vitro. *Microbiol. Res.*, **160**: 75-81.
- Chen, J. C., Lin, Z. H. and Ma, X. X., 2003. Evidence of the production of silver nanoparticles via pretreatment of *Phoma* sp. 3.2883 with silver nitrate. *Lett. Appl. Microbiol.*, **37**: 105-8.
- Cho, C. Y., Hynes, J. D., Wood, K. R. and Yoshida, H. K., 1994. Development of high- nutrient-dense, low-pollution diets and prediction of aquaculture wastes using biological approaches. *Aquaculture.*, **124**: 293–305.
- Chopra, I., 2007. The increasing use of silver-based products as antimicrobial agents: a useful development or a cause for concern? *J. Antimicrob. Chemother.*, **59**: 587–90.
- Christova, K., Sholeva, Z. and Chipeva, V., 1995. Application of molecular biological methods in taxonomy of genus *Streptomyces*. *J. Culture collection.*, **1**: 3-10.

- Chun, J, Youn, H. D., Yim, H. I., kim Yung Chil Han, M. Y. and Kang, S., 1997. *Streptomyces seoulensis* sp. nov. *Int. J. Syst. Bacteriol.*, **47**: 492-498.
- Clarridge, J. E., 2004. Impact of 16S rRNA gene sequence analysis for identification of bacteria on clinical microbiology and infectious diseases. *Clin. Microbiol. Rev.*, **17**: 840-862.
- Cohan, F. M., 2001. Bacterial species and speciation. *Syst. Biol.*, **50**: 513-524.
- Cole, S. T., Brosch, R., Parkhill, J., Garnier, T., Churcher, C., Harris, D., Gordon, S. V., Eiglmeier, K., Gas, S., Barry III, C. E., Tekaiia, F., Badcock, K., Basham, D., Brown, D., Chillingworth, T., Connor, R., Davies, R., Devlin, K., Feltwell, T., Gentles, S., Hamlin, N., Holroyd, S., Hornsby, T., Jagels, K., Krogh, A., McLean, J., Moule, S., Murphy, L., Oliver, K., Osborne, J., Quail, M. A., Rajandream, M. A., Rogers, J., Rutter, S., Seeger, K., Skelton, K., Squares, R., Squares, S., Sulston, J. E., Taylor, K., Whitehead S. and Barrell, B. G., 1998. Deciphering the biology of *Mycobacterium tuberculosis* from the complete genome sequence. *Nature.*, **393**: 537-544.
- Conn, H. J., 1916. A possible function of actinomycetes in soil. *J. Bactriol.*, **1**:197-207.
- Cook, A. E. and Meyers, P. R., 2003. Rapid identification of filamentous actinomycetes to the genus level using genus specific 16S RNA gene restriction fragments pattern. *Int. J. Syst. Microbiol.*, **53**: 1907-1915.
- Coombs, J. T. and Franco, C. M. M., 2003. Isolation and identification of actinobacteria from surface sterilized wheat roots. *Appl. Environ. Microbiol.*, **69(9)**: 5603-5608.
- Cui, H. H., Chen, C. L., Wang, J. D., Yang, Y. J., Cun, Y., Wu, J. B., Liu, Y. H., Dan, H. L., Jian, Y. T. and Chen, X. Q., 2004. Effects of probiotic on intestinal mucosa of patients with ulcerative colitis. *World J. Gastroenterol.*, **10**: 1521–1525.
- Cunningham, D. P. and Lundie, L. L. 1993. Precipitation of cadmium by *Clostridium thermoaceticum*. *Appl. Environ. Microbiol.*, **9**: 7-14.
- Dameron, C. T., Reese, R. N., Mehra, R. K., Kortan, A. R., Carroll, P. J. and Steigerwald, M.L. 1989. Biosynthesis of cadmium sulphide quantum semiconductor crystallites. *Lett. Nat.*, **338**: 596-7.
- Darouiche, R. O., Raad, I. I., Heard, S. O., Thornby, J. I., Wenker, O. C. and Gabrielli, A., 1999. Comparison of two antimicrobial impregnated central venous catheters. *New Engl J. Med.*, **340**: 1–8.

- Das, S., Lyla, P. S. and Ajmal Khan, S., 2006. Application of *Streptomyces* as a probiotic in the laboratory culture of *Penaeus monodon* (Fabricius), *Isr. J. Aquac. Bamidgeh*. **58**: 198–204.
- Das, S., Lyla, P. S. and Ajmal Khan, S., 2008. Characterization and identification of marine actinomycetes existing systems, complexities and future directions. *Natl. Acad. Sci. Lett.*, **31**: 149–160.
- Das, S., Lyla, P. S., Rajagopal, S. and Ajmal Khan, S., 2004. Antagonistic properties of deep sea actinomycetes isolated from Bay of Bengal. Proceedings of the Conference on Microbiology of the Tropical Seas. National Institute of Oceanography, Goa, India.
- Das, S., Ward, L.R. and Burke, C., 2010. Screening of marine *Streptomyces* spp. for potential use as probiotics in aquaculture. *Aquaculture*., **305**: 32-41.
- Davelos, A. L., Xiao, K., Flor, J. M. and Kinkel, L. L., 2004. Genetic and phenotypic traits of *Streptomyces* used to characterize antibiotic activities of field collected microbes. *Can. J. Microbiol.*, **50** (2): 79-89.
- De, K. and Gupta, M. K., 1991. Antifungal activity of some soil actinomycetes. *Ind. J. Microbiol.*, **31** (1): 53-54.
- Demain, A. L. 1999. Pharmaceutically active secondary metabolites of microorganisms. *Appl. Microbiol. Biotechnol.*, **52**: 455-463.
- Demling, R. H. and De Santi, L., 2001. Effects of silver on wound management. *Wounds*., **13**: 4.
- Dersjant-Li, Y., 2002. The use of soy protein in aquafeeds. In: Cruz- Sua rez, L.E., Ricque-Marie, D., Tapia-Salazar, M., Gaxiola-Cortes, M.G., Simoes, N. (Eds.), *Avances en Nutricio n Acuicola VI. Memorias del VI Simposium Internacional de Nutricio n Acuicola. 3 al 6 de Septiembre del 2002. Cancu n, Quintana Roo, Me xico*, pp. 541–558.
- Dhanasekaran, D., 2005. Biochemical, molecular characterization and antimicrobial compounds of *Streptomyces* spp. from Cudalore district, Tamil Nadu, India. Ph.D., Thesis, Bharathidasan University, India.
- Dhanasekaran, D., Sivamani, P., Arunagirinathan, N., Panneerselvam, A. and Thajuddin, N., 2005(a). Screenig and identification of antibiotics producing strains of marine *Streptomyces*. *J. Microbial. world.*, **7** (1): 62-66.
- Dhanasekaran, D.,Panneerselvam, A. and Thajuddin, N., 2005(b). Antifungal actinomycetes in marine soils of Tamil Nadu. *Geobios.*, **32**: 37-40.

- Dharmaraj, S. and Dhevendaran, D., 2010. Evaluation of *Streptomyces* as a probiotics feed for the growth of Ornamental fish *Xiphophorus helleri*. *Food Technol. Biotechnol.*, **48(4)**: 497-504.
- Dharmaraj, S. and Dhevendaran, K., 2010. Evaluation of *Streptomyces* as a Probiotic Feed for the Growth of Ornamental Fish *Xiphophorus helleri*. *Food Technol. Biotechnol.*, **48 (4)**: 497–504.
- Dharmaraj, S. and Sumantha, A., 2009. Bioactive potential of *Streptomyces* associated with marine sponges. *World J. Microbiol. Biotechnol.*, **25**: 1971-1979.
- Dhevagi, P. and Poorani, E., 2006. Isolation and characterization of actinomycetes from marine sediments. *J. Microb. World.*, **8 (1)**: 59-65.
- Dhevendaran, K., Sukumaran, M. and Georekutty, M. I., 2004. Growth Hormone (IAA) producing bacteria and *Streptomyces* and their bio-fertilizer effect on mangrove seedling, *Avicennia officinalis*. *J. Mar. Biotechnol.*, **22**: 209-213.
- Dhevendran, K., Shanmugham, R., Jasmine, A., Preseetha, P. K. and Anithakumary, Y. K., 2004. Studies on antagonistic *Streptomyces* in fauna associated with seaweeds of Kovalam coast, Kerala. National symposium and Exposition of Seaweeds, Cochin. PP-34.
- Dubois, M., Gilles, K. A., Hamilton, J. K., Rebers, P. A. and Smith F., 1956. Colorimetric relative fatty acid composition of the rotifer, increasing the method for determination of sugars and related substances. *Chem.*, **28**: 350-356.
- Duggar, B. M., Backus, E. J. and Campbell, T. H., 1954. Types of variation in actinomycetes. *Ann. NY Acad. Sci.*, **60**: 71-85.
- Duran, N., Marcato, P. D., De Souza, G. I. H., Alves, O. L. and Esposito, E., 2007. Antibacterial effect of silver nanoparticles produced by fungal process on textile fabrics and their effluent treatment. *J. Biomed Nanotechnol.*, **3**: 203–8.
- Eccleston, G. P., Brooks, P. R. and Kurtboke, D. I., 2008. The occurrence of bioactive micromonosporae in aquatic habitats of sunshine coast in Australia. *Mar. Drugs.*, **6**: 243-261.
- Ellaiah, P., Adhinarayana, K., Saisha, V. and Vasu, P., 2005. An oligoglycosidic antibiotic from a newly isolated *Streptomyces albovinaceus*. *Ind. J. Microbiol.*, **45 (1)**: 33-36.
- Ellaian, P. and Reddy, A. P. C., 1987. Isolation of actinomycetes from marine sediments of Visakhapatnam east coast of India. *Ind. J. Mar. Sci.*, **16**: 134-135.



- El-Naggar, M. Y., El-Aassar, S. A. and Abdul-Gawad, S. M., 2006. Meroparamycin production by newly isolated local *Streptomyces* sp. Strain MAR01: taxonomy, fermentation, purification and structural elucidation. *J. Microbiol.*, **44**: 432-438.
- El-Naggar, M. Y., Hassan, M. A., Said, W. Y. and El-Aassar, S. A., 2003. Effect of support materials on antibiotic MSW2000 production by immobilized *Streptomyces violatus*. *J. Gen. Appl. Microbiol.*, **49**: 235-243.
- El-Nakeeb, M. A. and Lechevalier, H. A., 1963. Selective isolation of aerobic actinomycetes in water and soil. *Appl. Microbiol.*, **11**: 75-77.
- Embley, T. M. and Stackebrandt, E., 1994. The molecular phylogeny and systematics of the actinomycetes. *Annu. Rev. Microbiol.*, **48**: 257-289.
- Emerson, R. H., Whiffen, A. J., Bohonos, N. and De Boe, C., 1946. Studies on the production of antibiotics by actinomycetes and molds. *J. Bacteriol.*, **52**: 357-365.
- Evtushenko, L. I., Taran, V. V., Akimov, V. N., Kroppenstedt, R. M., Tiedje, J. M. and Stackebrandt, E., 2000. *Nocardiosis tropica* sp. nov., *Nocardiosis trehalosi* sp. nov., nom. rev. and *Nocardiosis dassonvillei* subsp. albirubida subsp. nov., com. no. *Int. J. Syst. Evol. Microbiol.*, **50**: 73-81.
- FAO/WHO, 2002. Joint FAO/WHO (Food and Agriculture Organization/World Health Organization) working group report on drafting guidelines for the evaluation of probiotics in food. London, Ontario, Canada. Guidelines for the evaluation of probiotics in food. Joint working group report on drafting. London, Ontario., 1–11.
- Fayaz, A. M., Balaji, K., Girilal, M., Yadav, R., Kalaichelvam, P. T. and Venketesan, R., 2010. Biogenic synthesis of silver nanoparticles and their synergistic effect with antibiotics: a study against gram-positive and gram-negative bacteria. *Nanomedicine: Nanotechnol. Bio. Med.*, **6 (1)**: 103-109.
- Feng, Q. L., Wu, J., Chen, G. Q., Cui, F. Z., Kim, T. N. and Kim, J. O., 2000. A mechanistic study of the antibacterial effect of silver ions on *Escherichia coli* and *Staphylococcus aureus*. *J. Biomed. Mater.*, **52 (4)**:662–8.
- Fenical, W. and Jensen, P. R., 2006. Developing a new resource for drug discovery: marine actinomycete bacteria. *Nat. Chem. Biol.*, **2**: 666–673.

- Ferrari, E., Jarnagin, A. S. and Schmidt, B. F., 1993. Commercial production of extracellular enzymes. In: Sonenshein, A. L., Hoch, J. A., Losick, R. (Eds.), *Bacillus subtilis* and Other Gram-positive Bacteria. American Society for Microbiology, Washington, DC, 917–937.
- Feynman, R., 1959. Lecture at the California Institute of Technology. December 29.
- Fielder, H. P., Nega, M., Pfefferle, C., Groth, I., Kempter, C., Steptan, H. and Metzger, J. W., 1996. Kanchanamycins, new polyol macrolide antibiotics produced by *Streptomyces olivaceus* Tu4018 I. Taxonomy, fermentation, isolation and biological activities. *J. Antibiot.*, **49** (8): 758-764.
- Flowers, T. H. and Williams, S. T., 1977. The influence of pH on the growth rate and variability of neutrophilic and acidophilic *Streptomyces*. *Microbes.*, **18**: 223-228.
- Folch, J., Lees, M. and Sloane-Stanley, G. H., 1957. A simple method for the isolation and purification of total lipids from animal tissues. *J. Biol. Chem.*, **226**: 497-509.
- Food and Agriculture Organization of the United Nations (FAO). 2001. Health and nutritional properties of probiotics in food including powder milk with live lactic acid bacteria. In the joint FAO/WHO expert consultation report on evaluation of health and nutritional properties of probiotics in food including powder milk with live lactic acid bacteria (October 2001).
- Fourati, B. F. L., Fatso, S., Ben Ameer, M. R., Mellouli, L. and Laatsch, H., 2005. Purification and structure elucidation of antifungal and antibacterial activities of newly isolated *Streptomyces* sp. strains US80. *Res. Microbiol.*, **156** (3): 341-347.
- Fox, C. L. and Modak, S. M., 1974. Mechanism of silver sulfadiazine action on burn wound infections. *Antimicrob. Agents Chemother.*, **5** (6): 582–8.
- Fuller, R., 1989. Probiotic in man and animals. *J. Appl. Bacteriol.*, **66**: 365-378.
- Furno, F., Morley, K. S., Wong, B., Sharp, B. L., Arnold, P. L. and Howdle, S. M., 2004. Silver nanoparticles and polymeric medical devices: a new approach to prevention of infection? *J. Antimicrob. Chemother.*, **54**: 1019–24.
- Furushita, M., Shiba, T., Maeda, T., Yahata, M., Kaneoka, A., Takahashi, Y., Torii, K., Hasegawa, T. and Ohta, M., 2003. Similarity of tetracycline resistance genes isolated from fish farm bacteria to those from clinical isolates. *Appl. Environ. Microbiol.*, **69**: 5336–5342.

- Ganesh Babu, M. M. and Gunasekaran, P., 2009. Production and structural characterization of crystalline silver nanoparticles from *Bacillus cereus* isolate. *Colloids Surf. B. Biointerfaces.*, **74**: 191-195.
- Gangwar, M., Sodhi, H. S., Agarwal, R., 1997. Isolation of hypercellulolytic *Thermomonospora curvata* strain TC-2 and its role in composing. *Ann. Biol. Ludhiana.*, **13 (1)**: 233-238.
- Ganthimathi, R., Arunkumar, M., Selvin, J., Thangavelu, T., Sivaramakrishnan, S., Kiran, G. S., Shanmughapriya, S and K. Natarajaseenivasan., 2008. Antimicrobial potential of sponge associated marine actinomycetes. *J. Med. Mycol.*, **18**: 16-22.
- Gasperi, G., 1890. Reseaches morphologiques et biologiques sur un microorganisme de atmosphere le streptothrix foersterii cohn. *Ann. Microgr.*, **2**: 449-474.
- Gatesoupe, F. J., 1994. Lactic acid bacteria increase the resistance of turbot larvae, *Scophthalmus maximus*, against the pathogenic *Vibrio*. *Aquat. living resour.*, **7**: 277-282.
- Gatesoupe, F. J., 1999. The use of probiotics in aquaculture: Review. *Aquaculture.*, **180**: 147-165.
- Gaudier, E., Michel, C., Segain, J. P., Cherbut, C. and Hoebler, C., 2005. The VSL3 probiotic mixture modifies microflora but does not heal chronic dextran sodium sulfate-induced colitis or reinforce the mucus barrier in mice. *J. Nutr.*, **135**: 2753–2761.
- Gemmell, C. G., Edwards, D. I. and Frainse, A. P., 2006. Guidelines for the prophylaxis and treatment of methicillin-resistant *Staphylococcus aureus* (MRSA) infections in the UK. *J. Antimicrob. Chemother.*, **57**: 589–608.
- Genilloud, O., Pelaez, F., Gonzalez, I. and Diez, M. T., 1994. Diversity of actinomycetes and Fungi on seaweeds from the Iberian Coasts. *Microbiologia.*, **10 (4)**: 413-422.
- Gesheva, V. and Gesheva, R., 1993. Structure of the population of *Streptomyces hygroscopicus* and characteristics of its variants. *Actinomycetes.*, **4 (3)**: 65-71.
- Gibson, G. R. and Roberfroid, M. B.1995., Dietary modulation of the human colonic microbiota. Introducing the concept of prebiotics. *J. Nutr.* **125**: 1401–1412.
- Gill, H. S., 2003. Probiotics to enhance anti-infective defences in the gastrointestinal tract. *Best Prac. Res. Clinic. Gastroenterol.*, **17**: 755–773.
- Gilles Le Molluae., 2001. Environmental factors affect immune response and resistance in crustaceans. *The Advocate*, pp: 18

- Gismondo, M. R., Drago, L. and Lombardi, A., 1999. Review of probiotics available to modify gastrointestinal flora. *Int. J. Antimicrob. Agents.*, **12**: 287–292.
- Globig, L., 1888. Uber Bakterienwachstum bei 50-70<sup>0</sup>Z.Hyg. *Infectionskrankh.*, **3**: 294-321.
- Godfrey, T. and West, S., 1996. Industrial Enzymology. Macmillan Publishers Inc., New York, NY, pp. 3–10.
- Gole, A., Dash, C., Ramachandran, V., Sainkar, S. R., Mandale, A. B. and Rao, M., 2001. Pepsin– gold colloid conjugates: preparation, characterization, and enzymatic activity. *Langmuir.*, **17**: 1674–9.
- Gomez-Gill, B., Tron-Mayen, L., Roque, A., Turnbull, J. F., Inglis, V. and Guerra-Flores, A. L., 1998. Species of vibrio isolated from hepatopancreas, haemolymph and digestive tract of population of healthy juvenile *Penaeus vannamei*. *Aquaculture.*, **163**: 1-9
- Gong, P., Li, H., He, X., Wang, K., Hu, J. and Tan, W., 2007. Preparation and antibacterial activity of Fe<sub>3</sub>O<sub>4</sub>@Ag nanoparticles. *Nanotechnol.*, **18**: 604–11.
- Gonzalez-Feix, M. L. and Perez-Velazquez, M., 2002. Current status of lipid nutrition of Pacific white shrimp, *Litopenaeus vannamei*. In: Cruz- Suarez, L.E., Ricque-Marie, D., Tapia-Salazar, M., Gaxiola-Cortes, M. G., Simoes, N. (Eds.), Avances en Nutricio n Acuicola VI. Memorias del VI Simposium Internacional de Nutricio n Acuicola. 3al 6 de Septiembre del 2002. Cancu n, Quintana Roo, Me xico. pp. 35–45.
- Goodfellow, M. and Haynes, J. A., 1984. *Actinomycetes* in marine sediment, in biological, biochemical and biomedical aspects of *actinomycetes* (ed.). Oritz-Oritz, L., Bojali, C.F. and Yakaleff, V. Academic press, Newyork. London; pp 453-463.
- Goodfellow, M. and Williams, S. T., 1983. Ecology of actinomycetes. *Ann. Rev. Microbiol.*, **37**: 189-216.
- Gopalakannan, A., Atulkumar and Arul, V., 2004. Effect of gut probiotic lactic acid bacteria isolated from marine fish on *Penaeus monodon* post larvae to control the *Vibrio anguillarum*. Pp.169-176. In: Abidi, S.A.H., Ravindran, M., Venkatesan, R., Vijayakumaran, R., (eds) *Proc. Natl. Seminar New Frontiers in Marine Biosci. Res. Natl Inst. Ocean Technol.*, Chennai, India.
- Gordon, R. F. and Smith, M. M. 1955. Proposed group of characters for the separation of *Streptomyces* and *Nocordia*. *J. Bacteriol.*, **69**: 147-150.

- Gottlieb, D., 1961. An evaluation of Criteria and procedures used in the description and characterization of the Streptomyces, *Appl. Microbiol.*, **9**: 55-65.
- Gram, L., Melchiorson, J., Spanggaard, B., Humber, I. and Nielsen, T.F., 1999. Inhibition of *Vibrio anguillarum* by *Pseudomonas fluorescens* AH2, a possible probiotic treatment of fish. *Appl. Environ. Microbiol.*, **65**: 969-973.
- Gregor Reid, 2006. Safe and efficacious probiotics: What are they? *Trends in Microbiol.*, **4(8)**: 348-352.
- Grein, A. and Mayero, S. P., 1958. Growth characteristics and antibiotic production of actinomycetes isolated from littoral sediments and materials suspended in seawater. *J. Bacteriol.*, **76**: 457-463.
- Grisez, L. and Ollevier, F., 1995. *Vibrio (Listonella) anguillarum* infections in marine fish larviculture. In: Lavens, P., Jaspers, E., Roelands, I. (Eds.), Larvi 91-fish and crustacean larviculture symposium. European aquaculture society, Gent, P-497, Special publication number 24.
- Gu, H., Ho PL., Tong E., Wang L. and Xu B., 2003. Presenting vancomycin on nanoparticles to enhance antimicrobial activities. *Nano. Lett.*, **3 (9)**: 1261-3.
- Gullian, M., Thompson, F. and Rodriguez., J., 2004. Selection of probiotic bacteria and study of their immunostimulatory effect in *Penaeus vannamei*. *Aquaculture.*, **233**: 1-14.
- Gupta, A. and Silver, S., 1998. Silver as a biocide: will resistance become a problem? *Nat Biotechnol.*, **16**: 888.
- Gurunathan, S., Kalishwaralai, K., Vaidyanathan, R., Deepak, V., Pandian, S. R. K., Muniyandi, J., Hariharan, N. and Eom, S. H., 2009. Biosynthesis, purification and characterization of silver nanoparticles using *E. coli*. *Colloids Surf. B: Biointerfaces.*, **74**: 328-335.
- Guttman, L. and van Rijn, J., 2008. Identification of conditions underlying production of geosmin and 2-methylisoborneol in a recirculating system. *Aquaculture.*, **279**: 85-91.
- Hamada, M., Kaneta, K., Nishiyama, Y., Hoshino, Y., Konishi, M. and Oki, T., 1991. Hydramycin, a new antitumour antibiotic taxonomy, isolation, physico-chemical properties, structure and biological activity. *J. Antibiotics.*, **44 (8)**: 824-831.
- Harada, K. I., Tomika, K., Fujii, K., Masuda, K., Minkmi, Y., Yazawa., K. and Komaki, H., 2004. Isolation and structural characterization of siderospores, Madurastatins, produced by a pathogenic *Actinomadura madurae*. *J. Antibiot.*, **57 (2)**: 125-135.

- Harikrishnan, R., Balasundaram, C. and Moon-soo Heo., 2010. Effect of probiotics enriched diet on *Paralichthys olivaceus* infected with lymphocystis disease virus (LCDV). *Fish and Shellfish immunol.*, **29**: 868-874.
- Hasegawa, T., Yamano, T. and Yoheda, M., 1978. *Streptomyces inusitatus* sp. nov. *Int. J. Syst. Bacteriol.*, **28** (3): 407-410.
- Hatano, K., Nishii, T. and Kasi, H., 2003. Taxonomic reevaluation of whorl-forming *Streptomyces* (formerly *Streptomyverticillium*) species by using phenotypes, DNA-DNA hybridization and sequencing of gry B, and proposal of *Streptomyces luteireticuli* (ex Kato and Arai, 1957) corrig., sp. nov., nerm. Rev. *Int. J. Syst. Evol. Microbiol.*, **53**: 1519-1529.
- Havenaar, R., Ten Brink, B. and Huis in't Veld, J. H. J., 1992. Selection of strains for probiotic use. In: R. Fuller (ed), *Probiotics: the scientific basis*, Chapman and Hall, London. pp 209-224.
- Hayakawa, M., 1990. Selective isolation methods and distribution of soil actinomycetes. *Actinomycetologica.*, **4**: 103-112.
- Hayakawa, M., Ariizumi, M., Yamazaki, T. and Nonomura, H., 1991. Chemotaxis in the zoosporic actinomycete *Catenolopanes japonicus*. *Actinomycetologica.*, **9**: 152-153.
- Hayakawa, M., Takeuchi, T. and Yamazaki, T., 1996. Combined use of trimethoprim with nalixidic acid for the selective isolation and enumeration of actinomycetes from soil. *Actinomycetologica.*, **10**: 80-90.
- He, H., Williamson, R. T., Shen, B., Grazini, E. I., Yang, H. Y., Sakya, S. M., Petersen, P. J. and Carter, G.T., 2002. Mannopeptimycins, novel antibacterial glycoproteins from *Streptomyces hygroscopicus*, LL-AC98. *J. American chem. Sci.*, **124** (33): 9729-9736.
- Hedge, V. R., Patel, M. G., Gullo, V. P. and Fuar, M. S., 1991. Macrolactams: a new class of antifungal agents. *J. Am. Chem. Soc.*, **112**: 6403-6405.
- Hedge, Y., Patel, M., Horan, A., Gullo, V., Marquez, J., Gunnarson, I., Gentile, F., Loebenberg, D. and King, A., 1992. Macrolactams: a novel class of anti fungal antibiotics produced by *Actinomadura slala*. SCC 1776 and SCC 1777. *J. Antibiot.*, **45**: 324-632.
- Hesseltive, C. W., Benedict, R. G. and Pridham, T. G., 1954. Useful criteria for species differentiation in the genus *Streptomyces*. *Ann. Newyork Acad. Sci.*, **60**: 136-151.

- Higgins, D. G., Bleasby, A. T. and Fuchs, R., 1992. Cluster v: improved software for multiple sequences alignment. *CABLOS.*, **8**:187-191.
- Hoeksema, H., Johnson, J. L. and Hinman, J. W., 1955. Structural studies on streptonivcin, a new antibiotic. *J. Am. Chem. Soc.*, **77**:6710-6711.
- Hooper, L. V., Midtvedt, T. and Gordon, J. I., 2002. How host-microbial interactions shape the nutrient environment of the mammalian intestine. *Ann. Rev. Nutr.*, **22**: 283–307.
- Hopwood, D. A., Malpartida, F., Kieser, H. M., Ikeda, H., Duncan, J., Fujii, I., Rudd, B. A. M., Floss, H. G. and Omura, S., 1985. Production of 'hybrid' antibiotics by genetic engineering. *Nature.*, **314**: 642-644.
- Howgate, P., 2004. Tainting of farmed fish by geosmin and 2- methyliso- borneol: a review of sensory aspects and of uptake/depuration. *Aquaculture.*, **234**: 155–181.
- Hozzein, W. N., Li, W. J., Ali, M., Hammouda, O., Mousa, A. S., Xu, L. H. and Jiang, C. L., 2004. *Nocardiosis alkaliphila* sp. nov., a novel alkaliphilic actinomycete isolated from desert soil in Egypt. *Int. J. Syst. Evol. Microbiol.*, **54**: 247-252.
- HSU, S. C. and Lockwood, J. L., 1975. Powdered chitin agar as a selective medium for enumeration of actinomycetes in water and soil. *Appl. Microbiol.*, **29 (3)**: 422-426.
- Hugo, W. B. and Russell, A. D., 1982. Types of antimicrobial agents. In: Principles and practice of disinfection, preservation and sterilization. *Oxford, UK: Blackwell Scientific Publications.* pp. 106-8.
- Hussain, S., Hess, K., Gearhart, J., Geiss, K. and Schlager, J., 2005. In vitro toxicity of nanoparticles in BRL3A rat liver cells. *Toxicol. In vitro.*, **19**: 975–83.
- Husseiney, M. I., Abd El-Aziz, M., Badr, Y. and Mahmoud, M. A., 2007. Biosynthesis of gold nanoparticles using *Pseudomonas aeruginosa*. *Spectrochim. Acta. A.*, **67**: 1003-6.
- Ikeda, H., Ishikawa, J., Hanamoto, A., Shinose, M., Kikuchi, H., Shiba, T., Sakaki, Y., Hattori, M. and Omura, S., 2003. Complete genome sequence and comparative analysis of the industrial microorganism *Streptomyces avermitilis*. *Nat. Biotechnol.*, **21**: 526-531.
- Imada, C., 2005. Enzyme inhibitors and other bioactive compounds from marine actinomycetes. *Antonie van Leeuwenhoek.*, **87**: 59-63.
- Imamura, N., Nishijima, M., Adachi, K. and Sano, H., 1993 . Novel antimycin antibiotics, urauchimycins A and B, produced by marine actinomycete. *J. Antibiot.*, **46**: 241-246.

- Ip, M., Lui, S. L., Poon, V. K. M., Lung, I. and Burd, A., 2006. Antimicrobial activities of silver dressings: an in vitro comparison. *J. Med. Microbiol.*, **55**: 59-63.
- Irianto, A. and Austin, B., 2002. Probiotics in aquaculture. *J. Fish Dis.*, **25**: 633–642.
- Ismet, A., Vikineswary, S., Paramaswari, S., Wong, W. H., Ward, A., Seki, T., Fiedler, H. P. and Goodfellow, M., 2004. Production and chemical characterization of antifungal metabolites from *Micromonospora* sp. M39 isolated from mangrove rhizosphere soil. *World J. Microbiol. Biotechnol.*, **20**: 523-528.
- Isolauri, E., Salminen, S. and Ouwehand, A. C., 2004. Probiotics. *Best Pract. Res. Clin. Gastroenterol.*, **18**: 299–313.
- Ivanova, V. and Schlegel, R., 1997. Structure elucidation of the antibiotic demalohylniphimycin by two-dimensional NMR techniques. *Actinomycetes.*, **8 (1-2)**: 1-9.
- Jain, P. and Pradeep, T., 2005. Potential of silver nanoparticle-coated polyurethane foam as an antibacterial water filter. *Biotechnol. Bioeng.*, **90 (1)**: 59-63.
- Janakiram, P., Jayasree, L. and Madhavi, R., 2003. Biochemical constituents of shrimps from semi-intensive and modified extensive culture ponds. *A. Fisheri. Sci.* **16** : 25-31.
- Jensan, P. R., Williams, P. G., Dong-Chan Oh., Zeigler, L. and Fenical, W., 2007. Species specific secondary metabolites production in marine actinomycetes of the genus *Salinispora*. *Appl. Environ. microbiology.*, **73 (4)**: 1146-1152.
- Jensen, P. R., Dwight, R. and Fenical, W., 1991. Distribution of actinomycetes in near-shore tropical marine sediments. *Appl. Environ. Microbiol.*, **57**: 1102-1108.
- Jensen, P. R. and Fenical, W., 1994. Strategies for the discovery of secondary metabolites from marine bacteria: ecological perspectives. *Annu. Rev. Microbiol.*, **48**: 559-584.
- Jensen, P. R. and Fenical, W., 2000. Marine Microorganisms and Drug Discovery: Current Status and Future Potential. In: *Drugs from the Sea*, N. Fusetani (Ed.). Karger, Basel, pp: 6-29.
- Jensen, P. R. and Lauro, F. M., 2008. An assessment of actinobacterial diversity in the marine environment. *Antonie van Leeuwenhoek.*, **94**: 51–62.
- Jensen, P. R., Dwight, R. and Fenical, W., 1991. Distribution of actinomycetes in near shore tropical marine sediments. *Appl. Environ. Microbiol.*, **57 (4)**: 1102-1108.
- Jiang, C. L. and Xu, L. H., 1990. Characteristics of the population of soil actinomycetes in Yuntan. *Actinomycetes.*, **1 (3)**: 67-74.



- Jiang, C. L. and Xu, L. H., 1993. Actinomycetes diversity in unusual habitats. *Actinomycetes.*, **4** (2): 47-57.
- Johdo, O., Ishikura, T. and Yoshimoto, A., 1991. Anthracycline metabolites from *Streptomyces violaceus* I. Isolation of antibiotic blocked mutants from *S.violaceus* A262. *J.Antibiot.*, **44** (10): 1110-1120.
- Jun, J., Yuan-Yuan, D., Shao-hai, W., Shao-feng, Z. and Zhong-yi, W. 2007. Preparation and characterization of antibacterial silver-containing nanofibers for wound dressing applications. *J US-China Med. Sci.*, **4** (2): 52-4.
- Kalishwaralal, K., Deepak, V., Ramkumarpandian, S., Nellaiah, H. and Sangiliyandi, G., 2008. Extracellular biosynthesis of silver nanoparticles by the culture supernatant of *Bacillus licheniformis*. *Mater. Letters.*, **62**: 4411-4413.
- Kasthuri, J., Veerapandian, S. and Rajendiran, N., 2009. Biological synthesis of silver and Gold nanoparticles using apiin as reducing agent. *Colloids Surf. B Biointerfaces.*, **68**: 55–60.
- Kathiresan, K., Balagurunathan, R. and Masilamani Selvam, M., 2005. Fungicidal activity of marine actinomycetes against phytopathogenic fungi. *Ind. J. Biotechnol.*, **4**: 271-276.
- Kathiresan, K., Manivannan, S., Nabell, M. A. and Dhivya, B. 2009. Studies on silver nanoparticles synthesized by a marine fungus, *Penicillium fellutanum* isolated from coastal mangrove sediment. *Colloids Surf. B: Biointerfaces.*, **71**:133-137.
- Kawaguchi, H., Naito, T. and Tsukiura, H., 1965. Studies on coumermycin. A new antibiotic. II. Structure of coumermycin A1. *J. Antibiot.*, **18**:11-25.
- Kawahara, K., Tsuruda, K., Morishita, M. and Uchida, M., 2000. Antibacterial effect of silver zeolite on oral bacteria under anaerobic condition. *Dent. Mater.*, **16**: 452–5.
- Kelecom, A., 1999. Chemistry of marine natural products: Yesterday, today and tomorrow. *AnAcad. Bras. Cienc.*, **71**: 249-263. DOI: 684.5400008394380.0110
- Kelecom, A., 2002. Secondary metabolites from marine microorganisms. *AnAcad. Bras. Sci.*, **74**: 151-170.
- Kenig, M. and Reading, C., 1979. Holomycin and an antibiotic (MM19290) related to tunicamycin, metabolites of *Streptomyces clavuligerus*. *J. Antibiot.* **32**: 549-554.

- Kennedy, S. B., Tucker, J. W., Neidig, C. L., Vermeer, G. K., Cooper, V. R., Jarrell, J. L. and Sennett, D. G., 1998. Bacterial management strategies for stock enhancement of warm water marine fish: a case study with common snook (*Centropomus undecimalis*). *Bull. Mar. Sci.*, **62**: 573-588.
- Kesarcodi-Watson, A., Kaspar, H., Lategan, M. J. and Gibson, L., 2008. Probiotics in aquaculture: The need, principles and mechanisms of action and screening processes. *Aquaculture.*, **274**: 1–14.
- Kieser, T, Bibb, M. J., Buttner, M. J., Chater, K.F. and Hopwood, D.A., 2000. Practical *Streptomyces* Genetics (2nd ed.). Norwich, England: John Innes Foundation. ISBN 0-7084-0623-8.
- Kim, B. S., Kim, C. J., Chun, J., Koh, Y. H., Lee, S. H., Ayun, J. W., Cha, C. Y. and Kooh, Y. H., 2004. Phylogenetic analysis of the genera *Streptomyces* and *Kitasatospora* based on partial RNA polymerase  $\beta$ -subunit gene (rpo B) sequence. *Int. J. Syst. Evol. Microbiol.*, **54**: 593-598.
- Kim, B. S., Sahin, N., Minnikin, D. E., Screwinska, J. Z., Mordarski, M. and Goodfellow., M., 1999. Classification of thermophilic *Streptomyces* including the description of *Streptomyces thermoalcalitolerans* sp, Nov. *Int. J. Syst. Bacteriol.*, **49** (1): 7-17.
- Kim, B.S., Moon, S.S.and Hwang, B.K., 2000. Structure elucidation and antifungal activity of an anthrocycline antibiotic, daunomycin, isolated from *Actinomadura roseola*. *J. Agri. Foodchem.*, **48** (5): 1875-1881.
- Kim, H. J., Camilleri, M., McKinzie, S., Lempke, M. B., Burton, D. D., Thomforde, G. M. and Zinsmeister, A. R., 2003. A randomized controlled trial of a probiotic, VSL3, on gut transit and symptoms in diarrhoeapredominant irritable bowel syndrome. *Alimentary Pharmacol. Therapeut.*, **17**: 895–904.
- Kim, J. S., Kuk, E., Yu, K. N., Kim, J. H., Park, S. J. and Lee, H. J., 2007. Antimicrobial effects of silver nanoparticles. *Nanomed Nanotechnol. Biol. Med.*, **3**: 95-101.
- Kimura, M., 1980. A simple methods for estimating evolutionary retes of base substitutions through comparative studies of nucleotide sequences. *J. Mol. Evol.*, **16**: 111-120.
- Kinashi, H., Mori, E., Hatani, A. and Nimi, O., 1994. Isolation and characterization of large linear plasmids from lankacidin producing *Streptomyces* species. *J. Antibiot.*, **47**: 1447–1455.

- Kinoshita, N., Okada, M. and Hamada, M., 1994. Identification of strain MH193-16F4, a benanomycin producing actinomycetes, to *Actinomadura spadix*. *Actinomycetologica.*, **8**: 73-78.
- Kirby, R., Wright, L. F. and Hopwood, D. A., 1975. Plasmid determined antibiotic synthesis and resistance in *Streptomyces coelicolor*. *Nature.*, **254**: 265-267.
- Klasen, H. J., 2000. A historical review of the use of silver in the treatment of burns. Part early uses. *Burns.*, **30**: 1-9.
- Klaus, T., Joerger, R., Olsson, E. and Granqvist, C.G., 1999. Silver-based crystalline nanoparticles, microbially fabricated. *Proc. Natl. Acad. Sci.*, **96**: 13611-4.
- Klausen, C., Nicolaisen, M. H., Strobel, B. W., Warnecke, F., Nielsen, J. L. and Jorgensen, N. O. G., 2005. Abundance of actinobacteria and production of geosmin and 2-methylisoborneol in Danish streams and fish ponds. *FEMS Microbiol. Ecol.*, **52**: 265-278.
- Konishi, Y., Ohno, K., Saitoh, N., Nomura, T. and Nagamine, S., 2004. Microbial synthesis of gold nanoparticles by metal reducing bacterium. *Trans. Mater. Res. Soc.*, **29**: 2341-3.
- Kourai, H., Manabe, Y. and Yamada Y., 1994. Mode of bactericidal action of zirconium phosphate ceramics containing silver ions in the crystal structure. *J. Antibact. Antifungal Agents.*, **22**: 595-601.
- Kowshik, M., Ashtaputre, S., Kharrazi, S., Vogel, W., Urban, J., Kulkarni, S. and Paknikar, K., 2003. Extracellular synthesis of silver nanoparticles by a silver-tolerant yeast strain MKY3. *Nanotechnol.*, **14**: 95-100.
- Kozasa, M., 1986. Toyocerin (*Bacillus toyoi*) as a growth promoter for animal feeding. *Microb. Alim. Nutr.*, **4**: 121-125.
- Krasilnikov, N. A., 1960. Rules for the classification of antibiotic producing actinomycetes. *J. Bacteriol.*, **79**: 75-80.
- Kreibig, U. and Vollmer, M., 1995. Optical properties of metal clusters. Berlin, Germany: Springer.
- Kreuze, J. F., Suomalaine, S., Paulin, L. and Valkonen, J. P. T., 1999. Phylogenetic analysis of 16S rRNA genes and PCR analysis of the nec 1 gene from *Streptomyces* spp. causing common scab pitted scab and netted scab in finland. *Phytopathology.*, **89** (6): 462-469.

- Krishnaraj, C., Jagan, E. G., Rajasekar, S., Selvakumar, P., Kalaichelvam, P. T. and Mohan, N., 2010. Synthesis of silver nanoparticles using *Acalypha indica* leaf extracts and its antibacterial activity against water borne pathogens. *Colloid Surf. B.*, **76**: 50.
- Krolikowska, A., Kudelski, A., Michota, A. and Bukowska, J., 2003. SERS studies on the structure of thioglycolic acid monolayers on silver and gold. *Surf. Sci.*, **32**: 227-232.
- Kuehbach, T., Ott, S. J., Helwig, U., Mimura, T., Rizzello, F., Kleessen, B., Gionchetti, P., Blaut, M., Campieri, M., Folsch, U. R., Kamm, M. A. and Schreiber, S., 2006. Bacterial and fungal microbiota in relation to Probiotic therapy (VSL3) in pouchitis. *Gut.*, **55**: 833–841.
- Kui Hong, An-Hui Gao, Qing-Yi Xie, Hao Geo, Ling huang, Hai-Peng Lin, Hai-Ping Yu, Jia Li, Xin-Sheng Yao, Micheal Goodfellow and Ji-Sheng Ruan. 2009. Actinomycetes for marine drug discovery isolation from mangrove soils and plants in China. *Mar. Drugs.*, **7**: 24-44.
- Kumar, A., Mandal, S., Selvakannan, P. R., Parischa, R., Mandale, A. B. and Sastry, M., 2003. Investigation into the interaction between surface-bound alkylamines and gold nanoparticles. *Langmuir.*, **19**: 6277–6282.
- Kumar, A., Vemula, P. K., Ajayan, P. M. and John, G., 2008. Silver-nanoparticle-embedded antimicrobial paints based on vegetable oil. *Nature Materials.*, **7 (3)**: 236-41.
- Kumar, S. K., Tamura, I. B., Jakobsen and Nei, M., 2001. MEGA2: Molecular evolutionary genetics analysis software. *Bioinformatics.*, **17**: 244-1245.
- Kureshy, N. and Davis, D.A., 2002. Protein requirement for maintenance and maximum weight gain for the Pacific white shrimp, *Litopenaeus vannamei*. *Aquaculture.*, **204**: 125-143.
- Kuster, E. and Williams, S. T., 1964. Production of hydrogen sulphide by *Streptomyces* and methods for its detection. *Appl. Microbiol.*, **12**: 46-52.
- Kuster, E., 1963. Morphological and physiological aspects of the taxonomy of *Streptomyces*. *Microbiol. Espanola.*, **16**: 193-202.
- Lacey, J. and Goodfellow, M., 1975. A novel actinomycete from sugar cane bagasse: *Saccharopolyspora hirsuta* gen. et sp. nov. *J. Gen. Microbiol.*, **88**: 75-85.  
[http://ipvgen.unipv.it/~biblio/journal\\_general\\_microbiology.html](http://ipvgen.unipv.it/~biblio/journal_general_microbiology.html).

- Lakshmanaperumalsamy, P., 1978. Studies on actinomycetes with special reference to antagonistic *Streptomyces* from sediments of Porto Novo Coastal Zone. Ph.D. Thesis., Annamalai University, Tamilnadu, India.
- Landsdown, A. B. G., 2002. Silver I: its antibacterial properties and mechanism of action. *J.Wound Care.*, **11**: 125–38.
- Lanoot, B., Vancanneyt, M., Cleenwerck, I., Wang, L., Li, W., Liu, Z. and Swings, J., 2002. The search for synonyms among *Streptomyces* by using SDS-PAGE of whole-cell proteins. Emendation of the species *Streptomyces aurantiacus*, *Streptomyces cacaoi* subsp. *cacaoi*, *Streptomyces caeruleus* and *Streptomyces violaceus*. *Int. J. Syst. Evol. Microbiol.*, **52**: 823-829.
- Lara-Flores, M., Olvera-Novoa, M. A., Guzman-Mendez, B. E. and Lopez-Madrid, W., 2003. Use of the bacteria *Streptococcus faecium* and *Lactobacillus acidophilus* and the yeast *Saccharomyces cerevisiae* as growth promoters in Nile Tilapia (*Oreochromis niloticus*). *Aquaculture.*, **216**: 193-201.
- Lazovskaya, A. L., Vorobeva, Z. G., Slinina, K. N., Kulchitskaya, M. A. and Grishina, N. V., 2009. Effectiveness of spore probiotics with to Mycobacteria and Nocardioform Actinomycetes. *Russ. Agri. Sci.*, **35** (1): 59-61.
- Lazzarini, A., Cavaletti, L., Toppo, G. and Marinelli, F., 2000. Rare genera of *Actinomycetes* as potential producers of new antibiotics. *Antonie van Leeuwenhoek.*, **78**: 399-405.
- Leaper, D. L., 2006. Silver dressings: their role in wound management. *Int. Wound J.*, **3** (4): 282–94.
- Lechevalier, M. P. and Lechevalier, H., 1970. Chemical composition as a criterion in the classification of aerobic *Actinomycetes*. *Int. J. Sys. Bacteriol.*, **20**: 435-443.
- Lengke, M., Fleet, M. and Southam, G., 2006. Biosynthesis of silver nanoparticles by filamentous cyanobacteria from a silver (I) nitrate complex. *Langmuir.*, **10**: 1021-30.
- Lewis, R. J., Tsai, F. T. F. and Wigley, D. B., 1996. Molecular mechanisms of drug inhibition of DNA gyrase. *Bioessays.*, **18**: 661-671.
- Li, M. G. Li, W. J., Xu, P., Cui, X. L., Xu, L. H. and Jiang, C. L., 2003. *Nocardiopsis xinjiangensis* sp. nov., a halophilic actinomycete isolated from saline soil sample in China. *Int. J. Syst. Evol. Microbiol.*, **53**: 317-321.

- Li, W. J., Kroppenstedt, R. M., Wang, D., Tang, S. K., Lee, J. C., Park, D. J., Kim, C. J., Xu, L. H. and Jiang, C. L., 2006. Five novel species of the genus *Nocardiopsis* isolated from hypersaline soils and emended description of *Nocardiopsis salina* Li et al. 2004. *Int. J. Syst. Evol. Microbiol.*, **56**: 1089-1096.
- Li, Y., Leung, P., Song, Q. W. and Newton, E., 2006. Antimicrobial effects of surgical masks coated with nanoparticles. *J Hosp Infect.*, **62**: 58–63.
- Liangwei, D., Hong, J., Xiaohua, L. and Erkang, W., 2007. Biosynthesis of gold nanoparticles assisted by *Escherichia coli DH5α* and its application on direct electrochemistry of hemoglobin. *Electrochem. Commun.*, **9**: 1165-70.
- Lingappa, Y. and Lockwood, J. L., 1961. A Chitin medium for isolation, growth and maintenance of *Actinomycetes*. *Nature.*, **189**: 158-159.
- Liu, Z. and Yamei, Z., 1996. *Streptomyces scopiformis* sp. nov. *Actinomycetes.*, **7(1)**: 1-3.
- Lowery, O. H., Rosebrough, N. J., Farr, A. L. and Randall, R. J., 1951. Protein measurement with the Folin phenol reagent. *J. Biol. Chem.*, **193**: 265-275.
- Ma, D., Forsythe, P. and Bienenstock, J., 2004. Live *Lactobacillus reuteri* is essential for the inhibitory effect on tumor necrosis factor alpha-induced interleukin-8 expression. *Infec. Immunity.*, **72**: 5308–5314.
- Madigne, M. T., Martiko, J. M. and Parker, J., 1997. Antibiotics: Isolation and Characterization, In: brock biology of microorganisms, 8<sup>th</sup> ed. Prentice-hall international inc. New Jersey., 440 - 442.
- Maeda, M. and Liao, L. C. 1992. Effect of bacterial population on the growth of a prawn larva, *Penaeus monodon*. *Bull. Nat. Res. Ins. Aquaculture.*, **21**: 25-29.
- Maiese, W. M., Lechevalier, M. P., Lechevalier, H. A., Korshalla, J., Goodman, J., Wildey, M. J., Kuck, N. and Greenstein, M., 1989. LL-EI085, a novel antibiotic from *Micromonospora citrea*: taxonomy, fermentation and biological activity. *J. Antibiot.*, **42**: 846-851.
- Maldonado, L. A., Fenical, W., Jensen, P. R., Kauffman, C. A., Mincer, T. J., Wards A. C., Bull, A. T. and Goodfellow, M., 2005. *Salinispora arenicola* gen. nov., sp. nov. and *Salinispora tropica* sp. nov., obligate marine actinomycetes belonging to the family *Micromonosporaceae*. *Int. J. Syst. Evol. Microbiol.*, **55**: 1759-1766.

- Mancy, D., Ninet, L. and Preud'Homme, J., 1974. Antibiotic 18631 RP. U. S. patent 3,793,147.
- Mandal, S., Phadtare, S. and Sastry, M., 2005. Bacterial mediated extracellular synthesis of metallic nanoparticles. *Curr. Appl. Phys.*, **5**: 118–127.
- Maneerung, T., Tokura, S. and Rujiravanit, R., 2008. Impregnation of silver nanoparticles into bacterial cellulose for antimicrobial wound dressing. *Carbo Poly.*, **72 (1)**: 43–51.
- Mann, S., 1996. Biomimetic materials chemistry. VCH Publishers, New York.
- Mann, S., 2001. Biomineralization: principles and concepts in bioinorganic materials chemistry, Oxford Uni, Press, Oxford.
- Mansour, S. R., 2003. The occurrence and distribution of soil actinomycetes in Saint catherina area, South Sinai. *Egypt. Pak. Biol. Sci.*, **6 (9)**: 721-728.
- Maplestone, R. A., Stone, M. T. and Williams, D. H., 1996. The evolution role of secondary metabolites – a review. *Gene.*, **115**: 198-192.
- Marshall, M., Beliaev, A., Dohnalkova, A., David, W., Shi, L. and Wang, Z. 2007. c-Type cytochrome-dependent formation of U(IV) nanoparticles by *Shewanella oneidensis*. *PLoS Biol.*, **4 (8)**: 1324-33.
- Matsukama, S., Okuda, J. and Watanabe, J., 1994. Isolation of actinomycetes from pine litter layer., *Actinomycetologica.*, **8**: 57-65.
- Matsumura, Y., Yoshikata, K., Kunisaki, S.I. and Tsuchido, T., 2003. Mode of bactericidal action of silver zeolite and its comparison with that of silver nitrate. *Appl. Environ. Microbiol.*, **69 (7)**: 4278–81.
- Matsuura, T., Abe, Y., Sato, K., Okamoto, K., Ueshige, M. and Akagawa Y., 1997. Prolonged antimicrobial effect of tissue conditioners containing silver zeolite. *J. Dent.*, **25**: 373–7.
- Maxwell, A., 1993. The interaction between coumarin drugs and DNA gyrase. *Mol. Microbiol.*, **9**: 681-686.
- Maxwell, A., 1997. DNA gyrase as a drug target. *Trends Microbiol.*, **5**:102-109.
- Mazmanian, S. K., Round, J. L. and Kasper, D., 2008. A microbial symbiosis factor prevents inflammatory disease. *Nature.*, **53**: 620–625.
- Mc Eroy, C., Jones, W. H. and Rinehart, F. A., 1954. An investigation of the soil microflora of two grassland plots. *Proc. Okla. Acad. Sci.*, **33**: 163-168.
- McCracken, V. J. and Gaskins, H. R., 1999. Probiotic and the immune system. InTannock, G.W., (Ed), Probiotics: A critical review. Horizon Scientific Press. Wymondham. pp. 85-111.

- Mellouli, H., Ben Ameer, M. R., Sioud, S., Salem, M. and Bejan, S., 2003. Isolation, purification and partial characterization of antibacterial activities produced by a newly isolated *Streptomyces* sp. US 24 Strains. *Res. Microbiol.*, **154** (5): 345-352.
- Metsa-Ketela, M., Salo, V., Halo, L., Hautala, A., Hakala, J., Mantsala, P and Ylihonko, K., 1999. An efficient approach for screening minimal PKS genes from *Streptomyces* sp. FEMS. *Microbiol. Letters.*, **180**: 1- 6.
- Meunpol, O., Meejing, P. and Piyatiratitivorakul, S., 2005. Maturation diet based on fatty acid content for male *Penaeus monodon* (Fabricius) broodstock. *Aquacul. Res.*, **36**:1216-1225.
- Mincer, T. J., Jensen, P. R., Kauffman, C. A. and Fenical, W., 2002. Widespread and persistent populations of a major new marine actinomycetes taxon in ocean sediments. *Appl. Environ. Microbiol.*, **68** (10): 5005-5011.
- Mishra, V. and Prasad, D. N., 2005. Application of in vitro methods for selection of *Lactobacillus casei* strains as potential probiotics. *Int. J. Food Microbiol.*, **103**: 109-115.
- Miyadoh, S., Hamada, M., Hotta, K., Kudo, T., Seino, A., Vobis, G. and Yolota, A., 1997. Atlas of Actinomycetes. Asakura Publishing Co. Ltd., Tokyo.
- Mokhtari, N., Daneshpajouh, S., Seyadbagheri, S., Atashdehghan, R., Abdi, K., Sarkar, S., Minaian, S., Shahverdi, H. R. and Shahverdi, A. R., 2009. *Mater. Res. Bull.*, **44**: 1415-1421.
- Monocheva, P., Trishkov, S., Dimitrova, N., Chipeva, V., Nikolva, S.A. and Bogatzevska, N., 2002. Characteristics of soil actinomycetes from Antarctica. *J. Culture collections.*, **3**: 3-14.
- Moriarty, D. J. W., 1996. Probiotics and bioremediation in aquaculture. *Asian Shrimp News.*, **26**: p3.
- Moriarty, D. J. W., 1998. Control of luminous *Vibrio* species in aquaculture ponds. *Aquaculture.*, **164**: 351-358.
- Moron, R., Gonzalez, I. and Genilloud, O., 1999. New genus-specific primers for the PCR identification of members of the genera *Pseudonocardia* and *saccharopolyspora*. *Int. J. Syst. Evol. Microbiol.*, **49**: 149-162. DOI: 10.1099/00207713-49-1-149
- Morones, J. R., Elechiguerra, J. L., Camacho, A. and Ramirez, J. T., 2005. The bactericidal effect of silver nanoparticles. *Nanotechnol.*, **16**: 2346–53.



- Moyer, C. A., Brentano, L., Gravens, D. L., Margraf, H. W. and Monafó, W. W., 1965. Treatment of large human burns with 0.5% silver nitrate solution. *Arch. Surg.*, **90**: 812–67.
- MPEDA, 2006. Media campaign on “Welfare Schemes of Central Government Gopichettipalayam on 27 and 28 of January.
- Mukherjee, P., Ahmad, A., Mandal, D., Senapati, S., Sainkar, S.R. and Khan, M.I., 2001. Fungus mediated synthesis of silver nanoparticles and their immobilization in the mycelial matrix: a novel biological approach to nanoparticle synthesis. *Nano Lett.*, **1**: 515-9.
- Mukherjee, P., Roy, M., Mandal, B., Dey, G., Mukherjee, P. and Ghatak, J., 2008. Green synthesis of highly stabilized nanocrystalline silver particles by a non-pathogenic and agriculturally important fungus *T. asperellum*. *Nanotechnol.*, **19**: 75103-10.
- Mulvaney, P., 1996. Surface plasmon spectroscopy of nanosized metal particles. *Langmuir*. **12**: 788-800.
- Munro, M. H. G., Stroshare, R. M. and Rinehart, K. L. Jr., 1982. Location of guanidine and ureido groups in bluansomycin from <sup>13</sup>C NMR Spectra of Streptomycin and related compounds. *J. Antibiot.*, **35 (10)**: 1331-1337.
- Muthurayar, T., Sivakumar, K., Sahu, M., Thangaradjou, T. and Kannan, L. 2006. Mutational effects on the antibacterial activity of some marine actinomycetes isolated from *Chanos chanos* (Forskai, 1775). *Environ. Ecol.*, **24 (1)**:46-50.
- Nadaraj, P., 1996. Isolation and characterization of an antifungal agent from an indigenous *Streptomyces* sp. M.Sc, Thesis, University of Malaya, Kuala Lumpur, Malaysia.
- Nadson, G. A., 1903. Microorganisms, kak geologitsheskie dieiatien: Comm. Inv. Salvia mineral lakes, St. Petersburg.
- Nair, B. and Pradeep, T., 2002. Coalescence of nanoclusters and formation of submicron crystallites assisted by *Lactobacillus* strains. *Cryst. Growth Des.*, **2**: 293-8.
- Nakano, T., Miyake, K., Ikeda, M., Mizukami, T. and Katsumata, R., 2000. Mechanism of the incidental production of a melanin-like pigment during 6-demethylchlortetracycline production in *Streptomyces aureofaciens*. *Appl. Environ. Microbiol.*, **66**: 1400- 1404.
- Nanda, A. and Saravanan, M., 2009. Biosynthesis of nanoparticles from *Staphylococcus aureus* and its antimicrobial activity against MRSA and MRSE. *Nanomedicine.*, 1-5.

- Newman, D. J. and Cragg, M.G., 2007. Natural products as sources of new drugs over the last 25 years. *J. Nat. Prod.*, **70**: 461-477.
- Nikawa, H., Yamamoto Hamada, T., Rahardjo, M. B. and Murata Nakaando, S., 1997. Antifungal effect of zeolite-incorporated tissue conditioner against *Candida albicans* growth and/or acid production. *J. Oral Rehabil.*, **25**: 30-357.
- Nikhil, S., Shaligram., Mahesh Bule., Rahul Bhambure., Rekha, S., Singhal., Sudheer Kumar Singh., George Szakacs. and Ashok Pandey., 2009. Biosynthesis of silver nanoparticles using aqueous extract from the compactin producing fungal strain. *Process Biochem.*, **44**: 939-943.
- Nikoskelainen, S., Salminen, S., Bylund, G. and Ouwehand, A., 2001. Characterization of the properties of human and dairy derived probiotics for prevention of infectious diseases in fish. *Appl. Environ. Microbiol.*, **67**: 2430-2435.
- Ninawe, A. S. and J. Selvin., 2009. Probiotics in shrimp aquaculture: Avenues and challenges. *Crit. Rev. Microbiol.*, **35**: 43-66.
- Ninet, L., Benazet, F. and Charpentié, Y., 1972. Clorobiocin (18.631 R.P.), a new chlorinated antibiotic produced by several *Streptomyces species*. *Acad. Sci. Ser. C.*, **275**: 455-458.
- Nino-Martinez, N., Martinez-Castanon, G. A, Aragon-Pina A, Martinez-Gutierrez, F., Martinez-Mendoza, J.R. and Ruiz, F., 2008. *Nanotechnol.*, **19 (6)**: 065711/1-065711/8.
- Nishio, M., Tomatsy, K., Konishi, M., Tomita, K., Oki, T. and Kawognuni, H., 1989. Karnamicin, a complex of new antifungal antibiotics, Taxonomy, Fermentation, Isolation and Physiochemical and Biological properties. *J. Antibiot.*, **XLII (6)**: 852-868.
- Nonomura, H., 1974. Key for classification and identification of 458 species of the *Streptomyces* included in ISP. *J. Ferment. Technol.*, **52(2)**: 78-92.
- Novella, I. S., Marin, I. and Sanchez, J., 1996. Restriction analysis of actinomycetes chromosomal DNA. *Can. J. Microbiol.*, **42**: 201-206.
- O'Donnell, A. G., Embley, T. M. and Goodfellow, N., 1993. Future of bacterial systematic, In Hand book of new bacterial systematic, London, Academic press, pp 513-524.
- Oblisami, G., 1965. Comparative studies on the microflora of some soil types of South India, with particular reference to their actinomycetes population and their antagonistic propeties. Ph.D Thesis, Annamalai University, TamilNadu, India, pp 181.

- Okami, Y., 1952. Utilization of nitrogen compounds by Streptomycetaceae and its application to classification. *Japan J. Med. Sci. Biol.*, **5**: 265-275.
- Okazaki, T. and Okami, Y., 1972. Studies on marine organisms II. Actinomycetes in Sagami Bay and their antibiotic substances. *J. Antibiot.*, **25**: 461-466.
- Olmos, S. J., 2003. Molecular characterization and phylogenetic identification of marine microorganisms. X Congreso Nacional de Biotecnología y Bioingeniería. Puerto Vallarta, Jalisco, México.
- Olmos, S. J., Bolanos, V., Causey, S., Ferrari, E., Bolivar, F. and Valle, F., 1996. A functional SpoOA is required for maximal aprE expression in *Bacillus subtilis*. *FEBS Lett.* **381**: 29–31.
- Olmos, S. J., De Anda, R., Ferrari, E., Bolivar, F. and Valle, F., 1997. Effects of the sinR and degU32 (Hy) mutations on the regulation of the aprE in *Bacillus subtilis*. *Mol. Gen. Genet.* **253**: 562–567.
- Olmos, S. J., Sanchez, G. A. and DeAnda, R., 1998. Regulations of the aprE (subtilisin) gene in abrB mutants of *Bacillus subtilis*. *Asia Pac. J. Mol. Biol. Biotechnol.* **6**: 97–103.
- Omura, S. 2002. Macrolide antibiotics: chemistry, biology, and practice. Academic Press, New York, USA.
- Omura, S., Mamada, H., Wang, N. S., Imamura, N., Oiwa, R. and Iwai, Y., 1984. Takaokamycin, a new peptide antibiotic produced by *Streptomyces* sp. *J. Antibiot.*, **37(7)**: 700-705.
- Ortiz, L., Bojalil, L.F. and Yakoleff, V. (eds) Biological, biochemical and biomedical aspects of actinomycetes. *Academic, NY*, pp 453–472.
- Oskay, M., Tamer, A.U. and Azeri, C., 2004. Antibacterial activity of some actinomycetes isolated from farming soils of Turkey. *African J. Biotechnol.*, **3 (9)**: 441-446.
- Otte, J.M. and Podolsky, D.K., 2004. Functional modulation of enterocytes by gram-positive and gram-negative microorganisms. *Am. J. Physiol. Gastrointest. Liver Physiol.*, **286**: G613–G626.
- Ouhdouch, Y., Babrekar, P. G. and Finance, C., 2001. Actinomycetes of moroccan habitats isolation and screening for antifungal activities. *Europ. J. Soil Biol.*, **37 (2)**: 69-74.

- Oyewumi, M. O., and Mumper, R. J., 2004. Comparison of cell uptake, biodistribution and tumor retention of folate-coated and PEG-coated gadolinium nanoparticles in tumor-bearing mice. *J. Control. Rel.*, **24**: 613–626.
- Pagani, H. and Parenti, F., 1978. Kineosporia a new genus of the order actinomycetales, *Int. J. Syst. Bacteriol.*, **28** (3):401-406.
- Pal, S., Tak, Y. K. and Song, J. M., 2007. Does the antibacterial activity of silver nanoparticles depend on the shape of the nanoparticle? A study of the gram-negative bacterium *Escherichia coli*. *Appl. Environ. Microbiol.*, **27** (6): 1712–20.
- Panigrahi, A., Kiron, V., Kobayashi, T., Puangkaew, J., Satoh, S. and Sugita, H., 2004. Immune response in rainbow turbot *Oncorhynchus mkiss* induced by a potential probiotics bacteria *Lactobacillus rhamnosus* JCM1136. *Vet Immunol. Immunopathol.*, **102**: 379-388.
- Parikh, R. P., Singh, S., Prasad, B. L. V., Patole, M. S., Sastry, M. and Shouche, Y. S., 2008. Extracellular synthesis of crystalline silver nanoparticles and molecular evidence of silver resistance from *Morganella* sp.: towards understanding biochemical synthesis mechanism. *Chembiochem.*, **9** (9): 1415-22.
- Parker, R. B., 1974. Probiotics, the other half of the antibiotics story. *Anim Nutr Health.*, **29**: 4–8.
- Paul, A.K. and Banerjee, A.K., 1984. Antifungal actinomycetes in soils of west Bengal. *Hindustan Antibiot. Bull.*, **26** (1-2): 18-22.
- Peto, G., Molnar, G.L., Paszti, Z., Geszti, O., Beck, A. and Gucci, L., 2002. Electronic structure of gold nanoparticles deposited on SiOx/Si. *Mater. Sci. Eng. C.*, **19**: 95-99.
- Pimprikar, P. S., Joshi, S. S., Kumar, A. R., Zinjarde, S. S. and Kulkarni, S. K., 2009. Influence of biomass and gold salt concentration on nanoparticle synthesis by the tropical marine yeast *Yarrowia lipolytica* NCIM 3589. *Colloids Surf. B: Biointerfaces.*, **74**: 309-316.
- Pisano, M. A., Sommer, M. J. and Brancacci, L., 1989. Isolation of bioactive actinomycetes from marine sediments using rifampicin. *Appl. Microbiol. Biotechnol.*, **31**: 609-612.
- Porter, J. N., Wilhelm, J. J. and Simpson, R. B., 1969. Useful criteria for studying the distribution of *Streptomyces* in soils. *In developments in industrial Microbiology, III. Plenum press, Inc., Newyork.* Pp 240-244.

- Prapthu, N. M., Nazar, A. R., Rajagopal, S. and Ajmal Khan, S., 1999. Use of probiotics in water quality management during shrimp culture. *J. Aquacult. Trop.*, **14**: 227-236.
- Pridham, T. G. and Gottlieb, P., 1948. The utilization of carbon compounds by some actinomycetes as an acid for species determination. *J. Bacteriol.*, **56**: 170-184.
- Pridham, T. G. and Tresner, H. D., 1974. Streptomycetaceae, In Bergey's manual of Determinative Bacteriology (8<sup>th</sup>Edn), the Williams and Wilkins Co., Baltimore, U.S.A, pp 747.
- Pridham, T. G., Hesseltines, C. W. and Benedict, R. G., 1958. A guide for the classification of Streptomycetes according to selected groups. *Appl. Microbiol.*, **6**: 52-79.
- Prosser, B. L. T. and Palleroni, N.J., 1978. Nutritional characterization of some selected actinomycetes. *Int. J. Syst. Bacteriol.*, **28 (4)**: 516-522.
- Raimondi, F., Scherer, G. G., Kotz, R. and Wokaun, A., 2005. Nanoparticles in energy technology: examples from electrochemistry and catalysis. *Angew. Chem. Int. Ed.*, **44**: 2190-209.
- Rajendran, M., 1973. A guide to the study of freshwater Calanoids. *J. Madurai Kamaraj University, India*.**1**:1-86.
- Rajinikanth, T., Ramasamy, P. and Ravi, V., 2010. Efficacy of probiotics, growth promoters and disinfectant in shrimp grow out farms. *World J. Fish & Mar. Sci.*, **2 (3)**: 208-215.
- Ramanathan, N., Padmavathy, P., Francis, T., Athithian, S. and Selvaranjitham, N., 2005. Manual on polyculture of tiger shrimp and crops in freshwater, Tamil Nadu Veterinary and animal sciences University. Fisheries College and Res. Institute, Thothukudi, pp-1-161.
- Ravi, V., Ajmalkhan, S., and Rajagopal, S., 1998. Influence of probiotics on growth of Indian white prawn *Penaeus indicus*. *J. Sci. Id. Res.*, **57 (10-11)**: 752-756.
- Raytaopadar, S. and Paul, A. K., 2001. Production of an antifungal antibiotic by *Streptomyces aburariensis* 1DA-28. *Microbiol. Res.*, **155 (4)**: 315-329.
- Rehacet, Z., 1959. Isolation of actinomycetes and determination of the number of their spores in soil. *Microbiol. USSR*, **28**:220-225.
- Rengpipat, S., Phianphak, W., Piyatiratitivorakul, S. and Menasveta, P., 1998. Effects of a probiotic bacterium on black tiger shrimp *P. monodon* survival and growth. *Aquaculture.*, **167**: 301-313.

- Retchkiman-Schabes, P. S., Canizal, G., Becerra-Herrera, R., Zorrilla, C., Liu, H. B. and Ascencio, J. A., 2006. Biosynthesis and characterization of Ti/Ni bimetallic nanoparticles. *Opt. Mater.*, **29**: 95–9.
- Richard, J. W., Spencer, B. A., McCoy, L. F., Carina, E., Washington, J. and Edgar, P., 2002. Acticoat versus silverlon: the truth. *J. Burns. Surg. Wound Care*, **1**: 11–20.
- Riva, E., Gastaldo, L., Beretta, M. G., Ferrari, P., Zerilli, L. F., Cassani, G., Selva, E., Goldstein, B.P., Berti, M., Parenti, F. and Denaro, M., 1989. A42867. A novel glycopeptides antibiotic. *J. Antibiot.*, **XLII (4)**: 497-505.
- Rossi-Doria, T., 1891. Su di alcune specie di “Streptothrix” trivate nelleria et studiate in rapports. *Ann. D’ Igiene (Roma)*., **3**: 399-438.
- Saadoun, I. and Al Momani, F., 1998. Frequency of grey series *Streptomyces* in Jordan Soils. *Actinomycetes.*, **9(3)**: 61-65.
- Sabry, S. A., Ghanem, N. B., Abu-Ella, G. A. Schumann, P., Stackebrandt, E. and Kroppenstedt, R. M. 2004. *Nocardiopsis aegyptia* sp. nov., isolated from marine sediment. *Int. J. Syst. Evol. Microbiol.*, **54**: 453-456.
- Sadowski, Z. and Maliszewska, I., 2008. Synthesis of silver nanoparticles using microorganisms. *Material Science Poland.*, **26 (2)**: 419–24.
- Sadowski, Z., Maliszewska, I., Polowczyk, I., Kozlecki, T. and Grochowalska, B., 2008. Biosynthesis of colloid-silver particles using microorganisms. *Polish J. Chem.*, **82 (1/2)**: 377–82.
- Sahin, N. and Ugar, A., 2003. Investigation of the antimicrobial activity of some isolates. *Turk. J. Biol.*, **27**: 79-84.
- Sahu, M. K., Murugan, M., Sivakumar, K., Thangaradjou, T. and Kannan, L., 2007. Occurrence and distribution of actinomycetes in marine environs and their antagonistic activity against bacterial that is pathogenic to shrimps. *The Israeli J. Aquacult.*, **59 (3)**: 155-161.
- Sahu, M. K., Sivakumar, K. and Kannan, L., 2005. Isolation of actinomycetes from various samples of the Velluar estuary, Southeast coast of India. *Poll Res.*, **24**: 45-48
- Sahu, M.K., Sivakumar, K., Poorani, E., Thangaradjou, T. and Kannan, L. 2007(a). Studies on L-asparaginase enzyme of actinomycetes isolated from estuarine fishes. *J. Environ. Bio.*, **28 (2)**: 465-474.

- Salinas, I., Cuesta, A., Esteban, M. A. and Meseguer, J., 2005. Dietary administration of *Lactobacillus delbrueckii* and *Bacillus subtilis*, single or combined on gilthead seabream cellular innate immune responses. *Fish Shellfish Immunol.*, **19**: 67-77.
- Salminen, S., Isolauri, E. and Salminen, E., 1996. Clinical uses of probiotics for stabilizing the gut mucosal barrier: successful strains and future challenges. *Antonie van Leeuwenhoek.*, **70**: 347–358.
- Salzman, N. H., Ghosh, D., Huttner, K. M., Paterson, Y. and Bevins, C. L., 2003. Protection against enteric salmonellosis in transgenic mice expressing a human intestinal defensin. *Nature.*, **422**: 522–526.
- Sambasivam, S., Chandran, R. and Ajmalkhan, S., 2003. Role of probiotics on the environment of shrimp pond. *J. Fish.*, **47**: 209-213.
- Sampath, V. and Vinithkumar, N. V., 2004. Novel natural products from marine organisms. *Adv. Biotechnol.*, **3**: 17-22.
- Sankar, G., Elavarasi, A., Sakkaravarthi, K. and Ramamoorthy., K.2011. Biochemical changes and growth performance of Black Tiger shrimp larvae after using *Ricinus communis* extract as Feed additive. *I. J. PharmTech Res.*, **3(1)**: 201-208.
- Sastry, M., Ahmad, A., Khan, M. I. and Kumar, R., 2003. Biosynthesis of metal nanoparticles using fungi and actinomycete. *Curr. Sci.*, **85 (2)**: 162–170.
- Sastry, M., Ahmad, A., Khan, M. I. and Kumar, R., 2004. Microbial nanoparticle production. In: Niemeyer, C.M. Mirkin, C.A. (eds) *Nanobiotechnology. Wiley-VCH, Weinheim, Germany*, pp 126–135.
- Sathya Sadhasivam, Parthasarathi Shanmugam and KyuSik Yun., 2010. Biosynthesis of silver nanoparticles by *Streptomyces hygroscopicus* and antimicrobial activity against medically important pathogenic microorganisms. *Colloids Surf. B: Biointerfaces.*, **81 (1)**: 358-362.
- Schatz, A., Bugie, E. and Waksman, S. A., 1944. Streptomycin, a substance exhibiting antibiotic activity against gram positive and gram negative bacteria. *Proc. Soc. Exp. Biol. Med.*, **55**: 66-69.
- Schimana, J., Fiedler, H. P., Groth, I., Subth, R., Beil, W., Walker, M. and Zeeck, A., 2000. Simocyclinones, novel cytostatic angucyclinone antibiotics produced by *Streptomyces antibioticus* Tü 6040. I. Taxonomy, fermentation, isolation and biological activities. *J. Antibiot.*, **53**: 779-787.

- Schippers, A., Bosecker, K., Willscher, S., Sproer, C., Schumann, P. and Kroppenstedt, R. M., 2002. *Nocardiopsis metallicus* sp. nov., a metal-leaching actinomycete isolated from an alkaline slag dump. *Int. J. Syst. Evol. Microbiol.*, **52**: 2291-2295.
- Schloss, P. D. and Handelsman, J., 2004. Status of the microbial census. *Microbiol. Mol. Biol. Rev.*, **68**: 686-691.
- Semedo, L. T. A. S., Linhare, A. A., Gomes, R. C., Manfio, G. P., Alviano, C. S., Linhares, L. F. and Coeio, R. R. R., 2001. Isolation and characterization of actinomycetes from Brazilian tropical soils. *Microbiol. Res.*, **155 (4)**: 291-299.
- Sen, G. P. and Nandi, P. N., 1958. Production of an antibiotic substance from a strain of *Streptomyces* sp. AC3(203). In Antibiotics their production, utilization and mode of action. Council of scientific and Industrial Research New Delhi (ed.), Symposium. The Hindustan Antibiotics. Pvt. Ltd.
- Senapati, S., Mandal, D., Ahmad, A., Khan, M. I., Sastry, M. and Kumar, R., 2004. Fungus mediated synthesis of silver nanoparticles: a novel biological approach. *Ind. J. Phys.*, **78**:101-105
- Shahverdi, A. R., Fakhimi, A., Shahverdi, H. R. and Minaian, S. 2007. Synthesis and effect of silver nanoparticles on the antibacterial activity of different antibiotics against *S. aureus* and *E. coli*. *Nanomedicine.*, **3**: 168-71.
- Shaligram, N. S., Singh, S. K., Singhal, R. S., Szakacs, G. and Pande, A., 2009. Effect of pre-cultural and nutritional parameters on compactin production by soil- state fermentation. *J. Microbiol. Biotechnol.*doi:10.4014/jmb.0805.324.
- Sharma, O. P. and Bhukhar, S. K. S., 2000. Effect of aquazyn-TM-1000, a probiotic on the water quality and growth of *Cyprinus carpio* var, communis (L.). *Ind. J. Fish.*, **47**: 209-213.
- Shiau, S.Y., 1998. Nutrient requirements of penaeid shrimps. *Aquaculture.*, **164**: 241-250.
- Shimizu, M., Nakagawa, Y., Sato, Y., Furumai, T., Igarashi, Y., Onaka, H., Yoshida, R. and Kunch, H., 2000. Studies on endophytic actinomycetes (1) *Streptomyces* sp. isolated from Rhododendron and its antimicrobial activity. *J. Gen. Pl. Patho.*, **66(4)**: 360-366.
- Shindo, K., Kamishohara, M., Odagawa, A., Matsuoka, M. and Kawai, H., 1993. Vicenistatin, a novel 20-membered macrocyclic lactum antitumour antibiotic. *J. Antibiot.*, **46 (7)**: 1076-1081.



- Shinobu, R., 1958. Physiological and cultural study for the identification of soil actinomycetes species. *Mem. Osaka Univ. Bot. Nat. Sci.*, **7**: 1-76.
- Shiying, H., Zhirui, G., Zhanga, Y., Zhanga, S., Wanga, J. and Ning, G., 2007. Biosynthesis of gold nanoparticles using the bacteria *Rhodopseudomonas capsulata*. *Mater. Lett.*, **61 (18)**: 3984-7.
- Shriling, E. B. and Gottlieb, D., 1996. Methods for characterization of *Streptomyces* species. *Int. J. Syst. Biotechnol.*, **16**: 312-340.
- Shrivastava, S., Bera, T., Roy, A., Singh, G., Ramachandrarao, P. and Dash, D., 2007. Characterization of enhanced antibacterial effects of novel silver nanoparticles. *Nanotechnol.*, **18**:103–12.
- Siewert, G. and Kieslich, K., 1971. Preparation and Ultraviolet light induced transformation of an antifungal mixture of heptanes antibiotics of *Streptomyces surinam*. *Appl. Microbiol.*, **21 (6)**: 1007-1010.
- Singh, M. P., Petersen, P. J., Weiss, W. S., Janse, J. E., Luckman, S. W., Lenoy, E. B., Bradford, P. A., Testa, R. T. and Greensterin, M. 2003. Mannepeptimycins, new cyclic glycopeptide antibiotics produced by *Streptomyces hygroscopicus* LL.AC 98: antibacterial and metchanistic activity. *Antimicrob. Agen. Chemothery*, **47 (1)**:62-69.
- Sivakumar, J. 2007. Isolation and identification of *Streptomyces* from medicinal plant root soil: An antimicrobial study. M.Phil thesis, Madurai Kamarajar University, Madurai.
- Sivakumar, J., Santhanam, P. and Masilamaniselvam, M. 2011. Antimicrobial activity of actinomycetes isolated from the western ghats of Tamil Nadu. *Int. J. Pharma and BioSci.*, **2 (1)**: 42-49.
- Sivakumar, J., Sivakumar, T., Santhanam, P. and Masilamaniselvam, M. 2010. Effect of mutation on antimicrobial activity of actinomycetes from Western Ghats of India. *Middle-east J. Scientific Res.*, **6 (1)**: 37-44.
- Sivakumar, K., 2001. Actinomycetes of an Indian Mangrove (Pitchavaram) environment: An Inventory, Ph.D Thesis Annamalai University, India.
- Sivakumar, K., Sahu, M. K. and Kathirasan, K. 2005. Isolation of actinomycetes from the mangrove environment of the southeast coast of India. *Eco. Env. & Cons.*, **11 (3-4)**: 355-357.

- Skinner, F.A., 1951. A method for distinguishing between viable spores and mycelia fragment of actinomycetes in soil. *J. Gen. Microbiol.*, **15**: 159-166.
- Skoog, D. A., West, D. M. and Holder, F. J., 1997. Quantitative infra red photometry ND spectrophotometry, In *Fundamentals of analytical Chemistry*, 7<sup>th</sup> edn., Saunders College Publishing Company, Tokyo, pp596.
- Slack, J. M., Landfried, S. and Genenser, M. A., 1969. Morphological, Biochemical and Serological studies on 64 strains of *Actinomyces israeli*. *J. Bacteriol.*, **97**: 873-884.
- Smith, C. G., Dietz, A., Sokolski, W. T. and Savage, G. M., 1956. Streptonivicin, a new antibiotic. I. Discovery and biologic studies. *Anitbiot. & Chemotherapy.*, **6**: 135-142.
- Smith, J. E. 1996. *Biotechnology*, Cambridge, New York, USA.
- Smith, P. and Davey, S., 1993. Evidence for the competitive exclusion of *Aeromonas salmonicida* from fish with stress-inducible furunculosis by a fluorescent *Pseudomonad*. *J. Fish Dise.*, **16**: 521-524.
- Sohng, J. K., Oh, T. J., Lee, J. J. and Kim, C. G., 1997. Identification of a gene cluster of biosynthetic genes of rubradirin substructures in *S. achromogenes* var. *rubradiris* NRRL3061. *Mol. Cells.*, **7**: 674-681.
- Sondi, I. and Salopeak-Sondi, B., 2004. Silver nanoparticles as antimicrobial agent: a case study on *E.coil* as a model for gram negative bacteria. *J. Colloids Interface Sci.*, **275**: 177-182.
- Song, H. Y., Ko, K. K., Oh, L. H. and Lee, B. T., 2006. Fabrication of silver nanoparticles and their antimicrobial mechanisms. *Eur. Cells Mater.*, **11**: 58.
- Song, J., Lee, S. C., Kang, J.W., Beak, H. S. and Sun, J. W., 2004. Phylogenetic analysis of *Streptomyces* spp isolated from potato scab lesions in korea on the basis o 16S rRNA gene and 16S rDNA internally transcribed spacer sequences. *Int. J. Syst. Evol. Microbiol.*, **54**: 203-209.
- Soundarapandian, P. and Gunalan, B., 2006. Recent technology for the survival and production of giant tiger shrimp *Penaeus monodon* along south east coast of India. *Int. J. Zoo. Res.*, **4** (1): 21-27.
- Sourav kundu, Sahu, M. K., Sivakumar, K. and Kannan, L., 2006. Isolation and characterization of extra cellular enzymes producing actinomycetes from the alimentary canal of estuarine fishes. *Asian J. Microbial. Biotech. Env. Sci.*, **8** (4): 811-815.

- Srivibool, R., 2000. Antimicrobial activities of *Actinomadura* isolates from tropical island soils. *Actinomycetes.*, **10**: 10-12.
- Stackebrandt, E. and Ebers, J., 2006. Taxonomic parameters revisited: tarnished gold standards. *Microbiol. Today.*, **33**: 152– 155.
- Stackebrandt, E., Witt, D., Kemmerling, C., Kroppenstedt, R. and Liesack, W., 1991. Designation of Streptomyces 16S and 23S rRNA based target regions for oligonucleotide probes. *Appl. Environ. Microbiol.*, **57 (5)**: 8-1477.
- Steffensky, M., Mühlenweg, A., Wang, Z. X., Li, S. M. and Heide, L., 2000. Identification of the novobiocin biosynthetic gene cluster of *Streptomyces spheroids* NCIB 11891. *Antimicrob. Agents Chemother.*, **44**:1214-1222.
- Strickland, J. D. H., and Parsons, T. R., 1972. A Practical Hand book of Sea Water Analysis. *Bull. Fish. Res. Bd.*, Canada, **167**.310pp
- Subhash, S. K. and Lipton, A. P., 2007. Effects of a probiotic bacterium, *Lactobacillus acidophilus*, on the growth and survival of pearl oyster (*Pinctada margaritifera*) spat. *The Israeli J Aquaculture-Bamidgeh.*, **59**: 127-132.
- Sunilkumar, M. K., 1996. Heterotrophic marine bacteria as supplementary feed for larval *Penaeus monodon*. *NAGA the ICLARMQ*: 23-26.
- Surajit, D., Lyia, P. S. and Ajmal, K. S., 2006. Marine microbial diversity and ecology: importance and future perspective, *Curr. Sci. India.*, **90**: 1325-1335.
- Susan, L. Prescott, M.D. and Bengt Bjorksten., 2007. Probiotics for the prevention or treatment of allergic diseases. *Amer. Acad Allergy, Asthma & Immun.*, **120 (2)**: 255-262.
- Suzuki, K., 1993. Search and discovery of soil microorganisms, which produce new bioactive substances: Selective isolation of microorganisms and their fermentation products. *Actinomycetologica.*, **7**: 107-109.
- Sweeney, R. Y., Mao, C., Gao, X., Burt, J. L., Belcher, A. M. and Georgiou, G., 2004. Bacterial biosynthesis of cadmium sulfide nanocrystals. *Chem. Biol.*, **11**: 1553-9.
- Takahashi, Y., Matsumoto, A., Seino, A., Iwai, Y. and Omura, S., 1996. Rare actinomycetes isolated from desert soils. *Actinomycetologica.*, **10**: 91-97.
- Takeuchi, T., Sawada, H., Tanake, F. and Metsuda, I., 1996. Phylogenetic analysis of *Streptomyces* sp. causing potato scab based on 16S rRNA sequences. *Int. J. Syst. Bacteriol.*, **46 (2)**: 476-479.

- Takizawa, M., Colwell, R. R. and Hill, R. T., 1993. Isolation and diversity of actinomycetes in the Chesa Peake Bay. *Appl. Environ. Microbiol.*, **59** (4): 997-1002.
- Tanaka, Y. and Omura, S., 1990. Metabolism and products of *Actinomycetes*: an introduction. *Actinimucetologica.*, **4**: 13 -14.
- Taniguchi, N., 1974. On the Basic Concept of Nano-Technology. *Proc. Intl. Conf. Prod. Eng. Tokyo, Part II. Japan Society of Precision Engineering.*
- Tannock, G. W., 2005. New perceptions of the gut microbiota: implications for future research. *Gastroenterol. Clinics of North Amer.*, **34**: 361–382.
- Tannock, G. W., Munro, K., Harmsen, H. J., Welling, G. W., Smart, J. and Gopal, P. K., 2000. Analysis of the fecal microflora of human subjects consuming a probiotic product containing *Lactobacillus rhamnosus* DR20. *App. & Environ. Microbiol.*, **66**: 2578–2588.
- Terekhova, L. P., Galatenko, O. A., Alferova, I. V. and Preobrazhenskaia, T. P., 1991. Comparative evaluation of various bacterial growth inhibitors as selective agents for isolation of soil Actinomyces. *Antibiot. Khimioter.*, **36** (10): 5-8.
- Terekhova, L. P., Galatenko, O. A., Kuliaeva, V. V., Tolstykh, I. V., Golova, T. P., Katrukha, G. S., Zhukhmistova, N. E., Khovatova, O. L., Malkina, N. D. and Boikova, I. V., 1992. Production of Griseoviridin and Etamycin by the new culture, *Streptomyces albolongus*. *Antibiot. Khimioter.*, **37** (12): 19-21.
- Tian, J., Wong, K. K. Y., Ho, C. M., Lok, C. N., Yu, W. Y., Che, C. M., Chiu, J. F. and Tam P. K. H., 2007. Topical delivery of silver nanoparticles promotes wound healing. *Chem. Med. Chem.*, **2**: 129–136.
- Timmerman, H. M., Mulder, L., Everts, H., Van Espen, D. C., Van der Wal, E., Klaassen, G., Rouwers, S. M., Hartemink, R., Rombouts, F. M. and Beynen, A. C., 2005. Health and growth of veal calves fed milk replacers with or without probiotics. *J. Dairy Sci.*, **88**: 2154–2165.
- Tims, F. C., 1932. An actinomycetes antagonistic to a pythium root parasite of sugar cane. *Phytopathology.*, **221**: 27.
- Trefzer, A., Salas, J. A. and Bechthold, A., 1999. Genes and enzymes of deoxysugar biosynthesis. *Nat. Prod. Rep.*, **16**: 283-299.

- Tripathy, A., Ashok, M., Raichur., N., Chandresekar., T., Prathna, C., Amitava Mukherjee. 2009. Process variable in biomimetic synthesis of silver nanoparticles by aqueous extract of *Azadirachta indica* (Neem) leaves. *J. Nanopart. Res.* DOI 10,1007/s 11051-009-9602-5.
- Umamaheshwary, K., Sahu, M, K., Sivakumar, K., Thangaradjou, T., Smithra, D. and Kannan, L. 2005. Investigation on L-Glutaminase producing actinomycetes strain LG-33 from the estuarine fish, *Mugil cephalus* (Linnaeus, 1758). *Environent & Ecol.*, **23** (4): 942-947.
- Vanaja kumar, 1979. Studies on actinomycetes associated with mollusks from Port Novo coastal water, Ph.D Thesis Annamalai University, India.
- Vaseeharan, B. and Ramasamy, P., 2003. Control of pathogenic *Vibrio* sp. By *Bacillus subtilis* BT23, a possible probiotic treatment for black tiger shrimp *Penaeus monodon*. *Letters in A. Microbiol.*, **36**: 83–87
- Vaseeharan, B., Lin, J. and Ramasamy, P., 2004. Effect of probiotics, antibiotic sensitivity, pathogenicity and plasmid profiles of *Listonella anguillarum* like bacteria isolated from *P. monodon* culture systems. *Aquaculture.*, **241**: 77-91.
- Verschuere, L., Rombaut, G., Sorgeloos, P. and Verstraete, W., 2000. Probiotic bacteria as a biological control agent in aquaculture. *Mol. Biol. Rev.*, **64**: 655-671.
- Vesselinova, N. and Gesheva, R., 1991. Variability of *Streptomyces spectabilis* 1000. *Actinomycetes.*, **2** (1): 13-17.
- Vigneshwaran, N., Ashtaputre, N. M., Varadarajan, P. V., Nachane, R. P., Paralikar, K. M. and Balasubramanya, R. H., 2007. Biological synthesis of silver nanoparticles using the fungus *Aspergillus flavus*. *Mater. Lett.*, 1413–1418.
- Vigneshwaran, N., Kathe, A. A., Varadarajan, P. V., Nachane, R. P. and Balasubramanya, R. H., 2006. Biomimetics of silver nanoparticles by white rot fungus, *Phaenerochaete chrysosporium*. *Colloids Surf. B: Biointerfaces.*, **53**: 55-9.
- Vijayakumar, R., 2006. Studies on actinomycetes from Palk Strait region of Tamil Nadu coast with reference to antibiotic production. Ph.D., Thesis, Bharathidasan University, India.
- Vijayakumar, R., Muthukumar, C., Ambikapathy, V., Thajuddin, N. and Panneerselvam, A., 2000. Screening of antagonistic isolated from point calimere, TamilNadu, S. India., National Symposium on marine plants, their chemistry and utilization, tuticorin, TamilNadu, India, pp 22, (Abstr.).

- Vijayakumar, R., Muthukumar, C., Thajuddin, N. and Panneerselvam, A., 2005. Screening of antagonistic actinomycetes from east coast of India. VIII National symposium on soil biology in human welfare, Pannaiyah Ramajayam College, Thanjavur, TamilNadu, India, pp 26 (Abstr.).
- Vikineswary, S., Nadaraj, P., Wong, W. H. and Balagurunathan, S., 1997. Actinomycetes from a tropical mangrove ecosystem antifungal activity of selected strains. *Asian Pac. J. Mol. Biol. Biotechnol.*, **5**: 81-86.
- Villamil, L., Figueras, A., Planas, M. and Novoa, B., 2003. Control of *Vibrio alginolyticus* in *Artemia* culture by treatment with bacterial probiotics. *Aquaculture.*, **219**: 43-56.
- Vimal, V., Benita Mercy Rajan, and Kannabiran, K., 2009. Antimicrobial activity of marine actinomycetes, *Nocardioopsis* sp. VITSVK 5 (FJ973467). *Asian J. Medicinal Sci.*, **1(2)**: 57-63.
- Vouloumanou, E. K., Makris, G. C., Karageorgopoulos, D. E. and Falagas, M. E., 2009. Probiotics for the prevention of respiratory track infections: a systemic review. *Int. J. Antimicrobial agents.*, **34**:197.e1-197e10.
- Waksman, S. A. and Curitis, R. E., 1916. The *Actinomycetes*. *Soil Sci.*, **1**: 99-134.
- Waksman, S. A., 1919. Cultural studies of the species of *Actinomyces*. *Soil Sci.*, **8**: 71-215.
- Waksman, S. A., 1937. Associative and antagonistic of microorganisms I. Historical review of antagonistic relationships. *Soil sci.*, **43**: 51-68.
- Waksman, S. A., 1961. The actinomycetes: classification, identification and description of genera and species. Vol. III, Williams and Wilkins Co., Baltimore, U.S.A., pp 363.
- Waksman, S. A., Horning, E. S., Welsch, M. and Woodruff, H. B., 1942. Distribution of antagonistic actinomycetes in nature. *Soil sci.*, **54**: 281-296.
- Waksman, S., 1939. Production and activity of Streptothricin. *J. Bacteriol.*, **45**: 299-310.
- Waksman, S.A., 1943. Production and activity of streptomycin. *J. Bacteriol.* **45**: 299-310
- Waksman, S.A., 1957. Species concept among the actinomycetes with special reference to the genus *Streptomyces*. *Bact. Rev.*, **21**: 1-29.
- Weisburg, W. G., Barns, S. M., Pelletier, D. A. and Lare, D. J., 1991. 16S rDNA amplification for phylogenetic study. *J. Bacteriol.*, **173**:697-703.
- Weyland, H., 1969. *Actinomycetes* in northsea and Atlantic Ocean sediments. *Nature.*, **223**: 858.

- Wilcox, M., Kite, P. and Dobbins, B., 1998. Antimicrobial intravascular catheters-which surface to coat. *J. Hospital Infec.*, **40**: 322-3.
- Wilkenfeld, J. S., 1992. Commercial hatchery status report: an industry panel viewpoint. In: Wyban, J. (Ed.), Proceedings of the special session on shrimp farming. World Aquaculture Society, Baton Rouge, PP.71-86.
- Williams, S. T., Goodfellow, M. and Alderson, G., 1989. Genus *Streptomyces* . In Williams, S.T., Sharpe, M.E. and Holt, J.G. (ed.) Bergey's manual of systematic Bacteriology, Williams and Wilkins, Baltimore., **4**:2452-2492.
- Wilson, K., 1990. Preparation of genomic DNA from bacteria. In current protocol in molecular biology (Ausubel, F. A., Brent, R., Kingstan, R. E., Moore, D. D., Smith, J. A., Seidmen, J. G. and Struhi, K., Eds.), Chapter 2-4, Greene Publishing and Wiley inter Science, Newyork.
- Woese, C.R., 1987. Bacterial evolution. *Microbiol. Rev.*, **51**: 221-271.
- Wood, S., Williams, S. T. and White, W. R., 2001. Microbes as a source of earthy flavours in potable waters. A review. *Int. Biodeterioration.*, **19 (3-4)**: 83-97.
- Wright, L. F. and Hopwood, D. A., 1976. Identification of the antibiotic determined by the SCP1 plasmid of *Streptomyces colicolor* A 3(2). *J. Gen. Microbiol.*, **95**: 96-106.
- Wyban, J. A. and Sweeney, J. N., 1991. Intensive shrimp production technology. The oceanic institute, Honolulu, 158 pp.
- Yeo, S. Y. and Jeong, S. H., 2003. Preparation and characterization of polypropylene silver nanocomposite fibres. *Polymer Int.*, **52**: 1053.
- Yilmaz, M., Soran, H. and Beyarli, Y., 2006. Antimicrobial activities of some *Bacillus* sp.strains isolated from the soil. *Microbial Res.*, **161**: 127-131.
- Yokoda, A., 1997. Phylogenetic relationship of *Actinomycetes*. *Atlas of actinomycetes*, Asakura Publishing co. Ltd., Japan, pp 194-297.
- Yoshiko, O. H., 2003. Activation of potential function in *Streptomyces* for the regulation of secondary metabolism. *Actinomycetol.*, **17**: 67-70.
- You, J. L., Cao, L. X., Liu, G. F., Zhou, S. N., Tan, H. M. and Liu. Y.C., 2005. Isolation and characterization of actinomycetes antagonistic to pathogenic *Vibrio* spp. fom nearshore marine sediments. *World J. Microbiol. Biotechnol.*, **21**: 679-682.

- Zhang, L., Li, N., Caicedo, R. and Neu, J., 2005. Alive and dead *Lactobacillus rhamnosus* GG decrease tumor necrosis factor-alpha-induced interleukin- 8 production in Caco-2 cells. *J. Nutrition.*, **135**: 1752–1756.
- Zhonghui Zheng., Wei Zeng., Yaojiah Huang., Zhiyuan g., Jun Li., Huirong Cai and Wenjin Su., 2000. Detection of antitumor and antimicrobial activities in marine organism associated actinomycetes isolated from the Taiwan strait, China .*FEMS Microbial. let.*, **188**: 87-91.
- Ziaei-Nejad, S., Rezaei, M. H., Takami, G. A., Lovett, D. L., Mirvaghefi, A. R. and Shakouri, M., 2006. The effect of *Bacillus* spp. bacteria used as probiotics on digestive enzyme activity, survival and growth in the Indian white shrimp *Fenneropenaeus indicus*. *Aquaculture.*, **252**: 516-524.
- Zobell, C. E., 1946. Marine Microbiology, Chronica Botanica Co., Waltham, Mass, p. 246.