

References:

- Aggarwal D, Kumar A, Reddy MS (2011) *Agrobacterium tumefaciens* mediated genetic transformation of selected elite clone(s) of *Eucalyptus tereticornis*. *Acta Physiologiae Plantarum* 33:1603-1611
- Aggarwal D, Jaiswal N, Kumar A, Reddy MS (2013) Factors affecting genetic transformation and shoot organogenesis of *Bacopa monnieri* (L.) Wettst. *Journal of Plant Biochemistry and Biotechnology* 22:382-391
- Allan EJ, Stuchbury T, Mordue Luntz AJ (1999) *Azadirachta indica* A. Juss. (Neem Tree): *In vitro* culture, micropropagation and the production of Azadiractine and other secondary metabolites. In: Bajaj YPS (eds.): *Biotechnology in Agriculture and Forestry, Medicinal and Aromatic Plants XI*, Berlin. Springer-Verlag, Vol.43:11-41
- Alpizar E, Dechamp E, Espeout S, Royer M, Lecouls AC, Nicole M, Bertrand B, Lashermes P, Etienne H (2006) Efficient production of *Agrobacterium rhizogenes*-transformed roots and composite plants for studying gene expression in coffee roots. *Plant Cell Reports* 25:959-967
- Al-Qurainy F, Khan S, Nadeem M, Tarroum M, Alaklabi A (2013) Assessment of phylogenetic relationship of rare plant species collected from Saudi Arabia using internal transcribed spacer sequences of nuclear ribosomal DNA. *Genetics and Molecular Research* 12:723-730
- Altman A, Loberant B (1998) Micropropagation: Clonal plant propagation *in vitro*. In: A. Altman, ed. (1998). *Agricultural Biotechnology*. Marcel Dekker, Inc., New York, pp19-42

- Alvarez J, Martín L (2006) Genetic diversity and structure in a natural *Hordeum chilense* population based on gliadin analysis. *Plant Systematics and Evolution* 261:11-18
- Amaral PFF, Almeida APR, Peixoto T, Rocha-Leao, Coutinho JAP, Coelho MAZ (2007) Beneficial effects of enhanced aeration using perfluorodecalin in *Yarrowia lipolytica* cultures for lipase production. *World Journal of Microbiology and Biotechnology* 23:339-344
- Anonymous (1988) Wealth of India, raw materials. Council of Scientific and Industrial Research (CSIR), New Delhi
- Archak S, Gaikwad A, Gautam D, Rao EVV, Swamy KR, Kurihaloo J (2003) Comparative assessment of DNA fingerprinting techniques (RAPD, ISSR and AFLP) for genetic analysis of cashew (*Anacardium occidentale* L.) accessions of India. *Genome* 46:362-369
- Arellano J, Vasquez F, Villegas T, Hernandez G (1996) Establishment of transformed roots cultures of *Perezia cuernavacana* producing the sesquiterpene quinone perezone. *Plant Cell Reports* 15:455-458
- Arjariya A, Chaurasia K (2009) Some medicinal plants among the tribes of Chhatarpur District (M.P.). *ECOPRINT* 16:43-50
- Ashraf M, Hussain M, Ahmad MSA, Al-Qurainy F, Hameed, M (2012) Strategies for conservation of endangered ecosystems. *Pakistan Journal of Botany* 44:1-6
- Atkinson RG, Gardner R (1991) *Agrobacterium*-mediated transformation of pepino and regeneration of transgenic plants. *Plant Cell Reports* 10:208-212
- Bagdonaite E, Martonfi P, Repcak M, Labokas J (2010) Variation in the contents of pseudohypericin and hypericin in *Hypericum perforatum* from Lithuania. *Biochemical Systematics and Ecology* 38:634-640

- Bagdonaite E, Martonfi P, Repcak M, Labokas J (2012) Variation in concentrations of major bioactive compounds in *Hypericum perforatum* L. from Lithuania. *Industrial Crops and Products* 35:302-308
- Bais HP, Suresh B, Ramachandra Rao S, Raghavarao KSMS, Ravishankar GA (2002) Performance of *Cichorium intybus* hairy root cultures in various bioreactor configurations. *In Vitro Cellular and Developmental Biology-Plant* 38:573-580
- Bajaj YPS (1986) Biotechnology of tree improvement for rapid propagation and biomass energy production. *Biotechnology in Agriculture and Forestry, Vol. 1 – Tree*. Springer-verlag, pp. 1-23
- Bammidi SR, Volluri SS, Chippada SC, Avanigadda S, Vangalapati M (2011) A Review on Pharmacological Studies of *Bacopa monniera*. *Journal of Chemical, Biological and Physical Sciences* 1:250-259
- Banerjee M, Shrivastava S (2008) An improved protocol for *in vitro* multiplication of *Bacopa monnieri* (L.). *World Journal of Microbiology and Biotechnology* 24:1355-1359
- Banerjee S, Naqui AA, Mandal S, Ahuja PS (1994) Transformation of *Withania somnifera* (L.) Dunal by *Agrobacterium rhizogenes*. Infectivity and phytochemical studies. *Phytotherapy Research* 8:452-455
- Barik DP, Mohapatra U, Chand PK (2005) Transgenic grasspea (*Lathyrus sativus* L.): Factors influencing *Agrobacterium*-mediated transformation and regeneration. *Plant Cell Reports* 24:523-531
- Barik S, Senapati SK, Aparajita S, Mohapatra A, Rout GR (2006) Identification and genetic variation among *Hibiscus species* (Malvaceae) using RAPD markers. *Zeitschrift fur Naturforsch C* 61:123-128

- Barradas G, Lopez-Bellido RJ (2009) Genotype and planting date effects on cotton growth and production under south Portugal conditions – I. Phenology and growth analysis. *Journal of Food Agriculture and Environment* 7:300-312
- Batra J, Dutta A, Singh D, Kumar S, Sen J (2004) Growth and terpenoid indole alkaloid production in *Catharanthus roseus* hairy root clones in relation to left- and right-termini-linked Ri T-DNA gene integration. *Plant Cell Report* 23:148-154
- Bel-Rhliid R, Chabot S, Piche Y, Chenevert T (1993) Isolation and identification of flavanoids from Ri T-DNA transformed roots (*Daucus carota*) and their significance in vesicular-arbuscular Mycorrhiza. *Phytochemistry* 33:1369-1371
- Benjamin BD, Roja G, Heble MR (1994) Alkaloid synthesis by root cultures of *Rauwolfia serpentina* transformed by *Agrobacterium rhizogenes*. *Phytochemistry* 35:381-383
- Benson EE (1999) *Plant Conservation Biotechnology*. Taylor and Francis Group, UK
- Bergonzi MC, Bilia AR, Gallori S, Guerrini D, Vincieri FF (2001) Variability in the content of the constituents of *Hypericum perforatum* L. and some commercial extracts. *Drug Development and Industrial Pharmacy* 27:491-497
- Bhandari P, Kumar N, Gupta AP, Singh B, Kaul VK (2006) Micro-LC determination of swertiamartin in *Swertia* species and Bacoside-A in *Bacopa monnieri*. *Chromatographia* 64: 599-602
- Bhatia P, Ashwath N (2005) Effect of medium pH on shoot regeneration from the cotyledonary explants of Tomato. *Biotechnology* 4:7-10
- Bhattacharya SK, Ghosal S (1998) Anxiolytic activity of a standardized extract of *Bacopa monniera*: an experimental study. *Phytomedicine* 5:77-82
- Bhattacharya SK, Bhattacharya A, Kumar A, Ghosal S (2000) Antioxidant activity of *Bacopa monniera* in rat frontal cortex, striatum and hippocampus. *Phytotherapy Research* 14:174-179

- Binita BC, Ashok MD, Yogesh TJ (2005) *Bacopa monnieri* (L) Pennell: A rapid, efficient and cost effective micropropagation. *Plant Tissue Culture and Biotechnology* 15:167-175
- Bombardelli E, Morazzoni P (1995) *Hypericum perforatum*. *Fitoterapia* 66:43-68
- Bonga JM, DJ Durzan (1987) Cell and tissue culture in Forestry General Principles and Biotechnology 1: pp 422, Specific principles and methods 2: pp447, Case histories 3:pp 416 Martinus Nijhoff Publishers, Dordrecht, Netherlands. ISBN 90-247-3433-9
- Bose KC, Bose NK (1931) Observations on the actions and uses of *Herpestis monniera*. *Journal of Indian Medical Association* 1:60
- Bourgaud F, Gravot A, Milesi S, Gontier E (2001) Production of plant secondary metabolites: a historical perspective. *Plant Science* 161:839-851
- Bransby DI, Ward CY, Rose PA, Sladden SE, Kee DD (1989) Biomass production from selected herbaceous species in the southeastern USA. *Biomass* 20:187-197
- Brar J, Anand M, Sood A (2013) *In vitro* seed germination of economically important edible bamboo *Dendrocalamus membranaceus* Munro. *Indan Journal of Experimental Biology* 51:88-96
- Briskin DP (2000) Medicinal plants and phytomedicines. Linking plant biochemistry and physiology to human health. *Plant Physiology* 124:507-514
- Brown DCW, Leung DWM, Thorpe TA (1979) Osmotic requirement for shoot formation in tobacco callus. *Physiologia Plantarum* 46:36-41
- Buitelaar RM, Tramper J (1992) Strategies to improve the production of secondary metabolites with plant cell cultures: a literature review. *Journal of Biotechnology* 23:111-143
- Bussel J (1999) The distribution of random amplified polymorphic DNA (RAPD) diversity amongst populations of *Isotoma petraea* (Lobeliaceae). *Molecular Ecology* 8:775-789

- Butler MS (2004) The role of natural product chemistry in drug discovery. *Journal of Natural Products* 67:2141-2153
- Cardillo AB, Giulietti AM, Palazon J, Bonfill M (2013) Influence of hairy root ecotypes on production of tropane alkaloids in *Brugmansia candida*. *Plant Cell, Tissue and Organ Culture* 114:305-312
- Carron TR, Robins MP, Morris P (1994) Genetic modification of condensed tannin biosynthesis in *Lotus corniculatus* L. Heterologous and antisense dihydroflavonol reductase down-regulate tannin accumulation in hairy root cultures. *Theoretical and Applied Genetics* 87:1006-1015
- Carvalho LC, Goulao L, Oliveira C, Goncalves JC, Amancio S (2004) RAPD assessment for identification of clonal identity and genetic stability of *in vitro* propagated chestnut hybrids. *Plant Cell Tissue and Organ Culture* 77:23-27
- Causton DR, Venus JC (1981) *The Biometry of Plant Growth*. London: Edward Arnold.
- Cesar SA, Maxwell SL, Parsad KB, Karithigan M, Ignacimuthu S (2010) Highly efficient shoot regeneration of *Bacopa monnieri* (L.) using a two-stage culture procedure and assessment of genetic integrity of micropropagated plants by RAPD. *Acta Physiologiae Plantarum* 32:443-452
- Chakravarty AK, Sarkar T, Masuda K, Shiojima K, Nakane T, Kawahara N (2001) Bacopaside I and II: two pseudojubilogenin glycosides from *Bacopa monniera*. *Phytochemistry* 58:553-556
- Chakravarty AK, Sarkar T, Nakane T, Kawahara N, Masuda K (2002) New phenylethanoid glycosides from *Bacopa monniera*. *Chemical and Pharmaceutical Bulletin* 50:1616-1618
- Chakravarty AK, Garai S, Masuda K, Nakane T, Kawahara N (2003) Bacopasides III–V: three new triterpenoid glycosides from *Bacopa monniera*. *Chemical and Pharmaceutical Bulletin* 51:215-217

- Chandel RS, Kulshreshtha DK, Rastogi RP (1977) Bacogenin A3: A new sapogenin from *Bacopa monniera*. *Phytochemistry* 16:141-143
- Chandler RF (1969) Plant morphology and stand geometry in relation to nitrogen. In: *Physiological aspects of crop yield*. American Society of Agronomy, Crop Science Society of America. Madison
- Channa S, Dar A, Yaqoob M, Anjum S, Sultani Z, Rahman A (2003) Broncho-vasodilatory activity of fractions of pure constituents isolated from *Bacopa monnieri*. *Journal of ethnopharmacology* 86:27-35
- Channa S, Dar A, Anjum S, Yaqoob M, Rahman A (2006) Anti-inflammatory activity of *Bacopa monniera* in rodents. *Journal of ethnopharmacology* 104:286-289
- Chandra S (2004) Effect of altitude on energy exchange characteristics of some alpine medicinal crops from central Himalayas. *Journal of Agronomy and Crop Science* 190:13-20
- Chandra S, Lata H, Techen N, Mehmadic Z, Khan IA, ElSohy MA (2011) Analysis of Genetic Diversity using SSR markers and Cannabinoid Contents in Different varieties of *Cannabis sativa* (L.). *Planta Medica* 77:5
- Chatterji N, Rastogi RP, Dhar ML (1965) Chemical examination of *Bacopa monniera* Wettst. Part II: The constitution of Bacoside A. *Indian Journal of Chemistry B* 3:24-29
- Chattopadhyay S, Farkya S, Srivastava AK, Bisaria VS (2002) Bioprocess considerations for production of secondary metabolites by plant cell suspension cultures. *Biotechnology and Bioprocess Engineering* 7:138-149
- Chauhan K, Trivedi U, Patel KC (2006) Application of response surface methodology for optimization of lactic acid production using date juice. *Journal of Microbiology and Biotechnology* 16:1410-1415

- Chen HC (1996) Optimizing the concentrations of carbon, nitrogen and phosphorous in a citric acid fermentation with response surface method. *Food Biotechnology* 10:13-27
- Chen JY, Wen CM, Chen TL (1999) Effect of oxygen transfer on lipase production by *Acinetobacter radioresistens*. *Biotechnology and Bioengineering* 62:311-316
- Chen SC, Liu HW, Lee KT, Yamakawa T (2007) High-efficiency *Agrobacterium rhizogenes*-mediated transformation of heat inducible sHSP18.2-GUS in *Nicotiana tabacum*. *Plant Cell Reports* 26:29-37
- Chen W, Guo XH, Gao WY, Chen HX, Huang LQ, Xiao PG (2006) Studies on *in vitro* culture of adventitious root in *Salvia miltiorrhiza*. *China Journal of Chinese Materia Medica* 31:1409-1412
- Cheng H, Yu LJ, Hu QY, Chen SC, Sun YP (2006) Establishment of callus and cell suspension cultures of *Corydalis saxicola* Bunting, a rare medicinal plant. *Zeitschrift fur Naturforsch C*. 61:251-256
- Cho HJ, Widholm JM, Tanaka N, Nakanishi Y, Murooka Y (1998) *Agrobacterium rhizogenes*-mediated transformation and regeneration of the legume *Astragalus sinicus* (Chinese milk vetch). *Plant Science* 138:53-65
- Chopra RN, Nayar L, Chopra IC (1956) *Glossary of Indian Medicinal Plants*, vol. 32. Council of Scientific and Industrial Research, New Delhi
- Chowdhuri DK, Parmar D, Kakkar P, Shukla R, Seth PK, Srimal RC (2002) Antistress effects of bacosides of *Bacopa monnieri*: modulation of Hsp70 expression, superoxide dismutase and cytochrome P450 activity in rat brain. *Phytotherapy Research* 16:639-645
- Christen P, Roberts MF, Phillipson JD, Evans WC (1989) High yield production of tropane alkaloids by hairy root cultures of *Datura candida* hybrid. *Plant Cell Reports* 8:75-77

- Christen P (1999) *Catharanthus* species: *In vitro* culture and the production of valepotriates and other secondary metabolites. In: Bajaj YPS (eds), *Biotechnology in Agriculture and Forestry, Medicinal and Aromatic Plants XI*, Berlin: Springer-Verlag. Vol.43:42-56
- Chun-Xiang Fu, De-Xiu Zhao, Xiao-Feng Xue, Zhi-Ping Jin, Feng Shan Ma (2005) Transformation of *Saussurea involucrata* by *Agrobacterium rhizogenes*: Hairy root induction and syringin production. *Process Biochemistry* 40:3789-3794
- Cirak C, Saglam B, Ayan AK, Kevseroglu K (2006) Morphogenetic and diurnal variation of hypericin in some *Hypericum* species from Turkey during the course of ontogenesis. *Biochemical Systematics Ecology* 34:1-13
- Cirak C, Radusiene J, Karabuk B, Janulis V (2007) Variation of bioactive substances and morphological traits in *Hypericum perforatum* populations from Northern Turkey. *Biochemical Systematics Ecology* 35:403-409
- Cirak C, Radusiene J, Stanius Z, Camas N, Caliskan O, Odabas MS (2012) Secondary metabolites of *Hypericum orientale* L. growing in Turkey: variation among populations and plant parts. *Acta Physiologiae Plantarum* 34:1313-1320
- Coruzzi GM, Zhou L (2001) Carbon and nitrogen sensing and signaling in plants: emerging 'matrix effects'. *Current Opinion in Plant Biology* 4:247-253
- Cruz Cruz A, GonzálezArnao MT, Englemann F (2013) *Biotechnology and Conservation of Plant Biodiversity*. *Resources* 2:73-95
- Cushman KE, Moraes RM, Gerard PD, Bedir E, Silva B, Khan IA (2006) Frequency and timing of leaf removal affect growth and podophyllotoxin content of American may apple in shade. *HortScience* 41:582-582
- D'souza P, Deepak M, Rani P, Kadamboor S, Mathew A, Chandrashekar AP, Agarwal A (2002) Brine shrimp lethality assay of *Bacopa monnieri*. *Phytotherapy Research* 16:197-198

- Darokar MP, Suman PSK, Shasany AK, Kumar S (2001) Low levels of genetic diversity detected by RAPD analysis in geographically distinct accessions of *Bacopa monnieri*. *Genetic Resource and Crop Evolution* 48:555-558
- Das A, Shanker G, Nath C, Pal R, Singh S, Singh H (2002) A comparative study in rodents of standardized extracts of *Bacopa monniera* and *Ginkgo biloba*. *Pharmacology Biochemistry and Behavior* 73:893-900
- Das S, Ray S, Dey S, Dasgupta S (2001) Optimization of sucrose, inorganic nitrogen and abscisic acid and levels for *Santalum album* L. somatic embryo production in suspension culture. *Process Biochemistry* 37:51-56
- Davidson HR, Campbell CA (1984) Growth rates, harvest index and moisture use of Manitou spring wheat as influenced by nitrogen, temperature and moisture. *Canadian Journal of Plant Science* 64:825-839
- Davis L (1993) *Efficiency in Research Development and Production: The Statistical Design and Analysis of Chemical Experiment*. Royal Society of Chemistry, Cambridge
- Deepak M, Sangli GK, Arun PC, Amit A (2005) Quantitative determination of the major saponin mixture bacoside A in *Bacopa monnieri* by HPLC. *Phytochemical Analysis* 16:24-29
- Deus B, Zenk MH (1982) Exploitation of plant cells for the production of natural compounds. *Biotechnology and Bioengineering* 24:1965-1974
- Dhakulkar S, Ganapathi TR, Bhargava S, Bapat VA (2005) Induction of hairy roots in *Gmelina arborea* Roxb. and production of verbascoside in hairy roots. *Plant Science* 169:812-818
- Dharmani P, Patil G (2006) Exploring Indian Medicinal plants of anti-ulcer activity. *Indian Journal of Pharmacology* 38:95-99

- Dhawan BN, Singh HK (1996) Pharmacology of ayurvedic nootropic *Bacopa monniera*. *Int. Conv. Biol. Psychiat.* Bombay
- Dhiman B, Singh M (2003) Molecular detection of Cashew husk (*Anacardium occidentale*) adulteration in market samples of dry tea (*Camellia sinensis*). *Planta Medica* 69:882-884
- Di Cosmo F, Misawa M (1995) Plant cell and tissue culture: alternatives for metabolite production. *Biotechnology Advances* 13:425-435
- Dick JMcP, Bisset H, McBeathC (1996) Provenance variation in rooting ability of *Calliandra calothyrsus*. *Forest Ecology and Management* 87:175-184
- Dixon RA (1999) Plant Natural products: the molecular genetic basis of biosynthetic diversity. *Current Opinion in Biotechnology* 10:192-197
- Donald CM, Hamblin J (1976) The biological yield and harvest index of cereals as agronomic and plant breeding criteria. *Advances in Agronomy* 28:367-405
- Dornenburg H, Knorr D (1997) Challenges and opportunities for metabolite production from plant cell and tissue cultures. *Food Technology* 51:47-54
- Doyle JJ, Doyle JL (1990) Isolation of plant DNA from fresh tissues. *Focus* 12:13-15
- Elangovan V, Govindasamy S, Ramamoorthy N, Balasubramanian K (1995) *In vitro* studies on the anticancer activity of *Bacopa monnieri*. *Fitoterapia* 66:211-215
- Elibol M (2004) Optimization of medium composition for actinorhodin production by *Streptomyces coelicolor* A3 (2) with response surface methodology. *Process Biochemistry* 39:1057-1062
- Elibol M, Ozer D (2000) Influence of oxygen transfer on lipase production by *Rhizopus arrhizus* *Process Biochemistry* 36:325-329
- Endress R (1994) *Plant cell biotechnology*. Berlin: Springer-Verlag
- Evans GC (1972) *The quantitative analysis of plant growth*. Black Well, Oxford

- Fernie AR (2007) The future of metabolic phytochemistry: larger numbers of metabolites, higher resolution, greater understanding. *Phytochemistry* 68:2861–2880
- Fett-Neto AG, Pennington JJ, Di Cosmo F (1995) Effect of white light on taxol and baccatin III accumulation in cell cultures of *Taxus cuspidata* and Zucc. *Journal of Plant Physiology* 146:584-590
- Filippini R, Piovan A, Borsarini A, Caniato R (2010) Study of dynamic accumulation of secondary metabolites in three subspecies of *Hypericum perforatum*. *Fitoterapia* 81:115-119
- Flores HE, Filner P (1985) Metabolic relationships of putrecine, GABA and alkaloids in cell and root cultures of solanaceae. In: Neumann K, Barz W, Reinhard E (eds), *Primary and secondary metabolism of Plant cell cultures* Berlin Springer-Verlag. pp 174-185
- Flores HE, Curtis WR (1992) Approaches to understanding and manipulating the biosynthetic potential of plant roots. *Annals of New York Academy of Science* 3:188-209
- Flores HE, Vivanco JM, Loyola-Vargas VM (1999) Radicle biochemistry: the biology of root-specific metabolism. *Trends in Plant Science* 4:220-226
- Forde BG, Clarkson DT (1999) Nitrate and ammonium nutrition of plants: physiological and molecular perspectives. *Advances in Botanical Research* 30:1-90
- Fowler MW, Stafford A (1992) Plant cell culture process systems and product synthesis. In: Fowler MW, Warren GS, editors. *Plant biotechnol* Oxford: Pergamon, 1992. pp. 79-98
- Fukui H, Feroj Hasan AFM, Ueoka T, Kyo M (1998) Formation and secretion of a new brown benzoquinone by hairy root cultures of *Lithospermum erythrorhizon*. *Phytochemistry* 47:1037-1039
- Gajera BB, Kumar N, Singh AS, Punvar BS, Ravikiran R, Subhash N, Jadeja GC (2010) Assessment of genetic diversity in castor (*Ricinus communis* L.) using RAPD and ISSR markers. *Industrial Crops and Products* 32:491-498

- Gangopadhyay M, Sircar D, Mitra A, Bhattacharya S (2008) Hairy root culture of *Plumago indica* as a potential source for harvesting plumbagin. *Biologia Plantarum* 52:533-537
- Ganjewala D, Srivastava AK, Luthra R (2001) Ontogenic and seasonal variation in accumulation of bacoside A in *Bacopa monniera* (L.). *Journal of Medicinal and Aromatic Plant Science* 22:233-237
- Garai S, Mahato SB, Ohtani K, Yamasaki K (1996a) Dammarane-type triterpenoid saponins from *Bacopa monniera*. *Phytochemistry* 42:815-820
- Garai S, Mahato SB, Ohtani K, Yamaski K (1996b) Bacosaponin D-a pseudojujubogenin glycoside from *Bacopa monniera*. *Phytochemistry* 43:447-449
- George EF (1996) Plant Growth Regulators. *In: Plant propagation by tissue culture. Part 1 The Technology*, 2nd edition. Exegetics Ltd, England, pp 420-476
- George EF, Hall MA, De Klerk GJ (2008) The components of plant tissue culture media: II. Organic additions, osmotic and pH effects, and support systems. *In: George EF, Hall MA, De Klerk GJ (eds) Plant propagation by tissue culture, 3rd edn. Springer, The Netherlands*, pp 115–173
- Ghaemi Oskouie SF, Tabandeh F, Yakhchali B, Eftekhari F (2008) Response surface optimization of medium composition for alkaline protease production by *Bacillus clausii*. *Biochemical Engineering Journal* 39:37-42
- Gilbert RA, Shine JM, Miller JD, Rice RW, Rainbolt CR (2006) The effect of genotype, environment and time of harvest on sugarcane yields in Florida, USA. *Field Crops Research* 95:156-170
- Giri A, Banerjee S, Ahuja PS, Giri CC (1997) Production of hairy roots in *Aconitum heterophyllum* wall. using *Agrobacterium rhizogenes*. *In Vitro Cellular and Developmental Biology-Plant* 33:280-284

- Giri A, Ravindra ST, Dhingra V, Narasu ML (2001) Influence of different strains of *Agrobacterium rhizogenes* on induction of hairy roots and artemisinin production in *Artemisia annua*. *Current Science* 81:378-382
- Goel RK, Sairam K, Babu MD, Tavares IA, Raman A (2003) *In vitro* evaluation of *Bacopa monniera* on anti-helicobacter pylori activity and accumulation of prostaglandins. *Phytomedicine* 10:523-527
- Govindrajan R, Vijaykumar M, Pushpangadan P (2005) Antioxidant approach to disease management and the role of rasayana herbs of ayurveda. *Journal of Ethnopharmacology* 19:165-178
- Grabkowska R, Krolicka A, Mielicki W, Wielanek M, Wysokinska H (2010) Genetic transformation of *Harpagophytum procumbens* by *Agrobacterium rhizogenes*: iridoid and phenylethanoid glycoside accumulation in hairy root cultures. *Acta Physiologiae Plantarum* 32:665-673
- Grime JP (1979) *Plant strategies and vegetation processes*. John Wiley & Sons, Chichester, UK
- Guo CY, Cao ZY (1982) Effect of different genotypes on induction frequency in anther and scutellum culture of maize *in vitro*. *Heredities* 4:8-10
- Gupta PK, Roy JK, Prasad M (2001) Single nucleotide polymorphisms: a new paradigm for molecular marker technology and DNA polymorphism detection with emphasis on their use in plants. *Current Science* 80:524-535
- Gupta R, Chadha KL (1995) Medicinal and aromatic plants research in India. In: Chadha KL, Gupta R (eds) *Advances in Horticulture: Medicinal and Aromatic Plants*, vol 11. Malhotra, New Delhi, p 429
- Haines RJ, Martin BE (1997) Biotechnology and sustainable production of tropical timber. *Forest Genetic Resources Information* (FAO) 25:52-58

- Hamill JD, Parr AJ, Robins RJ, Rhodes MJC (1986) Secondary product formation by cultures of *Beta Vulgairs* and *Nicotiana rustica* transformed with *Agrobacterium rhizogenes*. Plant Cell Reports 5: 111-114
- Hamill JD, Robins RJ and Rhodes MJC (1989) Alkaloid production by transformed root cultures of *Cinchona ledgeriana*. Planta Medica 55:354-357
- Hammond JP, White PJ (2008) Sucrose transport in the phloem: integrating root responses to phosphorus starvation. Journal of Experimental Botany 59:93-109
- Hanchinal VM, Survase SA, Sawant SK, Annapure US (2008) Response surface methodology in media optimization for production of β -carotene from *Daucus carota*. Plant Cell Tissue Organ Culture 93:123-132
- Hartman HT, Kester DE, Davies Jr. FT (1990) Plant propagation: Principles and practices. Fifth Edition. Prentice Hall International, Inc. New Jersey
- Henzi MX, Christey MC, McNeil DL (2000) Factors that influence *Agrobacterium rhizogenes*-mediated transformation of broccoli (*Brassica oleracea* L. var. italica). Plant Cell Reports 19:994-999
- He-Ping S, Yong-Yue L, Tie-Shan S, Eric TPK (2011) Induction of hairy roots and plant regeneration from the medicinal plant *Pogostemon Cablin*. Plant Cell, Tissue and Organ Culture 107:251-260
- Hibino K, Ushiyama K (1999) Commercial production of ginseng by plant tissue culture technology, in: T.J. Fun, G. Singh, W.R. Curtis (Eds.), Plant Cell and Tissue Culture for the Production of Food Ingredients, Kluwer Academic, Plenum publisher, pp. 215-224
- Hodgson EM, Lister SJ, Bridgwater AV, Clifton-Brown J, Donnison IS (2010) Genotypic and environmentally derived variation in the cell wall composition of *Miscanthus* in relation to its use as a biomass feedstock. Biomass and Bioenergy 34:652-660

- Holmes DS, Quigley M (1981) A rapid boiling method for the preparation of bacterial plasmids. *Analytical Biochemistry* 114:193-197
- Hou CC, Lin SJ, Cheng JT, Hsu FL (2002) Bacopaside III, bacopasaponin G, and bacopasides A, B, and C from *Bacopa monniera*. *Journal of Natural Products* 65:1759-1763
- Hsia C, Korban SS (1996) Organogenesis and somatic embryogenesis in callus cultures of *Rosa hybrida* and *Rosa chinensis minima*. *Plant Cell, Tissue and Organ Culture* 44:1-6
- Hussain MS, Fareed S, Ansari S, Rahman MA, Ahmad IZ, Saeed M (2012) Current approaches toward production of secondary plant metabolites. *Journal of Pharmacy and Bioallied Science* 4:10-20
- Hutchinson IF, Zimmerman RH (1987) Tissue culture of temperate fruit and nut trees. *Horticultural Reviews* 9:273-349
- Hutchings MJH, de Kroon (1994) Foraging in plants: the role of morphological plasticity in resource acquisition. *Advance in Ecological Research* 25:159-238
- Ishimaru K, Shimomura K (1991) Tannin production in hairy root cultures of *Geranium thunbergii*. *Phytochemistry* 30:825-828
- Islam A (2004) Genetic diversity of the genus *Curcuma* in Bangladesh and further biotechnological approaches for in vitro regeneration and long-term conservation of *C. longa* germplasm. PhD. thesis, University of Hannover
- Jain M, Johnson TS, Krishnan P (2012) Biotechnological approaches to conserve the wealth of nature, endangered and rare medicinal plant species, a review. *Journal of Natural Remedies* 12:93-102
- Jain P, Kulshreshtha DK (1993) Bacoside A1, a minor saponin from *Bacopa monniera*. *Phytochemistry* 33:449-451

- Jain P, Khanna NK, Trehan T, Pendse VK, Godhwani JL (1994) Anti-inflammatory effects of an Ayurvedic preparation, Brahmi Rasayan, in rodents. *Indian Journal of Experimental Biology* 32:633-636
- James DJ, Uratsu S, Cheng J, Negri P, Viss P, Dandekar AM (1993) Acetosyringone and osmoprotectants like betaine or proline synergistically enhance *Agrobacterium*-mediated transformation of apple. *Plant Cell Reports* 12:559-563
- Janani P, Sivakumari K, Parthasarathy C (2009) Hepatoprotective activity of bacoside A against N-nitrosodiethylamine-induced liver toxicity in adult rats. *Cell Biology and Toxicology* 25:425-434
- Jang, JC, Sheen J (1994) Sugar sensing in higher plants. *The Plant Cell* 6:1665-1679
- Jian B, Hou W, Wu C, Liu B, Liu W, Song S, Bi Y, Han T (2009) *Agrobacterium rhizogenes*-mediated transformation of *Superroot*-derived *Lotus corniculatus* plants: a valuable tool for functional genomics. *BMC Plant Biology* 9:78
- Jonsdottir IS, Watson MA (1997) Extensive physiological integration: an adaptive trait in resource-poor environments. In H. de Kroon and J. van Groenendael [eds.], *The ecology and evolution of clonal plants*, 109–136. Backhuys, Leiden, The Netherlands
- Joshi AG, Pathak AR, Sharma AM, Singh S (2010) High frequency of shoot regeneration on leaf explants of *Bacopa monnieri*. *Environmental and Experimental Biology* 8:81-84
- Jun YX, Qing Y, Qin J, Ming LY, Feng ZY, Ke G, Zhan WD (2007) Optimization of *Agrobacterium*-mediated transformation parameters for sweet potato embryogenic callus using beta -glucuronidase (GUS) as a reporter. *African Journal of Biotechnology* 6: 2578-2584
- Kang HJ, Anbazhagan VR, You XL, Moon HK, Yi JS, Choi YE (2006) Production of transgenic *Aralia elata* regenerated from *Agrobacterium rhizogenes*-mediated transformed roots. *Plant Cell Tissue and Organ Culture* 85:187-196

- Karim MZ, Yokota S, Rahman MM, Eizawa J, Saito Y, Azad MAK, Ishiguri F, Iizuka K, Yoshizawa N (2007) Effect of sucrose concentration and pH level on shoot regeneration from callus in *Aralia elata* Seem. Asian Journal of Plant Science 6:715-717
- Karimi MM, Siddique KHM (1991) Crop growth and relative growth rates of old and modern wheat cultivars. Australian Journal of Agricultural Research 42:13-20
- Karp A (1994) Origin, causes and uses of variation in plant tissue cultures. In I. K. Vasil, & T. A. Thorpe (Eds.), Plant Cell, Tissue Organ Culture (pp. 139-150). Dordrecht, Kluwer Academic Publication
- Karthikeyan AS, Sarma KS, Veluthambi K (1996) *Agrobacterium tumefaciens*-mediated transformation of *Vigna mungo* (L.) Hepper. Plant Cell Reports 15:328-331
- Karthikeyan A, Madhanraj A, Pandian SK, Ramesh M (2011) Genetic variation among highly endangered *Bacopa monnieri* (L.) Pennell from Southern India as detected using RAPD analysis. Genetic Resource and Crop Evolution 58:769-782
- Kashyap S, Kaur R, Kumar K, Sharma DR, Sharma SK (2005) Genetic relationship of strawberry cultivars as revealed by RAPD markers. Acta Horticulturae 696:135-142
- Kaur R, Sood M, Chander S, Mahajan R, Kumar V and Sharma DR (1999) *In vitro* propagation of *Valeriana jatamansi*. Plant Cell, Tissue and Organ Culture 59:227-229
- Kaur R, Sadiq M, Sharma P K, Kashyap A, Gupta M, Sharma D R (2008) Need for conservation of medicinal plants- review. Journal of Drug Research in Ayurvedic and Siddha 28:19-30
- Kaur R, Sood P, Vikal V, Kumar K, Saxena B, Sharma DR (2010) Genetic characterization of walnut (*Juglans regia* L.) by random amplified polymorphic DNA. Gene, Genomes and Genomics 4:32-36

- Kaur R, Hora A, Malik CP (2013) Molecular markers: Momentous Tools for exploring Plant Biotechnology. *CIBTech Journal of Biotechnology* 2: 21-36
- Khan S, Mirza KJ, Al-Qurainy F, Abdin MZ (2011) Authentication of the medicinal plant *Senna angustifolia* by RAPD profiling. *Saudi Journal of Biological Science* 18:287-292
- Khan S, Al-Qurainy F, Nadeem M (2012) Biotechnological approaches for conservation and improvement of rare and endangered plants of Saudi Arabia. *Saudi Journal of Biological Science* 19:1-11
- Khan S, Al-Qurainy F, Nadeem M, Tarroum M (2012) Development of genetic markers for *Ochradenus arabicus* (Resedaceae), an endemic medicinal plant of Saudi Arabia. *Genetics and molecular research* 11:1300-1308
- Khanna HK, Raina SK (1998) Genotype x culture media interaction effects on regeneration response of three Indica rice cultivars. *Plant Cell, Tissue and Organ Culture* 52:145-153
- Khuri AI, Cornell JA (1987) *Response Surfaces: Design and Analysis*. Marcel Dekker, New York
- Kim YJ, Wyslouzil BE, Weathers PJ (2002) Invited review: secondary metabolism of hairy root cultures in bio- reactors. *In Vitro Cellular and Developmental Biology- Plant* 38:1-10
- Konczak-Islam I, Yoshinaga M, Nakatani M, Erahara N, Yamakawa O (2000) Establishment and characteristics of an anthocyanin-producing cell line from sweet potato storage root. *Plant Cell Reports* 19:472-477
- Kothari SK, Singh CP, Kumar YV, Singh K (2003) Morphology, yield and quality of ashwagandha (*Withania somnifera* L. Dunal) roots and its cultivation economics as influenced by tillage depth and plant population density. *The Journal of Horticultural Science and Biotechnology* 78:422-425

- Krishna G, Reddy PS, Ramteke PW, Bhattacharya PS (2010) Progress of tissue culture and genetic transformation research in pigeon pea [*Cajanus cajan* (L.) Millsp.]. *Plant Cell Reports* 29:1079-1095
- Kruse S, Hermann A, Kornher A, Taube F (2008) Evaluation of genotype and environmental variation in fibre content of silage maize using a model-assisted approach. *European Journal of Agronomy* 28:210-223
- Kulshershtha DK, Rastogi RP (1973) Bacogenin-A1: a novel dammarane triterpene sapogenin from *Bacopa monniera*. *Phytochemistry* 12:887-892
- Kulshreshtha DK, Rastogi RP (1974) Bacogenin A2: a new sapogenin from bacosides. *Phytochemistry* 13:1205-1206
- Kumar A, Kaul MK, Bhan MK, Khanna PK, Suri KA (2007) Morphological and chemical variation in 25 collections of the Indian medicinal plant, *Withania somnifera* (L.) Dunal (Solanaceae). *Genetic Resources and Crop Evolution* 54:655-660
- Kumar SV, Rajam MV (2005) Enhanced induction of *Vir* genes results in the improvement of *Agrobacterium*-mediated transformation of eggplant. *Journal of Plant Biochemistry and Biotechnology* 14:89-94
- Kumar SV, Rajam MV (2007) Induction of *Agrobacterium tumefaciens vir* genes by the green alga – *Chlamydomonas reinhardtii*. *Current Science* 92:1727-1729
- Kurth H, Spreemann R (1998) Phytochemical characterization of various St. John's wort extracts. *Advances in Therapy* 15: 117-128
- Kuss FR (1986) A review of major factors influencing plant responses to recreation impacts. *Environmental Management* 10:637-650
- Lata H, Chandra S, Arora R (2010) Biotechnological characterization of different populations of Endangered Medicinal –Herb *Podophyllum hexandrum* Royle. In book: Medicinal

- Plant Biotechnology, Chapter: 3, Publisher: CABI, UK, Editors: Rajesh Arora, pp.36-47
- Lata H, Chandra S, ElSohy MA, Khan IA (2014) *In vitro* germplasm conservation of elite *Stevia rebaudiana* Bertoni. Acta Horticulture 1039:303-308
- Lattoo SK, Bamotra S, Sapru DR, Khan S, Dhar AK (2006) Rapid plant regeneration and analysis of genetic fidelity of *in vitro* derived plants of *Chlorophytum arundinaceum* Baker- an endangered medicinal herb. Plant Cell Reports 25:499-506
- Laurentin H (2009) Data analysis for molecular characterization of plant genetic resources. Genetic Resources and Crop Evolution 56:277-292
- Lee J, Park JH, Koh HJ (2013) Morphological and genetic characterization of off-type rice plants collected from farm fields in Korea. Journal of Plant Biology 56:160-167
- Leonti M, Casu L (2013) Traditional medicines and globalization: current and future perspectives in ethnopharmacology. Frontiers in Pharmacology 4:92
- Letham DS, Palni LMS (1983) The biosynthesis and metabolism of cytokinins. Annual Review of Plant Physiology 34:163-197
- Li H, Luo Yi, Xue X, Zhao Y, Zhao H, Li F (2011) A comparison of harvest index estimation methods of winter wheat based on field measurements of biophysical and spectral data. Biosystems Engineering 109:396-403
- Li J, Baga M, Hucl P, Chibbar RN (2011) Development of microsatellite markers in canary seed (*Phalaris canariensis* L.). Molecular Breeding 28:611-621
- Lian ML, Chakrabarty D, Paek KY (2002) Effect of plant growth regulators and medium composition on cell growth and saponin production during cell-suspension culture of mountain ginseng (*Panax ginseng* C.A. Mayer). Journal of Plant Biology 45:201-206

- Lim W, Mudge KW, Vermeulen F (2005) Effects of population, age, and cultivation methods on ginsenoside content of wild American ginseng (*Panax quinquefolium*). *Journal of Agriculture and Food Chemistry* 53:8498-8505
- Litz RE, Gray DJ (1992) Organogenesis and somatic embryogenesis. In: Hammerschlag FA, Litz RE (eds) *Biotechnology of perennial fruit crops*. CAB International, Wallingford, pp 3-34
- Lodhi AH, Bongaerts RJM, Verpoorte R, Coomber SA, Charlwood BV (1996) Expression of bacterial isochorismate synthase (EC 5.4.99.6) in transgenic root cultures of *Rubia peregrina*. *Plant Cell Reports* 16:54-57
- Lu Chi-Hua, Engelmann NJ, Lila MA, Erdman JW (2008) Optimization of lycopene extraction from Tomato cell suspension culture by response surface methodology. *Journal of Agricultural and Food Chemistry* 56:7710-7714
- Madhulatha P, Pandey R, Hazarika P, Rajam MV (2007) High transformation frequency in *Agrobacterium*-mediated genetic transformation of tomato by using polyamines and maltose in shoot regeneration medium. *Physiology and Molecular Biology of Plants* 13:191-198
- Mahato SB, Garai S, Chakravarty AK (2000) Bacopasaponins E and F: two jujubogenin bisdesmosides from *Bacopa monniera*. *Phytochemistry* 53:711-714
- Maher BF, Stough C, Shelmerdine A, Wesnes K, Nathan PJ (2002) The acute effects of combined administration of *Ginkgo biloba* and *Bacopa monniera* on cognitive function in humans. *Human Psychopharmacology* 17:163-164
- Maheshwari P, Songara B, Kumar S, Jain P, Srivastava K, Kumar A (2007) Alkaloid production in *Vernonia cinerea*: Callus, cell suspension and root cultures. *Biotechnology Journal* 2:1026-1032

- Majumdar S, Garai S, Jha S (2011) Genetic transformation of *Bacopa monnieri* by wild type strains of *Agrobacterium rhizogenes* stimulates production of bacopa saponins in transformed calli and plants. *Plant Cell Reports* 30:941-954
- Majumdar S, Garai S, Jha S (2012) Use of the cryptogein gene to stimulate the accumulation of bacopa saponins in transgenic *Bacopa monnieri* plants. *Plant Cell Reports* 31:1899-1909
- Malhotra CL, Das PK (1959) Pharmacological studies of *Herpestis monniera* Linn. (Brahmi). *The Indian Journal of Medical Research* 47:294-305
- Mantell SH, Smith H (1983) Cultural factors that influence secondary metabolite accumulation in plant cell and tissue cultures. In: Mantell SH, Smith H (eds) *Plant biotechnology*. Society for experimental biology seminar series 18. Cambridge University Press, Cambridge, pp 75–108
- Martin KP, Pachathundikandi S, Zhang CL, Slater A and Madassery J (2006) RAPD analysis of a variant of banana (*Musa* sp.) cv. grande naine and its propagation via shoot tip culture. *In Vitro Cellular and Development Biology – Plant* 42:188-192
- Martins M, Sarmiento D and Oliveira DD (2004) Genetic stability of micropropagated almond plantlets, as assessed by RAPD and ISSR markers. *Plant Cell Reports* 23:492-496
- Mathur S, Gupta MM, Kumar S (2000) Expression of growth and bacoside-A in response to seasonal variation in *Bacopa monnieri* accessions. *Journal of Medicinal and Aromatic Plant Sciences* 22:320-326
- Mathur S, Kumar S (1998) Phytohormone self sufficiency for regeneration in the leaf and stem explants of *Bacopa monnieri*. *Journal of Medicinal and Aromatic Plant Sciences* 20:1056-1059

- Mathur S, Sharma S, Gupta MM, Kumar S (2003) Evaluation of an Indian germplasm collection of the medicinal plant *Bacopa monnieri* (L.) Pennell by use of multivariate approaches. *Euphytica* 133:255-265
- Mathur S, Gupta MM, Ram M, Sharma S, Kumar S (2002) Herb yield and bacoside-A content of field-grown *Bacopa monnieri* accessions. *Journal of Herbs Spices and Medicinal Plants* 9:11-18
- Matsumoto T, Nishida K, Noguchi M, Tamaki E (1973) Some factors affecting the anthocyanin formation by *Populus* cells in suspension culture. *Agricultural and Biological Chemistry* 37:561-567
- Mc Adam EL, Vaillancourt RE, Koutoulis A, Whittock SP (2014) Quantitative genetic parameters for yield, plant growth and cone chemical traits in hop (*Humulus lupulus* L.) *BMC Genetics* 15:22
- McDonald KA, Jackman AP (1989) Bioreactor studies of growth and nutrient utilization in Alfalfa suspension cultures. *Plant Cell Reports* 8:455-458
- Mehta J, Ansari R, Syedy M, Khan S, Sharma S, Gupta N, Rathore R, Vaishnav K (2012) An effective method for high frequency multiple shoots regeneration and callus induction of *Bacopa monnieri* (L.) Pennel.: An important medicinal plant. *Asian Journal of Plant Science and Research* 2:620-626
- Misawa M (1985) Production of useful plant metabolites. In: Fiechter A, editor. *Advances in Biochemical Engineering and Biotechnology*. Berlin: Springer-Verlag, pp 59–88
- Moghaddam PR, Fallahi J, Shajari MA, Mahallati MN (2013) Effects of harvest date, harvest time, and post-harvest management on quantitative and qualitative traits in seedless barberry (*Berberis vulgaris* L.). *Industrial Crops and Products* 42:30-36
- Mohapatra A, Rout GR (2005) Identification and genetic variation among rose cultivars using random amplified polymorphic DNA. *Journal of Biosciences* 60:611-617

- Moser SB, Feil B, Jampatong S, Stamp P (2006) Effects of pre-anthesis drought, nitrogen fertilizer rate, and variety on grain yield, yield components, and harvest index of tropical maize. *Agricultural Water Management* 81:41-58
- Mosjidis JA (1996) Variability for biomass production and plant composition in *Sericea lespedeza*. *Biomass and Bioenergy* 11:63-68
- Motomari Y, Shimomura K, Mori K, Kunitake H, Nakashima T, Tanaka M, Miyazaki S, Ishimaru K (1995) Polyphenol production in hairy root cultures of *Fragaria ananassa*. *Phytochemistry* 40:1425-1428
- Murashige T, Skoog F (1962) A revised medium for rapid growth and bioassays with tobacco tissue culture. *Physiologia Plantarum* 15:473-497
- Murthy HN, Praveen N (2013) Carbon sources and medium pH affects the growth of *Withania somnifera* (L.) Dunal adventitious roots and withanolide A production. *Natural Product Research* 27:185-189
- Murthy MSRC, Swaminathan T, Rakshit SK, Kosugi Y (2000) Statistical optimization of lipase catalyzed hydrolysis of methyl oleate by response surface methodology. *Bioprocess Bioengineering* 22:35-39
- Murthy PB, Raju VR, Ramakrisana T, Chakravarthy MS, Kumar KV, Kannababu S, Subbaraju GV (2006) Estimation of twelve bacopa saponins in *Bacopa monnieri* extracts and formulations by high-performance liquid chromatography. *Chemical and Pharmaceutical Bulletin* 54:907-911
- Mustafa NR, de Winter W, van Iren F, Verpoorte R (2011) Initiation, growth and cryopreservation of plant cell suspension cultures. *Nature Protocols* 6:715-742
- Myers RH, Montgomery DC (1995) Response surface methodology: process and product optimization using designed experiments. 1st ed., Wiley Interscience, New

- Myers RH, Montgomery DC (2002) Response Surface Methodology: Product and Process Optimization Using Designed Experiments. 2nd edition. John Wiley & Sons, New York
- Nadeem M, Palni LMS, Purohit AN, Pandey H, Nandi SK (2000) Propagation and conservation of *Podophyllum hexandrum* Royle: an important medicinal herb. *Biological Conservation* 92:121-129
- Nadeem M, Palni LMS, Kumar A, Nandi SK (2007) Podophyllotoxin content, above and below ground biomass in relation to altitude in *Podophyllum hexandrum* Royle population from Kumaun region of Indian Central Himalaya. *Planta Medica* 73:388-391
- Nadeem M, Rikhari HC, Kumar A, Palni LMS, Nandi SK (2002) Taxol content in the bark of Himalayan Yew in relation to tree age and sex. *Phytochemistry* 60:627-631
- Nadkarni KM (1976) *Indian Materia Medica*. Popular Prakashan Private, Bombay, p 968
- Nag A, Gupta P, Sharma V, Sood A, Ahuja PS, Sharma RK (2012) AFLP and RAPD based genetic diversity assessment of industrially important reed bamboo (*Ochlandra travancorica* Benth). *Journal of Plant Biochemistry and Biotechnology* 22:144-149
- Nagella P, Murthy HN (2010) Establishment of cell suspension cultures of *Withania somnifera* for the production of withanolide A. *Bioresource technology* 101:6735-6739
- Nagella P, Thiruvengadam M, Jung SJ, Murthy HN, Chung IM (2013) Establishment of *Gymnema sylvestre* hairy root cultures for the production of gymnemic acid. *Acta Physiologiae Plantarum* 35:3067:3073
- Naik PM, Manohar SH, Praveen N, Murthy HN (2010) Effects of sucrose and pH levels on in vitro shoot regeneration from leaf explants of *Bacopa monnieri* and accumulation of bacoside A in regenerated shoots. *Plant Cell, Tissue and Organ Culture* 100:235-239

- Naik PM, Manohar SH, Praveen N, Murthy HN (2011) Effects of macro elements and nitrogen source on biomass accumulation and bacoside A production from adventitious shoot cultures of *Bacopa monnieri* (L.). *Acta Physiologiae Plantarum* 33:1553-1557
- Naik PM, Manohar SH, Praveen N, Upadhya V, Murthy HN (2012) Evaluation of Bacoside A content in different accessions and various organs of *Bacopa monnieri* (L.) Wettst. *Journal of Herbs, Spices and Medicinal Plants* 18:387-395
- Nakamura M, Takeuchi Y, Miyanaga K, Seki M, Furusaki S (1999) High anthocyanin accumulation in the dark by strawberry (*Fragaria ananassa*) callus. *Biotechnology Letters* 21:695-699
- Nath S, Buragohain AK (2005) Establishment of callus and cell suspension cultures of *Centella asiatica*. *Biologia Plantarum* 49:411-413
- Nathan PJ, Clarke J, Lloyd J, Hutchison CW, Downey L, Stough C (2001) The acute effect of an extract of *Bacopa monniera* (Brahmi) on cognitive function in healthy normal subjects. *Human Psychopharmacology* 16:345-351
- National Medicinal Plants Board (2004) 32 prioritized medicinal plants, National Informatics Centre, Ministry of Health and Family Welfare, Department of Ayush, Government of India. <http://www.nmpb.nic.in/sarpgandha.htm>
- National Medicinal Plants Board, NMPB (2008) Agrotechniques of selected medicinal plants. National Medicinal Plants Board, Department of Ayush, Ministry of Health and Family Welfare, Govt of India. TERI Press, New Delhi, pp 33–38
- Nayak S, Naik PK, Acharya LK, Pattnaik AK (2006) Detection and evaluation of genetic variation in 17 promising cultivars of turmeric (*Curcuma longa* L.) using 4C nuclear DNA content and RAPD markers. *Cytologia* 71:49-55
- Neill S, Hancock JT, Desikan R (2006) Preface to nitric oxide signalling: Plant growth and development. *Journal of Experimental Botany* 57:462

- Neill SJ, Desikan R, Hancock JT (2003) Nitric oxide signalling in plants. *New Phytologist* 159:11-35
- Newman DJ, Cragg GM, Sander KM (2003) Natural products as sources of new drugs over the period 1981-2002. *Journal of Natural Products* 66:1022-1037
- Newman DJ, Cragg GM, Snader KM (2000) The influence of natural products upon drug discovery. *Natural Products Reports* 17:215-234
- Normanly J, Slovin JP, Cohen JD (1995) Rethinking auxin biosynthesis and metabolism. *Plant Physiology* 107:323-329
- 'O' Neill M and Lewis A (1993) Human medicinal agents from plants. *In: Kinghorn AD Balandrin MF, ACS Symposium Series 534, Washington, DC. pp. 48*
- Ooi CT, Syahida A, Stanslas J, Maziah M (2013) Efficiency of different *Agrobacterium rhizogenes* strains on hairy roots induction in *Solanum mammosum*. *World Journal of Microbiology and Biotechnology* 29:421-430
- Otani M, Shimada T, Kamada H, Teraya H, Mii M (1996) Fertile transgenic plants of *Ipomoea trichocarpa* Ell. induced by different strains of *Agrobacterium rhizogenes*. *Plant Science* 116:169-175
- Palni LMS, Bag N, Nadeem M, Tamta S, Vyas P, Bisht MS, Purohit VK, Kumar A, Nandi SK, Pandey A, Purohit AN (1998) Micropropagation: Conservation through tissue culture of selected Himalayan Plants. *In: Research for Mountain Development: Some Initiatives and Accomplishments. Gyanodaya Prakashan, Nainital, pp 431–452*
- Palombi MA, Damiano C (2002) Comparison between RAPD and SSR molecular markers in detecting genetic variation in kiwifruit (*Actinidia deliciosa* A. Chev). *Plant Cell Reports* 20:1061-1066

- Pandey H, Nandi SK, Kumar A, Palni UT, Palni LMS (2007) Podophyllotoxin content in *Podophyllum hexandrum* Royle plants of known age of seed origin and grown at a lower altitude. *Acta Physiologiae Plantarum* 29:121-126
- Pandey NK, Tewari KC, Tewari RN, Joshi GC, Pandey VN, Pandey G (1993) Medicinal Plants of Kumaon Himalaya, strategies for conservation. In: Dhar U (ed) Himalayan Biodiversity Conservation Strategies. Himavikas Publication, Nainital 3:293-302
- Pandey SK, Ramesh B, Gupta PK (1994) Study on effect of genotype and culture medium on callus formation and plant regeneration in rice (*Oryza sativa* L.). *Indian Journal of Genetics and Plant Breeding* 54:293-299
- Pase MP, Kean J, Sarris J, Neale C, Scholey AB, Stough C (2012) The cognitive enhancing effects of *Bacopa monnieri*: a systematic review of randomized, controlled human clinical trials. *Journal of Alternative and Complementary Medicine* 18:647-652
- Paul S, Nandi SK, Palni LMS (2013) Assessment of genetic diversity and interspecific relationships among three species of *Podophyllum* using AFLP markers and podophyllotoxin content. *Plant Systematics and Evolution* 299:1879-1887
- Pavlov A, Berkov S, Weber J, Bley TH (2009) Hyoscyamine biosynthesis in *Datura stramonium* hairy root *in vitro* systems with different ploidy levels. *Applied Biochemistry and Biotechnology* 157:210-225
- Pavlov AI, Ilieva MP, Panchev IN (2000) Nutrient medium optimization for Rosamarinic acid production by *Lavandula vera* MM cell suspension. *Biotechnology Progress* 16:668-670
- Pawar R, Gopalakrishnan C, Bhutani KK (2001) Dammarane triterpene saponin from *Bacopa monniera* as the superoxide inhibitor in polymorphonuclear cells. *Planta Medica* 67:752-754

- Payne GF, Bringi V, Prince C, Shuler ML (1991) Plant cell and tissue culture in liquid systems. Munich: Hanser Publ., pp. 1-10
- Payne GF, Payne NN, Schuler ML, Asada, M (1988) *In situ* adsorption for enhanced producton by *Catharanthus roseus*. Biotechnology Letters 10:187-192
- Pharmawati M, Yen G, McFarlane IJ (2004) Application of RAPD and ISSR markers to analyse molecular relationships in *Grevillea* (Proteaceae). Australian Systematic Botany 17:49-61
- Phrompittayarat W, Putalun W, Tanaka H, Jetiyanon K, Wittayaareekuf S, Ingkaninan K (2007) Comparison of various extraction methods of *Bacopa monnieri*. Naresuan University Journal 15:29-34
- Phrompittayarat W, Ingkaninan K, Jetiyanon K, Wittaya-Areekul S, Putalun W, Tanaka H, Khan I (2011) Influence of seasons, different plant parts, and plant growth stages on saponin quantity and distribution in *Bacopa monnieri*. Songklanakarin Journal of Science and Technology 33:193-199
- Piatczak E, Krolicka A, Wielanek M, Wysokinska H (2012) Hairy root cultures of *Rehmannia glutinosa* and production of iridoid and phenylethanoid glycosides. Acta Physiologiae Plantarum 34:2215-2224
- Pilbeam CJ (1996) Variation in harvest index of maize (*Zea mays*) and commom bean (*Phaseolus vulgaris*) grown in a marginal rainfall area of Kenya. The Journal of Agriculture Science 126:1-6
- Pitta-Alvarez SI, Spollansky TC, Giulietti AM (2000) The influence of different biotic and abiotic elicitors on the production and profile of tropane alkaloids in hairy root cultures of *Brugmansia candida*. Enzyme and Microbial Technology 26:252-258
- Plackett RL, Burman JP (1946) The design of optimum multifactorial experiments. Biometrika 33:305-325

- Porter RR (1991) Host range and implication of plant infection by *Agrobacterium rhizogenes*.
Critical Reviews in Plant Science 10:387-421
- Potrykus I (1990) Gene transfer to plants: assessment and perspectives. *Physiologia Plantarum* 79:125-134
- Prakash G, Emmanuel CJSK, Srivastava AK (2005) Variability of azadirachtin in *Azadirachta indica* (neem) and batch kinetics studies of cell suspension culture. *Biotechnology and Bioprocess Engineering* 10:198-204
- Prakash G, Srivastava AK (2005) Statistical media optimization for cell growth and azadirachtin production in *Azadirachta indica* (A. Juss) suspension cultures. *Process Biochemistry* 40:3795-3800
- Prakash G, Srivastava AK (2008) Statistical elicitor optimization studies for the enhancement of azadirachtin production in bioreactor *Azadirachta indica* cell cultivation. *Biochemical Engineering Journal* 40:218-226
- Prasad R, Bagde US, Puspangadan P, Varma A (2008) *Bacopa monnieri* L.: Pharmacological aspects and case studies involving *Piriformospora indica*. *International Journal of Integrative Biology* 3:100-110
- Praveen N, Murthy HN (2013) Synthesis of withanolide A depends on carbon source and medium pH in hairy root cultures of *Withania somnifera*. *Industrial Crops and Products* 35:241-243
- Purohit SS, Vyas SP (2004) Marketing of medicinal and aromatic plants in Rajasthan, National Consultative Workshop on Medicinal and Aromatic Plants, held at GBPUAT, Pantnagar.
- Radusiene J, Bagdonaite E, Kazlauskas S (2004) Morphological and chemical evaluation on *Hypericum perforatum* and *H. maculatum* in Lithuania. *Acta Horticulturae* 629:55-62

- Rahman LQ, Verma PC, Singh D, Gupta MM, Banerjee S (2002) Bacoside production by suspension cultures of *Bacopa monnieri* (L.) Pennell. *Biotechnology Letters* 24:1427-1429
- Rahulan R, Nampoothiri KM, Szakacs G, Nagy V, Pandey A (2009) Statistical optimization of L-leucine amino peptidase production from *Streptomyces gedanensis* IFO 13427 under submerged fermentation using response surface methodology. *Biochemical Engineering Journal* 43:64-71
- Rai D, Bhatia G, Palit G, Pal R, Singh S, Singh HK (2003) Adaptogenic effect of *Bacopa monniera* (Brahmi). *Pharmacology Biochemistry and Behavior* 75:823-830
- Rai MK, Asthana P, Jaiswal VS, Jaiswal U (2010) Biotechnological advances in guava (*Psidium guajava* L.): recent development and prospects for future research. *Trees* 24:1-12
- Rajendran A, Palanisamy A, Thangavelu V (2008) Evaluation of medium components by Plackett – Burman statistical design for lipase production by *Candida rugosa* and kinetic modeling. *Chinese Journal of Biotechnology* 24:436-444
- Ramage CM, Borda AM, Hamill SD, Smith MK (2004) A simplified PCR test for early detection of dwarf off-types in micropropagated *Cavendish Banana* (*Musa* spp. AAA). *Scientia Horticulturae* 103:145-151
- Ramakrishna A, Ravishankar GA (2011) Influence of abiotic stress signals on secondary metabolites in plants. *Plant Signaling and Behavior* 6:1720-1731
- Ramesh M, Vijaya Kumar K, Karthikeyan A, Pandian SK (2011) RAPD based genetic stability analysis among micropropagated, synthetic seed derived and hardened plants of *Bacopa monnieri* (L.): a threatened indian medicinal herb. *Acta Physiologiae Plantarum* 33:163-171

- Rao KJ, Kim CH, Rhee SK (2000) Statistical optimization of medium for the production of recombinant hirudin from *Saccharomyces cerevisiae* using response surface methodology. *Process Biochemistry* 35:639-647
- Rao PV, Jayaraman K, Lakshmanan CM (1993) Production of lipase by *Candida rugosa* in solid state fermentation 1: determination of significant process variables. *Process Biochemistry* 28:391-395
- Rao RV, Hodgkin T (2002) Genetic diversity and conservation and utilization of plant genetic resources. *Plant Cell, Tissue and Organ Culture* 68:1-19
- Rao SR, Ravishankar GA (2002) Plant cell cultures: Chemical factories of secondary metabolites. *Biotechnology Advances* 20:101-153
- Rastogi RP (1990) *Compendium of Indian Medicinal Plants*, vol. 1. CSIR, New Delhi, pp. 118-122
- Rastogi S, Kulshreshtha DK (1999) Bacopside A (2): A triterpenoid saponin from *Bacopa monniera*. *Indian Journal of Chemistry* 38:353-356
- Rastogi S, Pal R, Kulshreshtha DK (1994) Bacoside A3-a triterpenoid saponin from *Bacopa monniera*. *Phytochemistry* 36:133-137
- Rates SMK (2001) Plants as source of drugs. *Toxicon* 39:603-613
- Ravishankar GA, Bhyalakshmi N, Ramachandra Rao S (1999) Production of food additives. In: Ramawat KG, Merillon JM, editors. *Biotechnology: secondary metabolites*. New Delhi: Oxford IBH. pp. 89-110
- Ravishankar GA, Ramachandra Rao S (2000) Biotechnological production of phyto-pharmaceuticals. *Journal of Biochemistry, Molecular Biology and Biophysics* 4:73-102
- Ravishankar GA, Venkataraman LV (1990) Food applications of plant cell cultures. *Current Sciences* 59:914-920

- Ravishankar GA, Venkataraman LV (1993) Role of plant cell culture in food biotechnology: current trends, limitations and future prospects. In: Prakash J, Pierik RLM, editors. Plant biotechnology: commercial prospects and problems. New Delhi: Oxford IBH Press, pp. 255-74
- Rawat GS, Garg GP (2005) Medicinal plants: trade and commerce opportunities with India. *The Indian Forester* 131:275–287
- Ray T, Dutta I, Saha P, Das S, Roy SC (2006) Genetic stability of three economically important micropropagated banana (*Musa* spp.) cultivars of lower Indo-Gangetic plains, as assessed by RAPD and ISSR markers. *Plant Cell, Tissue and Organ Culture* 85:11-21
- Rohini G, Sabitha KE, Devi CSS (2004) *Bacopa monniera* Linn. extract modulates antioxidant and marker enzymes status in fibrosarcoma bearing rats. *Indian J. Exp. Biol.* 42:776-780
- Roja G, Rao PS (1998) Biotechnological investigation in medicinal plants for the production of secondary metabolites. In I. Khan, & A. Khanum (Eds.), Role of biotechnology in medicinal and aromatic plants (pp. 95-125). Hyderabad: Ukaaj Publ
- Rolland F, Baena-Gonzalez E, Sheen J (2006) Sugar sensing and signaling in plants: conserved and novel mechanisms. *Annual Review of Plant Biology* 57:675-709
- Rosic N, Momcilovic I, Kovacevic N, Grubisic D (2006) Genetic transformation of *Rhamnus fallax* and hairy roots as a source of anthraquinones. *Biologia Plantarum* 50:514-518
- Russo A, Borrelli F (2005) *Bacopa monniera*, a reputed nootropic plant: an overview. *Phytomedicine* 12:305-317
- Russo A, Izzo AA, Borrelli F, Renis M, Vanella A (2003) Free radical scavenging capacity and protective effect of *Bacopa monniera* Linn on DNA damage. *Phytotherapy Research* 17:870-875

- Ryad A, Lakhdar K, Majda KS, Samia A, Mark A, Corinne AD, Eric G (2010) Optimization of the culture medium composition to improve the production of Hyoscyamine in elicited *Datura stramonium* L. hairy roots using the response surface methodology (RSM). *International Journal of Molecular Sciences* 11:4726-4740
- Sairam K, Dorababu M, Goel RK, Bhattacharya SK (2002) Antidepressant activity of standardized extract of *Bacopa monniera* in experimental models of depression in rats. *Phytomedicine* 9:207-211
- Sairam K, Rao CV, Babu MD, Goel RK (2001) Prophylactic and curative effects of *Bacopa monniera* in gastric ulcer models. *Phytomedicine* 8:423-430
- Sakamoto K, Iida K, Sawamura K, Hajiro K, Asada Y, Yoshikawa T, Furuya T (1993) Effects of nutrients on anthocyanin production in cultured cells of *Aralia cordata*. *Phytochemistry* 33:357-360
- Samiulla DS, Prashanth D, Amit A (2001) Mast cell stabilising activity of *Bacopa monnieri*. *Fitoterapia* 72:284-285
- Sanaa A, Boulilab A, Bejaouia A, Boussaida M, Fadhela N (2012) Variation of the chemical composition of floral volatiles in the endangered Tunisian *Panocratium maritimum* L. populations (Amaryllidaceae). *Industrial Crops and Products* 40:312-317
- Sanchez MC, Martinez MT, Valladares S, Ferro E, Ana M, Vieitez (2003) Maturation and germination of oak somatic embryos originated from leaf and stem explants: RAPD markers for genetic analysis of regenerants. *Journal of Plant Physiology* 160:699-707
- Sang W, Ma K, C. axMaCher J (2011) Securing a Future for China's Wild Plant Resources. *BioScience* 61:720-725
- Sastri MS, Dhalla NS, Malhotra CL (1959) Chemical investigation of *Herpestis monniera* Linn (Brahmi). *Indian Journal of Pharmacology* 21:303-304

- Satdive R K, Fulzele DP, Eapen S (2007) Enhanced production of azadirachtin by hairy root cultures of *Azadirachta indica* A. Juss by elicitation and media optimization. *Journal of Biotechnology* 128:281-289
- Satyavati GV, Raina MK, Sharma M (1976) *Medicinal Plants of India*, vol I. Indian Council of Medical Research, New Delhi, pp. 112-118
- Saxena B, Kaur R, Bhardwaj SV (2011) Assessment of genetic diversity in cabbage cultivars using RAPD and SSR Markers. *Journal of Crop Science and Biotechnology* 14:85-95
- Scheible WR, Lauerer M, Schulze ED, Caboche M, Stitt M (1997) Accumulation of nitrate in the shoot acts as a signal to regulate shoot–root allocation in tobacco. *The Plant Journal* 11:671-691
- Scognamiglio M, D'Abrosca B, Fiumano V, Golino M, Esposito A, Fiorentino A (2014) Seasonal phytochemical changes in *Phillyrea angustifolia* L.: Metabolomic analysis and phytotoxicity assessment. *Phytochemistry Letters* 8:163-170
- Scully B, Wallace DH (1990) Variation in and relationship of biomass, growth rates, harvest index and phenology of the yield of common beans. *Journal of American Society of Horticultural Science* 115:218-225
- Seibert M, Kadkade PG (1980) Environmental factors: A. Light. In: STABA, E.J. (ed.): *plant tissue culture as a source of biochemical*, CRC Press, Boca Raton
- Sevon N, Hiltunen R, Oksman-Caldentey KM (1998) Somaclonal variation in transformed roots and protoplast-derived hairy root clone of *Hyoscyamus muticus*. *Planta Medica* 64:37-41
- Sevon N, Oksman-Caldantey KM (2002) *Agrobacterium rhizogenes* mediated transformation: Root cultures as a sources of alkaloids. *Planta medica* 68:859-868
- Shanker G, Singh HK (2000) Anxiolytic profile of standardized Brahmi extract. *Indian Journal of Pharmacology* 32:152

- Shanks JV, Morgan J (1999) Plant 'hairy root' culture. *Current Opinion in Biotechnology* 10:151-155
- Shanmugasundaram ER, Akbar GK, Shanmugasundaram KR (1991) Brahmighritham, an Ayurvedic herbal formula for the control of epilepsy. *Journal of Ethnopharmacology* 33:269-276
- Sharma M, Khajuria RK, Mallubhotla S (2013) Annual variation in bacoside content of *Bacopa monnieri* (L.) Wettst Plants. *International Journal of Pharma and Bio Sciences* 4:266-271
- Sharma N, Satsangi R, Pandey R, Devi SV (2007b) *In vitro* clonal propagation and medium term conservation of *Brahmi* [*Bacopa monnieri* (L) Wettst]. *Journal of Plant Biochemistry and Biotechnology* 16:139-143
- Sharma SK, Bryan GJ, Winfield MO, Millam S (2007a) Stability of potato (*Solanum tuberosum* L.) plants regenerated via somatic embryos, axillary bud proliferated shoots, microtubers and true potato seeds: a comparative phenotypic, cytogenetic and molecular assessment. *Planta* 226:1449-1458
- Sharma SK, Ramamurthy V (2000) Micropropagation of 4-yr-old elite *Eucalyptus tereticornis* trees. *Plant Cell Reports* 19:511-518
- Sharma V, Bhardwaj P, Kumar R, Sharma RK, Sood A, Ahuja PS (2009) Identification and cross-species amplification of EST derived SSR markers in different bamboo species. *Conservation Genetics* 10:721-724
- Shawl AS, Qazi GN (2004) Production and trade of medicinal plants in India a review SKUAST. *Journal of Research* 6:1-12
- Shimomura K, Satake M, Kamada H (1986) Production of useful secondary metabolites by hairy roots transformed with Ri-plasmid. In: Somers D, Gengenbach BG, Biesboer DD,

- Hackett WP, Green CE, editors. Proceedings of the 5th International Congress of Plant Tissue and Cell Culture. Minneapolis: University of Minneapolis, p. 250
- Showkat P, Zaidi Y, Asghar S, Jamaluddin S (2010) *In vitro* propagation and callus formation of *Bacopa monnieri* (L.) Penn. Plant Tissue Culture and Biotechnology 20:119-125
- Shrivastava N, Rajani M (1999) Multiple shoot regeneration and tissue culture studies on *Bacopa monnieri* (L.) Pennell. Plant Cell Reports 18:919–923
- Sidwa-Gorycka M, Krolicka A, Kozyra M, Glowniak K, Bourgaud F, Lojkowska E (2003) Establishment of a co-culture of *Ammi majus* L. and *Ruta graveolens* L. for the synthesis of furanocoumarins. Plant Science 165:1315-1319
- Singh G, Gavrieli J, Oakey JS, Curtis WR (1998) Interaction of methyl jasmonate, wounding and fungal elicitation during sesquiterpene induction in *Hyoscyamus muticus* root cultures. Plant Cell Reports 17:391-395
- Singh HK, Dhawan BN (1982) Effect of *Bacopa monniera* extract on avoidance responses in rat. Journal of Ethnopharmacology 5:205-214
- Singh HK, Dhawan BN (1992) Drugs affecting learning and memory. In: Tandon, P.N., Bijiani, V., Wadhwa, S. (Eds.), Lectures in Neurobiology, vol. 1. Wiley Eastern, New Delhi, pp. 189-207
- Singh HK, Dhawan BN (1997) Neurophychopharmacological effects of the Ayurvedic nootropic *Bacopa monniera* Linn. (Brahmi). Indian Journal of Pharmacology 29:359-365.
- Singh HK, Rastogi RP, Srimal RC, Dhawan BN (1988) Effect of bacosides A and B on avoidance responses in rats. Phytotherapy Research 2:70-75
- Singh HK, Shanker G, Patnaik GK (1996) Neuropharmacological and anti-stress effects of bacosides: a memory enhancer. Indian Journal of Pharmacology 28:47

- Singh HK, Srimal RC, Srivastava AK, Garg NK, Dhan BN (1990) Neuropsychopharmacological effects of bacosides A and B. Proceedings of the Fourth Conference on Neurobiology Learning Memory, Abstract No. 79. Irvine California.
- Singh M, Chaturvedi R (2012) Evaluation of nutrient uptake and physical parameters on cell biomass growth and production of spilanthol in suspension cultures of *Spilanthes acmella* Murr. Bioprocess and Biosystems Engineering 35: 943-951.
- Singh M, Sharma C, Ahuja PS (1999) A Heterologous chloroplast rDNA revealed highly conserved RFLP patterns in the family of Asteraceae. Plant Molecular Biology Reports 17:73
- Sirvent T (2001) Hypericins: A Family of Light-activated Anthraquinones in St. John's Wort (*Hypericum perforatum* L.) and Their Importance in Plant/Pathogen/Herbivore Interactions. Cornell University, Ithaca, NY, pp. 213
- Sivakumar G, Yu KW, Hahn EJ, Paek KY (2005) Optimization of organic nutrients for ginseng hairy roots production in large-scale bioreactors. Current Science 89:641-649
- Sivanandhan G, Arun M, Mayavan S, Rajesh M, Jeyaraj M, Kapil Dev G, Manickavasagam M, Selvaraj N, Ganapathi A (2012) Optimization of elicitation conditions with methyl jasmonate and salicylic acid to improve the productivity of withanolides in the adventitious root culture of *Withania somnifera* (L.) Dunal. Applied Biochemistry and Biotechnology 168:681-696
- Sivanandhan G, Dev GK, Jeyaraj M, Rajesh M, Muthuselvam M, Selvaraj N, Manickavasagam M, Ganapathi A (2013) A promising approach on biomass accumulation and withanolides production in cell suspension culture of *Withania somnifera* (L.) Dunal. Protoplasma 250:885-898
- Sivanandhan G, Mariashibu TS, Arun M, Rajesh M, Kasthuriangan S, Selvaraj N, Ganapathi A (2011) The effect of polyamines on the efficiency of multiplication and rooting of

- Withania somnifera* (L.) Dunal and content of some withanolides in obtained plants. *Acta Physiologiae Plantarum* 33:2279-2288
- Sladden SE, Bransby DI, Aiken GE (1991) Biomass yield, composition and production costs for eight switchgrass varieties in Alabama. *Biomass and Bioenergy* 2:119-122
- Sonia, Saini R, Singh RP, Jaiswal PK (2007) *Agrobacterium tumefaciens*-mediated transfer of *Phaseolus vulgaris* a-amylase inhibitor-1 gene into mungbean: *Vigna radiata* (L.) Wilczek using bar as selectable marker. *Plant Cell Reports* 26:187-198
- Sood A, Ahuja PS, Sharma M, Sharma OP, Godbole S (2002) *In vitro* protocols and field performance of elites of an important bamboo *Dendrocalamus hamiltonii* Nees et Arn. Ex Munro. *Plant Cell, Tissue and Organ Culture* 71:55-63
- Southwell IA, Bourke CA (2001) Seasonal variation in hypericin content of *Hypericum perforatum* L. (St. John's Wort). *Phytochemistry* 56:437-441
- Srivastava S, Srivastava AK (2012) Statistical medium optimization for enhanced azadirachtin production in hairy root culture of *Azadirachta indica*. *In Vitro Cellular and Developmental Biology-Plant* 48:73-84
- Stafford A, Morris P, Fowler MW (1986) Plant cell biotechnology: a perspective. *Enzyme and Microbial Technology* 8:19-23
- Stockigt J, Obitz P, Flakenhagen H, Lutterbach R, Endress R (1995) Natural products and enzymes from plant cell cultures. *Plant Cell, Tissue and Organ Culture* 43:97-109
- Sudha CG, Sherina TV, Anu Anand VP, Reji JV, Padmesh P, Soniya EV (2013) *Agrobacterium rhizogenes* mediated transformation of the medicinal plant *Decalepis arayalpathra* and production of 2-hydroxy-4-methoxy benzaldehyde. *Plant Cell, Tissue and Organ Culture* 112:217-226
- Sujatha G, Zdravkovic-Korac S, alic DC, Flaminic G, Ranjitha Kumaria BD (2013) High-efficiency *Agrobacterium rhizogenes*-mediated genetic transformation in *Artemisia*

- vulgaris*: Hairy root production and essential oil analysis. *Industrial Crops and Products* 44:643-652
- Sumathy T, Subramanian S, Govidasamy S, Balakrishna K, Veluchamy G (2001) Protective role of *Bacopa monniera* on morphine induced hepatotoxicity in rats. *Phytotherapy Research* 15:643-645
- Sun D, Liddle MJ (1993) Plant morphological characteristics and resistance to simulated trampling. *Environmental Management* 17:511-521
- Tanaka N, Takao M, Matsumoto T (1994) *Agrobacterium rhizogenes* mediated transformation and regeneration of *Vinca minor* L. *Plant Tissue Culture Letters* 11:191-198
- Tao J, Li L (2006) Genetic transformation of *Torenia fournieri* L. mediated by *Agrobacterium rhizogenes*. *South African Journal of Botany* 72:211-216
- Tejavathi DH, Sowmya R, Shailaja KS (2001) Micropropagation of *Bacopa monnieri* using shoot tip and nodal explant. *Journal of Tropical Medicinal Plants* 2:39-45
- Tepfer D, Tempe J (1981) Production d'agropine par des racines transformées sous l'action d'*Agrobacterium rhizogenes* souche A4. *C.R. Academy of Science III* 292:153-156
- Thakur S, Ganapathy PS (1978) Morphogenesis of organ differentiation in *Bacopa monnieri* stem cultures. *Indian Journal of Experimental Biology* 16:514-516
- Thimmaraju R, Bhagyalakshmi N, Ravishankar GA (2004) *In situ* and *ex situ* adsorption and recovery of betalaines from hairy root cultures of *Beta vulgaris*. *Biotechnology Progress* 20:777-785
- Thimmaraju R, Venkatachalam L, Bhagyalakshmi N (2008) Morphometric and biochemical characterization of red beet (*Beta vulgaris* L.) hairy roots obtained after single and double transformations. *Plant Cell Reports* 27:1039-1052

- Tiwari KN, Tiwari V, Singh J, Singh BD, Srivastava P (2012) Synergistic effect of trimethoprim and bavistin for micropropagation of *Bacopa monniera*. *Biologia Plantarum* 56:177-180
- Tiwari RK, Trivedi M, Guang ZC, Guo GQ, Zheng GC (2007) Genetic transformation of *Gentiana macrophylla* with *Agrobacterium rhizogenes*: growth and production of secoiridoid glucoside gentiopicoside in transformed hairy root cultures. *Plant Cell Reports* 26:199-210
- Tiwari V, Singh BD, Tiwari KN (1998) Shoot regeneration and somatic embryogenesis from different explants of Brahmi [*Bacopa monniera* (L.) Wettst.]. *Plant Cell Reports* 17:538-543
- Tiwari V, Tewari KN, Singh BD (2001) Comparative studies of cytokinins on in vitro propagation of *Bacopa monniera*. *Plant Cell, Tissue and Organ Culture* 66:9-16
- Tiwari V, Tiwari KN, Singh BD (2000) Suitability of liquid cultures for *in vitro* multiplication of *Bacopa monniera* (L.) Wettst. *Phytomorphology* 50:337-342
- Tiwari V, Tiwari KN, Singh BD (2006) Shoot bud regeneration from different explants of *Bacopa monniera* (L.) Wettst. by trimethoprim and bavistin. *Plant Cell Reports* 25:629-635
- Toklu1 F, Bicer BT, Karaköy T (2009) Agro-morphological characterization of the Turkish lentil landraces. *African Journal of Biotechnology* 8:4121-4127
- Tripathi N, Chouhan DS, Saini N, Tiwari S (2012) Assessment of genetic variations among highly endangered medicinal plant *Bacopa monnieri* (L.) from Central India using RAPD and ISSR analysis. *3 Biotech* 2:327-336
- Tripathi YB, Chaurasia S, Tripathi E, Upadhyay A, Dubey GP (1996) *Bacopa monniera* L. as an antioxidant: mechanism of action. *Indian Journal of Experimental Biology* 34:523-526

- Triplett BA, Moss SC, Bland JM, Dowd MK (2008) Induction of hairy root cultures from *Gossypium hirsutum* and *Gossypium barbadense* to produce gossypol and related compounds. *In Vitro Cellular and Developmental Biology-Plant* 44:508-517
- Tyler VE (1987) *The new honest herbal*. George F. Stickley Co., Philadelphia, Pa
- Upton R, Graff A, Williamson E, Bunting D, Gatherum M, Walker EB, Butterweck V, Lieflander U, Nahrstedt A, Winterhoff A, Cott J (1997) *St. John's Worth, Hypericum perforatum*: Quality Control, Analytical and Therapeutic Monograph. American Herbal Pharmacopoeia, Santa Cruz, CA
- Vadehra DA, Harmon LG (1969) Factors affecting production of staphylococcol lipase. *Journal of Applied Bacteriology* 32:147-150
- Vahdati K, Leslie C, Zamani Z, McGranahan G (2004) Rooting and acclimatization of *in vitro* grown shoots from mature trees of three persian walnut cultivars. *HortScience* 39:324-327
- Vasil V, Vasil Ik (1980) Isolation and culture of cereal protoplasts. *Theoretical and Applied Genetics* 56:97-99
- Vengadesan G, Pijut PM (2009) *In vitro* propagation of northern red oak (*Quercus rubra* L.). *In Vitro Cellular and Developmental Biology-Plant* 45:474-482
- Vijayakumar M, Vijayakumar R, Stephen R (2010) *In vitro* propagation of *Bacopa monnieri* L. - a multipurpose medicinal plant. *Indian Journal of Science and Technology* 3:781-786
- Vitali G, Ventrone A (2002) *Plant Biosystems* 136:109
- Walker L, Sirvent T, Gibson D, Vance N (2001) Regional differences in hypericin and pseudohypericin concentrations and five morphological traits among *Hypericum perforatum* plants in the North-western United States. *Canadian Journal of Botany* 79:1248-1255

- Wang J, Gao W, Huang T, Cao Y (2009) Effects of culture conditions on biomass and active components of suspension cells of *Panax quinquefolium*. *China Journal of Chinese Materia medica* 34:375-378
- Wang JW, Tan RX (2002) Artemisinin production in *Artemisia annua* hairy root cultures with improved growth by altering the nitrogen source in the medium. *Biotechnology Letters* 24:1153-1156
- Wang Y, Weathers PJ (2007) Sugars proportionately affect artemisin production. *Plant Cell Reports* 26:1073-1081
- Washida D, Shimomura K, Nakajima YM (1998) Cinererosides in hairy roots of *Panax* hybrid. *Phytochemistry* 49:2331-2335
- Weathers PJ, DeJesus-Gonzalez L, Kim YJ, Souret FF, Towler MJ (2004) Alteration of biomass and artemisinin production in *Artemisia annua* hairy roots by media sterilization method and sugars. *Plant Cell Reports* 23:414-418
- Weisburg WA, Barns SM, Pelletier DA, Lane DJ (1991) 16S rDNA amplification for phylogenetic study. *Journal of Bacteriology* 173:697-703
- Welsh J, McClelland M (1990) Fingerprinting genomes using PCR with arbitrary primers. *Nucleic Acids Research* 18:7213-7218
- West-Eberhard MJ (1989) Phenotypic plasticity and the origins of diversity. *Annual Review of Ecology and Systematics* 20:249-278
- White EM, Wilson FEA (2006) Responses of grain yield, biomass and harvest index and their rates of genetic progress to nitrogen availability in ten winter wheat varieties. *Irish Journal of Agricultural and Food Research* 45:85-101
- Williams JG, Kubelik AR, Livak KJ, Rafalski JA, Tingey SV (1990) DNA polymorphisms amplified by arbitrary primers are useful as genetic markers. *Nucleic Acids Research* 18:6531-6535

- Wilson ID, Neill S, Hancock JT (2008) Nitric oxide signalling in plants. *Plant, Cell and Environment* 31:622-631
- Xin C, Yin L, Guocheng D, Jian C (2005) Application of response surface methodology in medium optimization for spore production of *Coniothyrium minitans* in solid state fermentation. *World Journal of Microbiology and Biotechnology* 21:593-599
- Yamakawa T, Kato S, Ishide K, Kodama T, Minoda Y (1983) Production of anthocyanins by vitis cells in suspension culture. *Agriculture and Biological Chemistry* 47:2185-2191
- Yamanaka M, Ishibashi K, Shimomura K, Ishimaru K (1996) Polyacetylene glucosides in hairy root cultures of *Lobelia cardinalis*. *Phytochemistry* 41:183-185
- Yasodha R, Sumathi R, Gurumurthi K (2004) Micropropagation for quality production in plantation forestry. *Indian Journal of Biotechnology* 3:159-170
- Yeoman MM, Davidson AW (1971) Effect of Light on Cell Division in Developing Callus Cultures. *Annals of Botany* 35:1085-1100
- Yu KW, Gao WY, Hahn EJ, Paek KY (2001) Effects of macro elements and nitrogen source on adventitious root growth and ginsenoside production in ginseng (*Panax ginseng* C. A. Meyer). *Journal of Plant Biology* 44:179-184
- Yu S, Kwok KH, Doran PM (1996) Effect of sucrose, exogenous product concentration and other culture conditions on growth and steroidal alkaloid production by *Solanum aviculare* hairy roots. *Enzyme and Microbial Technology* 18:238-243
- Zehra M, Banerjee S, Sharma S, Kumar S (1999) Influence of *Agrobacterium rhizogenes* strains on biomass and alkaloid productivity in hairy root lines of *Hyoscyamus muticus* and *H. albus*. *Planta Medica* 65:60-63
- Zenk MH, El-Shagi H, Arens H, Stöckigt J, Weiler EW, Deus B (1977) Formation of the indole alkaloids serpentine and ajmalicine in cell suspension cultures of *Catharanthus*

- roseus*. In: Barz W, Reinhard E, Zenk MH (eds) Plant tissue culture and its biotechnological application. Springer, Berlin, pp27–43
- Zhang H, Turnerb NC, Poole ML (2012) Increasing the harvest index of wheat in the high rainfall zones of southern Australia. *Field Crops Research* 129:111-123
- Zhang J, Greasham R (1999) Chemically defined media for commercial fermentations. *Applied and Microbiology and Biotechnology* 51:407-421
- Zhang W, Furusaki S (1997) Regulation of anthocyanin synthesis in suspension cultures of strawberry cell by pH. *Biotechnology Letters* 19:1057-1061
- Zhao B, Agblevor FA, Ritesh KC, Jelesko JG (2013) Enhanced production of the alkaloid nicotine in hairy root cultures of *Nicotiana tabacum* L. *Plant Cell, Tissue and Organ Culture* 113:121-129
- Zhao D, Xing J, Li M, Lu D, Zhao Q (2001) Optimization of growth and jaceosidin production in callus and cell suspension cultures of *Saussurea medusa*. *Plant Cell, Tissue and Organ Culture* 67:227-234
- Zhong JJ (1998) Production of ginseng saponin and polysaccharide by cell cultures of *Panax notoginseng* and *Panax ginseng* - Effects of plant growth regulators. *Applied Biochemistry and Biotechnology* 75:261-268
- Zhong JJ, Wang SJ (1998) Effects of nitrogen source on the production of ginseng saponin and polysaccharide by cell cultures of *Panax quinquefolium*. *Process Biochemistry* 33:671-675
- Zietjiewicz E, Rafalski A, Labuda D (1994) Genome fingerprinting by simple sequence repeat (SSR)-anchored polymerase chain reaction amplification. *Genomics* 20:176-183