

Camellia Biotechnology: A Bibliographic Search

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Abstract

This bibliographic search covers the references till December 2001 on various aspects of tissue culture, molecular biology and genetic engineering work on tea and other related *Camellia* species.

Key words: Camellia, tea, micropropagation, DNA, genetic transformation, molecular markers.

Introduction

The genus *Camellia* of family Theaceae comprise of more than 325 species. Among them tea is the most important economic species. Several other species are also important due to their ornamental value. Although vegetative propagation and conventional breeding are the only means for propagation and improving the plant, there is tremendous scope to assist the conventional breeding by using various biotechnological techniques to improve this crop. Thus there is an increasing effort towards biotechnological research on tea.

More than 200 research papers including abstracts, review etc published till December 2001, are included here. The areas covered in the present search are micropropagation, protoplast culture, cry preservation, synthetic seed production, genetic transformation, molecular markers like RAPD, RFLP, AFLP, SSR, ISSR, organelle DNA analysis and cloning of gene.

Thus the bibliographic search will be of immense help for the researches working on tea or other *Camellia* species with same interest across the world.

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1. Ackerman, W.L. 1978. Handling Camellia seed by aseptic culture. Am. Camellia Year Book. 70-74.
2. Agarwal B, Singh U & Banerjee M (1992) *In vitro* clonal propagation of tea (*Camellia sinensis* (L.) O. Kuntze). Plant Cell Tissu. Org. Cult. 30: 1-5.
3. Akula A & Akula C (1999) Somatic embryogenesis in tea (*Camellia sinensis* (L.) O Kuntze). In: Jain SM, Gupta PK & Newton RJ (eds) Somatic embryogenesis in woody plants Vol 5 (pp. 239-259) Kluwer Academic Publishers, UK.
4. Akula A & Dodd WA (1998) Direct somatic embryogenesis in a selected tea clone, 'TRI-2025' (*Camellia sinensis* (L.) O. Kuntze) from nodal segment. Plant Cell Rep. 17: 804-809.
5. Akula A, Akula C & Bateson M (2000) Betaine a novel candidate for rapid induction of somatic embryogenesis in tea (*Camellia sinensis* (L.) O.Kuntze). Plant Growth Regul. 30:241-246.
6. Anderson S (1994) Isozyme analysis to differentiate between tea clones. Inligtingsbulletin Institut vir Tropiese en Subtropiese Gewasse. 266:15.
7. Anderson WC (1984) A revised tissue culture medium for shoot multiplication of Rhododendron. J. Amer Soc. Hort Sci. 109: 343-347.
8. Arulpragasam PV & Latiff R (1986) Studies on the tissue culture on tea (*Camellia sinensis* (L.) O. Kuntze). 1. Development of a culture method for the multiplication of shoots. Sri Lanka J. Tea Sci. 55: 44-47.
9. Arulpragasam, P.V. 1991. Micropropagation of tea: Achievement and future prospects. The Assam Review and Tea News. 80(8):13-20.
10. Arulpragasam, P.V. 1991. Micropropagation of tea: Achievement and future prospects. Int Conf. On Tea Research: Global perspective. Jan. 11-12, Calcutta, 1-5. .
11. Arulpragasam PV, Latiff R & Seneviratne P (1988) Studies on the tissue culture of tea (*Camellia sinensis* (L.) O. Kuntze). 3. Regeneration of plants from cotyledon callus. Sri Lanka J. Tea Sci. 57: 20-23.
12. Ayyappan, P and Rajkumar, R. 1989. Somatic embryogenesis and plantlet regeneration from cotyledons of *Camellia sinensis* (L.) O.Kuntze. Proc. National Symp. On "Recent Advance in Plant Cell Research", Kerala university, India. June. pp19-21.
13. Bag N, Palni LMS & Nandi SK (1997) Mass propagation of tea using tissue culture methods. Physiol. Mol. Biol. Plants. 3: 99-103.

14. Bagratishvili DG, Zaprometov MN & Butenko RG (1979) Obtaining a cell suspension culture from the tea plant. *Fiziol. Rast.* 26: 449-451.
15. Bagratishvili DG, Zaprometov MN & Butenko RG (1980) Formation of phenolics in suspension culture of tea plant cells as affected by nitrate level and hormonal effector in the media. *Plant Physiol. (Russian)*.27(2): 404-412.
16. Bagratishvili DG, Zaprometov MN & Butenko RG (1984). Effect of abscisic acid on tea plant cell culture growth and on the synthesis of phenolics. *Plant Physiol. (Russian)*.31(5): 980-982.
17. Balasubramanian S, Marimuthu S, Rajkumar R & Balasaravanan T (2000) Isolation , culture and fusion of protoplast in tea. In: Muraleedharan. N & Rajkumar R (eds) Recent advance in plants crops research. (pp. 3-9) Allied publishers Ltd. India.
18. Balasubramanian S, Marimuthu S, Rajkumar R & Haridas V (2000) Somatic embryogenesis and multiple shoot induction in *Camellia sinensis* (L.) O. Kuntze. *J. Plant Crops.* 28: 44-49.
19. Balasubramanian S, Marimuthu S, Rajkumar R & Balasaravan. T. 1998. Isolation, culture and fusion of protoplast in tea. Abstr. PLACROSYM XIII, Coimbatore, Dec 16-18, pp1.
20. Ballester, A., Janeiro, L.V and Vieitez, A.M 1997. Cold storage of shoot cultures and alginate encapsulation of shoot tips of *Camellia japonica* L. and *Camellia reticulata* Lindley. *Sci. Hort.* 71:67-78.
21. Banerjee M & Agarwal B (1990) *In vitro* rooting of tea, *Camellia sinensis* (L.) O. Kuntze. *Ind. J. Exp. Biol.* 28: 936-939.
22. Bano Z, Rajaratnam S & Mohanty BD (1991) Somatic embryogenesis in cotyledon culture of tea (*Thea sinensis* L.) *J. Hort. Sci.* 66: 465-470.
23. Barbara, H.T. 1997. A re-examination of the phylogenetic relationships within the genus *Camellia*. *Int. Camellia J.* 130-134.
24. Barciela J & Vieitz AM (1993) Anatomical sequence and morphometric analysis during somatic embryogenesis on cultured cotyledon explants of *Camellia japonica* L. *Ann. Bot.* 71: 395-404.
25. Bennett, W.Y.1978. Tissue culture for Camellias. II. *Am. Camellia Year Book.* 2-104.
26. Bennett, W.Y. and Scheibert, P. 1982. *In vitro* regeneration of callus and plantlets from cotyledons of *Camellia japonica*. *Camellia J.* 37:12-15.
27. Bennett, W.Y.1977. Tissue culture for Camellias. I. *Am. Camellia Year Book.* 188-190.
28. Becker DK & Dood WA (1994) The use of polyphenyl polypyrrolidone and a microtechnique for the isolation and purification of protoplasts from tea (*C sinensis* (L.) O.Kuntze). In review.

29. Beretta D, Vanoli M. & Eccher T (1987) The influence of glucose, vitamins and IBA on rooting of *Camellia* shoots *in vitro*. Abstr. Symp. on Vegetative Propagation of Woody Species, Pisa Italy p.105.
30. Bezbaruah HP (1971) Cytological investigation in the family theaceae-I. Chromosome numbers in some *Camellia* species and allied genera. Caryologia. 24: 421-426.
31. Biao X, Kuboi T, Xu J & Yongyan B (1998) Effect of polyphenol compounds on tea plant transformation. American Society for Plant Physiologists. Abstr. 314.
32. Bisht, M.S., Vyas, P., Bag, Nand Palani, L.M.S. 1998. Micropropagation of some plants of Indian Himalayan region. In: Srivastava, P.S. (ed) Plant Tissue Culture and Molecular Biology- application and prospects. Narosa Publishing House. New Delhi. pp 126-170.
33. Borthakur S, Mondal TK, Parveen SS, Guha A, Sen P, Borthakur A. & Deka PC (1998) Isolation of chloroplast DNA from tea, *Camellia* sp. Ind. J. Exp Biol. 36:1165-1167.
34. Borthakur S, Mondal TK, Borthakur A & Deka PC (1995) Variation in peroxidase and esterase isoenzymes in tea leaves. Two and a Bud. 42: 20-23.
35. Carlisi JC & Torres KC (1986) *In vitro* shoot proliferation of *Camellia* 'Purple Dawn'. Hort. Sci. 21: 314.
36. Chaudhary R, Lakhanpal S, Chandel KPS (1990) Germination and desiccation tolerance of tea (*Camellia sinensis* (L.) O. Kuntze) seeds and feasibility of cryopreservation. Sri Lank J Tea Sci. 59: 89-94.
37. Chaudhury R, Radhamani J & Chandel KPS (1991) Preliminary observation in the cryopreservation of desiccated embryonic axes of tea (*Camellia sinensis*) L.O.Kuntze) seeds for genetic conservation. Cryo-letters 12:31-36.
38. Chen C (1996) Analysis on the isozymes of tea plants F₁ hybrids. J. Tea. Sci. 16: 31-3.
39. Chen Z & Liao H (1982) Obtaining plantlet through anther culture of tea plants. Zhongguo chaye. 4:6-7.
40. Chen Z & Liao H (1983) A success in bringing out tea plants from the anthers. China Tea 5:6-7.
41. Chengyin L, Weihua L & Mingjun (1992) Relationship between the evolutionary relatives and the variation of esterase isozymes in tea plant. J. Tea Sci. 12:15-20.
42. Creze J & Beauchesne MG (1980) *Camellia* cultivation *in vitro*. Int. *Camellia* J. 12: 31-34

43. Carter, J. and Seema, D. 1997. Effect of different levels of BAP on *in vitro* regeneration and growth of *Camellia japonica* nodal explants. *Camellia J.* 52(4): 11-13.
44. Chen, J.S and Thseng, F.M. 1985. The differentiation rate of root and callus induction from developed buds of shoot tip culture in different varieties of tea. *Taiwan Tea Res. Bull.* 5: 31-38.
45. Das SC (1992) Non-conventional techniques of regenerating polyploids in tea. *Proc. 31st Tocklai Conf., TRA, Jorhat; 1992*: 26-30.
46. Das SC & Barman TS (1988) Current state and future potential of tissue culture in tea. *Proc. 30th Tocklai Conf. TRA Jorhat*, pp 90-94.
47. Das SC & Barman TS (1992). Tea shoot regeneration from embryo callus. In: N.S. Subba Rao, C. Balagopalan and S.V. Ramakrishna (eds) *New Treands in Biotechnology*, Oxford and IBH Publishing Co. Pvt Ltd., New Delhi/Bombay. 81-86.
48. Das SC , Barman T.S. and Singh, R. 1990. Tissue culture of tea : Plant Regeneration and establishment in the nursery. *Int. Conf. On tea Research: Global perspective. Jan. 11-12. Calcutta.* pp19-20.
49. Das, S., Jha, T.B and Jha S. 1996. Organogenesis and regeneration from pigmented callus in *Camellia sinensis* (L.) O. Kuntze cv. Nandadevi, an elite Darjelling tea clone. *Plant Sci. (Limerick).* 121(2): 207-212.
50. Dehua, L and Limin, L. 1990. A study on tissue culture of *Camellia sinensis* L. 1. Inducing embryoid, embryonicells and plant from cotyledon petiole and shoot. *J.Human Agric. College. (China).* 15(3) 33-38.
51. Dehua, L and Limin, L. 1990. A study on tissue culture of *Camellia sinensis* L. 2. Axillary bud and leaf micropropagation techniques. *J. Human Agric. College (China).* 17: 589-599.
52. Dood, W.A. 1994. Tissue culture of tea (*Camellia sinensis* (L.) O. Kuntze – a review. *Int. J. Trop. Agric.* 12 (3&\$): 212-247.
53. Doi, Y. 1981a. Frequency of root differentiation in anther culture of tea. *Study of Tea.* 60: 1-3.
54. Doi, Y. 1980. Suitable cultural conditions for callus induction from stem segments of tea and their application to anther culture. *Study of Tea.* 58:1-9.
55. Doi, Y. 1981b Influence of temperature on growth of callus induced from stem segments of young tea shoots. *Tea Res. J. (Japan).* 53: 42-44.
56. Doi, Y. 1983a. Callus induction and root differentiation in stem and leaf segment cultures of tea plant. *Tea Res J. (Japan)* 57:7-11.
57. Doi, Y. 1983b. Varital difference of callus induction rate and root differentiation rate in anther culture of tea *Tea Res. J. (Japan).* 57:13-17.

58. Forrest GI (1969) Studies on the polyphenol metabolism of tissue culture derived from the tea plant (*C. sinensis* L.) Biochem. J. 113: 765-772.
59. Furuya T Orihara T & Tsuda Y (1990) Caffeine and theanine from cultured cells of *Camellia sinensis*. Phytochemistry. Vol 29 (8): 2539-254.
60. Frisch, C.H. and Champer, N.D. 1987. Effect of synthetic auxins on callus induction from tea stem callus. Plant Cell Tissue. Org. Cult. 8:207-213.
61. Hairong X, Qiqing T & Wanfanz Z (1987) Studies on the genetic tendency of tea plant hybrid generation using isozyme technique. In. Proceedings of the International symposium on Tea Quality and Human Health, China, November 4-9 (pp21-25).
62. Haldeman JH, Thomas RL & Mckamy DL (1987) Use of benomyl and rifampicin for *in vitro* shoot tip culture of *Camellia sinensis* and *Camellia japonica*. Hort. Sci. 22: 306-307.
63. Haldeman JH, Thomas RL 1980. Embryo culture of tea, *Camellia sinensis* on media amended with antimicrobials. *Camellia J.* 43(1): 22-23.
64. Haldeman JH, Thomas RL 1989. Multiple shoot production from single buds of tea, *Camellia sinensis*. *Camellia J.* 44(2) 23-26.
65. Hao C ., Shujuan, Y and Yushu, W 1993. Tea callus culture and catechin accumulation. J. Tea Sci. (China). 13(2): 109-114.
66. Hao C Wang Y & Yang S (1994) Effects of macroelements on the growth of tea callus and the accumulation of catechins. J. Tea Sci (China). 14:31-36.
67. Haridas V, Balasaravanan T, Rajkumar R & Marimuthu S (2000). Factor influencing somatic embryogenesis in *Camellia sinensis* (L.) O.Kuntze. In: Recent Advances in Plantation Crops Research. Muraleedharan & RajKumar R (eds).Allied Publishers Ltd, India. 31-35.
68. Hirai M & Kozaki I (1986) Isozymes of citrus leaves. In: Kitaura K, Akihama T, Kukimura H, Nakajima H, Horie M & Kozaki I (eds) Development of new technology for identification and classification of tree crops and ornamentals (pp73-76) Fruit Tree Research Station, Ministry of Agriculture, Forestry and Fisheries, Japan.
69. Hwang Y-J, Okubo H, Fujieda K (1992) Pollen tube growth, fertilizer and embryo development of *Camellia japonica* L. x *C. chrysantha* (Hu) Tuyama. J. Jpn. Soc. Hort Sci. 60: 955-961.
70. Iddagoda N, Kataeva NN & Butenko RG (1988) *In vitro* clonal micropropagation of tea (*Camellia sinensis* L.) 1. Defining the optimum condition for culturing by means of a mathematical design techniques. Ind. J. Plant Physiol. 31: 1-10.

71. Ikeda N, Kawada M & Takeda Y (1991) Isozymic analysis of *Camellia sinensis* and its interspecific hybrids In: Proceedings of the International Symposium of Tea Science, Shizouka, Japan, Aug. 26-28 p 98.
72. Jain SM. & Newton R J (1990) Prospects of biotechnology for tea improvement. Proc. Indian. Natl. Sci. Acad. 6:441-448.
73. Jain SM, Das SC & Barman TS (1991) Induction of roots from regenerated shoots of tea (*Camellia sinensis* L.). Acta Hort. 289:339-340.
74. Jain SM, Das SC & Barman TS (1993) Enhancement of root induction from *in vitro* regenerated shoots of tea (*Camellia sinensis* L.) Proc. Ind. Natl. Sci. Acad. 59:623-628.
75. Jankun J, Selman SH & Swiercz R (1997) Why drinking green tea could prevent cancer? Nature. 5: 561.
76. Janeiro LV, Ballester A & Vieitez AM (1995a) Effect of cold storage on somatic embryogenesis systems of *Camellia*. J. Hort. Sci. 70: 665-67.
77. Jha TB. & Sen SK (1992) Micropropagation of an elite Darjeeling tea clone. Plant Cell Rep. 11:101-104.
78. Jha TB, Jha S & Sen SK (1992) Somatic embryogenesis from immature cotyledon of an elite Darjeeling tea clone. Plant Sci. 84:209-213.
79. Janeiro LV, Ballester A & Vieitez AM (1997). *In vitro* response of encapsulated somatic embryos of *Camellia*. Plant Cell tissue Org Cult. 51: 119-125.
80. Janeiro LV, Vieitez AM, Ballester, A 1996. Crypreservation of somatic embryos and embryonic axes of *Camellia japonica* L. Plant Cell Rep. 15: 669-703.
81. Kato M (1982) Results of organ culture on *Camellia japonica* and *C. sinensis*. Jpn. J. Breed. 32: 267-277.
82. Kato M (1985) Regeneration of plantlets from tea stem callus. Jpn. J. Breed. 35: 317-322.
83. Kato M (1986a) Micropropagation through cotyledon culture in *Camellia japonica* L. and *Camellia sinensis* L. Jpn. J. Breed. 36:31-38.
84. Kato M (1986b) Micropropagation through cotyledon culture in *Camellia sasanqua*. Jpn. J. Breed. 36: 82-83.
85. Kato M (1989a) *Camellia sinensis* L. (Tea): *In vitro* regeneration. In: Bajaj YSP (ed) Biotechnology in Agriculture and Forestry, Vol. 7. Medicinal and Aromatic Plants II (pp 83-98) Springer-Verlag, Berlin, Heidelberg .
86. Kato M (1996) Somatic embryogenesis from immature leaves of *in vitro* grown tea shoots. Plant Cell Rep. 15:920-923.
87. Katsuo K (1969) Anther culture in tea plant (a preliminary report) Study of tea. 4: 31.

88. Kim KJ, Jansen RK & Olmstead RC (1999) Submitted to EMBL . Accession No. AF 130216.
89. Konwar BK, Das SC, Bordoloi BJ & Dutta RK (1998) Hairy root development in tea through *Agrobacterium rhizogenes*- mediated genetic transformation. Two and a Bud. 45:19-20.
90. Koretskaya TF & Zaprometov MN (1975) Phenolic compounds in the tissue culture of *Camellia sinensis* and effect of light on their formation. Fiziol Rast. 22:941-946.
91. Kron KA & Chase MW (1993) Systematics of the Ericaceae, Empetraceae, Epacridaceae and allied taxa based upon rbcL sequence data. Ann Mo Bot. Gard. 80:128.
92. Kuboi T, Suda M & Konishi S (1991) Preparation of protoplasts from the leaves. Proc Int. Symp.Tea Sci., Shizuoka, Japan. 427-431.
93. Kuranuki Y & Sakai A (1995) Cryo-preservation of *in vitro* grown shoot tips of tea (*Camellia sinensis*) by vitrification. Cryo-letters. 16:345-352.
94. Kuranuki Y & Shibata M (1992) Effect of concentration of plant growth regulators on the shoot apex culture of tea plant. Bull. Shizuoka Tea Expt. Station. 16:1-6.
95. Kuranuki Y & Shibata M (1993) Improvement of medium components for *in vitro* cuttings of tea plant. 2. Optimum concentration of plant growth regulators. J. Tea Sci. 77: 39-45.
96. Kuranuki Y & Yoshida S (1991) Cryopreservation of tea seeds and excised embryonic axes in liquid nitrogen. Proc. Int. Symp. Tea Sci. Shizuoka, Japan. pp 419-420.
97. Li, W. 1986. Present situation and future application of bioengineering in tea plant. China Tea. 1:6-8.
98. Li, W., Shujuan, Y. and Yushu, W. 1987. *In vitro* culture of tea unripe embryo and the formation of plantlet. Proc Int Tea Quality Human Health Symp. Nov. 4-9. 87-90.
99. Lammerts WE (1958) Embryo culture in *Camellia* seed germination. In: Tourje EC (ed) *Camellia* culture (pp171-174) Southern California Camellia Society, Pasadena, California.
100. Magoma GN, Wachira FN, Obanda M, Imbuga M, Agong SG (2000) The use of catechins as biochemical markers in diversity studies of tea (*Camellia sinensis*). Gene Resource Crop Eval. 47:107-114.
101. Manivel, L. 1993. Micropropagation of tea clones through tissue culture. Planter, s chronical. June pp 13-14.
102. Matsumoto S & Fukai M (1998) *Agrobacterium tumefaciens* mediated gene transfer in tea plant (*Camellia sinensis*) cells. Jpn Agri. Res. Quart. 32:287-291.

103. Matsumoto S & Fukai M (1999) Effect of Acetosyringone application on *Agrobacterium*-mediated transfer in tea plant (*Camellia sinensis*). Bull Natl Res Ins Veg Orn. Shizuoka, Japan 14:9-15.
104. Matsumoto S, Takeuchi A, Hayatsu M & Kondo S (1994) Molecular cloning of phenylalanine ammonia-lyase cDNA and classification of varieties and cultivars of tea plants (*Camellia sinensis*) using the tea PAL cDNA probes. Theor. Appl. Genet. 89:671-675.
105. Matsuura T, Kakuda T, Kinoshita T, Takeuchi N and Sasaki K (1991) Production of theanine by callus culture of tea. In: Proc Intl. Symp on Tea Sci, Shizuoka, Japan (pp432-436).
106. Matsuura T, Kakuda T, Kinoshita T, Takeuchi N and Sasaki K (1991) Theanine formation by tea suspension cells. Biosci. Biotech. Biochem. 56(8): 1179-1181.
107. Matsuura T, Kakuda T . 1990. Effects of precursor temperature and illumination on theanine accumulation in tea callus. Agri. Biol. Chem. 54(9): 2283-2286.
108. Mondal TK, A.Bhattacharya, A, Sood and P.S.Ahuja (1998). Micropropagation of tea using thidiazuran. *Plant Growth Regulation*. 26: 57-61.
109. Mondal TK, A, Bhattacharya, A, Sood and P.S.Ahuja (1999). An efficient protocol for somatic embryogenesis and its use in developing transgenic tea (*Camellia sinensis* (L) O. Kuntze) for field transfer. In: A. Altman, M.Ziv and S.Izhar, eds (1999). Plant Biotechnology and *In Vitro* Biology in 21st Century. Kluwer Academic Publishers, Dordrecht, The Netherlands, pp. 101-104.
110. Mondal TK, Singh, HP and Ahuja PS. (2000). Isolation of genomic DNA from tea and other phenolic rich plants. *Journal of Plantation Crops*. 28 (1): 30-34.
111. Mondal TK, Ahuja PS and P.K.Chand. (2000). Molecular characterization of biodiversity in Tea (*Camellia sinensis* (L.) O.Kuntze) germplasm and *ex situ* conservation through *in vitro* culture. Abstract. National seminar on Biodiversity conservation for environment protection. Utkal University, Bhubaneswar, India. 16-17th March.
112. Mondal TK, Bhattacharya A, and Ahuja PS.(2001). Induction of synchronous secondary embryogenesis of Tea (*Camellia sinensis*). *Journal of Plant Physiology*, 158: 945-951.
113. Mondal TK, Bhattacharya A, Sood A and Ahuja PS. (2000). Factor effecting induction and storage of encapsulated tea (*Camellia sinensis* L. O.Kuntze) somatic embryos. *Tea*, Kenya 21:2: 92-100.
114. Mondal TK, Bhattacharya A and Ahuja PS.(2000). Development of a selection system for *Agrobacterium*-mediated genetic transformation of tea (*Camellia sinensis*). *Indian Journal of Plantation Crops*. 29(2) 35-40.

115. Mondal TK, Bhattachray A, Sharma M and Ahuja PS. (1999). Induction of *in vivo* somatic embryogenesis in tea (*Camellia sinensis*) cotyledons. *Current Science* 81 (3): 101-104.
116. Mondal TK and Chand PK (2002). Detection of genetic instability among the microporogated tea (*Camellia sinensis*) Plants. *In vitro cell and dev biol-Plant*. 37:1-5.
117. Mondal TK, Bhattacharya A, Ahuja PS and Chand P.K (2001) Factor effecting *Agrobacterium tumefaciens* mediated transformation of tea (*Camellia sinensis*(L.)O.Kuntze) Plant Cell Reports 20: 712-720.
118. Murali KS, Pandidurai V, Manivel L & Rajkumar R (1996) Clonal variation in multiplication of tea through tissue culture. *J Plant Crops*. 24: 517-522.
119. Nadamitsu S, Andoh Y, Kondo K & Segawa M (1986) Interspecific hybrids between *Camellia vietnamensis* and *C. chrysantha* by cotyledon culture. *Jpn. J. Breed*. 36: 309-313.
120. Nakamura Y (1983) Isolation of protoplasts in from tea plant. *Tea Res. J.* 58: 36-37.
121. Nakamura Y (1985a) Effect of origin of explants on differentiation of root and its varietal difference in tissue culture of tea plant. *Tea Res. J.* 62: 1-8.
122. Nakamura Y (1987a) Shoot tip culture of tea cultivar Yabukita. *Tea Res. J.* 65: 1-7.
123. Nakamura Y (1987b) *In vitro* rapid plantlet culture from axillary buds of tea plant (*C. sinensis* (L.) O. Kuntze). *Bull. Shizuoka Tea Expt. Station*. 13: 23-27.
124. Nakamura Y (1988a) Efficient differentiation of adventitious embryos from cotyledon culture of *Camellia sinensis* and other *Camellia* species. *Tea Res. J.* 67: 1-12.
125. Nakamura Y (1988b) Effects of the kinds of auxins on callus induction and root differentiation from stem segment culture of *Camellia sinensis* (L.) O. Kuntze. *Tea. Res. J.* 68: 1-7.
126. Nakamura Y (1989a) Differentiation of adventitious buds and its varietal difference in stem segment culture of *Camellia sinensis* (L.) O. Kuntze. *Tea Res. J.* 70: 41-49.
127. Nakamura Y (1990) Effect of sugar on formation of adventitious buds and growth of axillary buds in tissue culture of tea. *Bull. Shizuoka Tea Expt. Station*. 15: 1-5.
128. Nakamura Y and Shibita, M (1990). Micropropagation of tea plant (*Camellia sinensis* (L.) O Kuntze)/
129. Odriozola A (1986) Lo que conviene saber sobre la *Camellia*. In: Diputacion P (ed) *La Camellia*. (pp23-30) Peon, Pontevedra, Spain.

130. Ogutuga DBA & Northcote DH (1970b) Caffeine formation in tea callus tissue. J. Expt Bot. 21: 258-273.
131. Ogutuga DBA & Northcote DH (1970a) Biopsynthesis of caffeine in tea callus tissue. Biochem J. 117: 715-720.
132. Okano N & Fuchinone Y (1970) Production of haploid plants by anther culture of tea *in vitro*. Jpn. J. Breed. 20:63-64.
133. Orihara Y & Furuya T (1990) Production of theanine and other γ -glutamine derivatives by *Camellia sinensis* cultured cells. Plant Cell Rep. 9: 1205-1224.
134. Palani, L.M.S. and Bag, N. 1996. Tissue culture studies in tea. In: National Symp. Plant Tissue Cult. Commercialization diversification of agricultural and preservation of fragile ecosystems. Pant Nagar, India pp41.
135. Palani, L.M.S. and Bag, N, Nadeem, M., Tamta, S., Vyas, P., Bisht, M.S., Purohit, V.K., Kumar, A., Nandi, S.K., Pandey, A and Purohit, A.N. 1998. Micropropagation: Conservation through tissue culture of selected Himalayan Plants. In: anonymous (ed). Research for Mountain development: Some initiatives and Accomplishments, Gyanodaya Prakasan, Nainital, India, pp 431-452.
136. Palani, L.M.S., Hao, C and Nakamura, Y. 1999. Advances in tea biotechnology. In: Jain, N.K. 9ed). Global advances in tea science. Aravalli Books International Pvt. Ltd., New Delhi, pp 449-462.
137. Palani, L.M.S., Sood, A., Chand, G., Pandey, A., Jain, N.K. 1992. Tissue culture of tea : Possibilities and Limitations. In: Tea Culture, Processing and Marketing. (Mulky, M.J. and Sharma, V.S (eds)) Oxford and IBH Publishing Co Pvt Ltd., New Delhi, 21-31.
138. Pandey, A., Palani, L.M.S. and Bag, N 2000. Biological hardening of tissue culture raised through rhizosphere bacteria. Biotechnology Letters. 22:1087-1091.
139. Pandidurai V, Murali KS, Manivel L and Rajkumar R (1996) Factors affecting in vitro shoot multiplication and root regeneration in tea. J Plant. Crops. 24:603-609.
140. Pandidurai V, Murali KS, Manivel L and Rajkumar R (1997) Factors influencing in vitro morphogenesis of triploid tea cultivars. Indian J. Plant Physiology 2(2): 158-159.
141. Pandidurai V, Murali KS, Manivel L. 1996. Role of carbondioxide enrichment and PGR application in stimulating growth of in vitro propagated tea. PLACROSYM XII, Kottayam, Nov. 27-29 pp 133-135.
142. Paratasilpin T (1990) Comparative studies on somatic embryogenesis in *Camellia sinensis* var. *sinensis* and *C. sinensis* var. *assamica* (Mast.) Pierre. J. Sci. Soc. Thailand. 16: 23-41.

143. Paul S, Wachira FN, Powell W & Waugh R (1997) Diversity and genetic differentiation among population of Indian and Kenyan tea (*Camellia sinensis* (L.) O. Kuntze) revealed by AFLP markers. Theor. Appl. Genet. 94: 255-263.
144. Pedroso, MC and Pais, MS. 1992. A scanning electron microscope and x-ray micro analysis study during induction of morphogenesis in *Camellia japonica* L. Plant Sci. 87:99-108.
145. Pedroso MC & Pais MS (1993) Direct embryo formation in leaves of *C. japonica* L. Plant Cell Rep. 12: 639-643.
146. Pedroso MC & Pais MS (1994) Induction of microspore embryogenesis in *Camellia japonica* cv. Elegans. Plant Cell Tiss Org Cult. 37: 129-136.
147. Pedroso, M.C and Pais, M.S. 1995b. Factor controlling somatic embryogenesis cell wall changes as an *in vivo* marker of embryogenic competence. Plant cell Tissu. Org. Cult. 43: 147-159.
148. Pedroso, MC and Pais M.S 1995a . Direct embryo formation in leaves of *Camellia japonica* L. Plant Cell Repo., 12: 639-643.
149. Pedroso, MC., Primikrios, N., Roubelaks-Angelakis, K.A and Pais, M.S. 1997. Free and conjugated polyamines in embryogenic and non-embryogenic leaf regions of *Camellia* leaves before and during direct somatic embryogenesis. Physiol. Plant. 101(1): 213-219.
150. Phukan MK & Mitra GC (1984) Regeneration of tea shoots from nodal explants in tissue culture. Curr. Sci. 53: 874-876.
151. Phukan MK & Mitra GC (1990) Nutrient requirements for growth and multiplication of tea plants *in vitro*. Bangladesh J. Bot. 19: 65-71.
152. Plata E & Vieitez AM (1990) *In vitro* regeneration of *Camellia reticulata* by somatic embryogenesis. J. Hort. Sci. 65: 707-714.
153. Plata E (1993) Morphogenesis *in vitro* de *Camellia reticulata*: Proceson de embryogenesis somatica regeneration de plants. Doctoral Thesis, University of Santiago de Compostela, Santiago de Compostela. Plata E, Ballester A & Vieitez AM (1991) An anatomical study of secondary embryogenesis in *Camellia reticulata*. *In vitro* Cell Dev. Biol. 27: 183-189.
154. Ponsamuel J, Samson NP, Ganeshan PS, Satyaprakash V & Abrahan GC (1996) Somatic embryogenesis and plant regeneration from the immature cotyledonary tissues of cultivated tea (*Camellia sinensis* (L.) O. Kuntze). Plant Cell Rep. 16: 210-214,
155. Prakash O, Sood A, Sharma M & Ahuja PS (1999) Grafting micropropagated tea (*Camellia sinensis* (L.) O. Kuntze) shoots on tea seedling- a new approach to tea propagation. Plant Cell Rep. 18: 137-142.
156. Prince LM & Parks CR (2000) Estimation on Relationships of Theoiidae (Theaceae) infreed from DNA Data. Int Camellia J. 32: 79-84.

157. Prince LM & Parks CR (1997) Evolutionary relationships in the tea subfamily Theoideae based on DNA sequence Data. *Int Camellia J.* 29:135-144.
158. Purakayastha A & Das SC (1994) Isolation of tea protoplast and there culture. In: proceedings of 32nd Tocklai Conference. Tea Research association. Tocklai Experimental Station, Jorhat. India.
159. Quoirin M & Lepoivre P (1977) Improved medium for *in vitro* culture of *Prunus* sp. *Acta. Hort.* 78: 437-442.
160. Raina SK & Iyer RD (1992) Multicell pollen proembryoid and callus formation in tea. *J plantation crop.* 9: 100-104.
161. Raj Kumar R & Ayyappan P (1992) Somatic embryogenesis from cotyledonary explants of *Camellia sinensis* (L.) O. Kuntze. *The Planters Chronicle*. May. 227-229.
162. Raj Kumar R & Ayyappan P (1992) Micrppropagation of *Camellia sinensis* (L.) O kuntze. *J Plant Crops* 20: 252-256,
163. Rajasekaran P & Mohankumar P (1992) Rapid micropropagation of tea (*Camellia* spp). *J Plant Crops.* 20:248-251.
164. Rajasekaran P 1996. An *in vitro* and ex vitro rooting of micropropagated shoots of tea. (*camellia* spp.). *Sri Lankan J. tea Sci.* 64(1/2):12-20.
165. Rajshekar, P. 1997. Development of molecular markers using AFLP in tea. *Proceeding of National Seminar on Molecular Approaches to crop Improvement.* 29-31. Dec. Kottayam, Kerala. 122-129.
166. Rajshekar, P and Raman, K, 1993. Propagation of tea in vitro cultivars of nodal explants. *J. Plant Crops.* 21(1): 8-14.
167. Roberts EAH, Wight W & Wood DJ (1958) Paper chromatography as an aid to the identification of *Thea camellias*. *New Phytol.* 57: 211-225.
168. Saha SK and Bhattacharya NM (1992) Stimulating effect of elevated temperatures on callus production of meristemoids from pollen culture of tea (*Camellia sinensis* (L.) O. Kuntze). *Indian J.Expt.Biol.* 30: 83-86.
169. Saha, D.K and Bhattacharya, N.M 1998. In vitro development of short species from pollen callus in the anther culture of tea (*Camellia sinensis* (L.) O. Kuntze). *Proc. Seminar on cell and tissue culture in field Crop Improvement Food and Fukliger Technology Centre, ASPACT* pp 135-144.
170. Samartin, A. (1988). *In vitro* regeneration of adult *Camellia japonica* L and *Camellia sasanqua* Tunberg. *Int Camellia J.* 20: 51-55.
171. Samartin A (1991) Potential for large scale *in vitro* propagation of *Camellia sasanqua* Thunb. *J. Hort. Sci.* 67: 211-217.
172. Samartin A, Vieitez AM & Vieitez E (1984) *In vitro* propagation of *Camellia japonica* seedlings. *Hort. Sci.* 19 225-226.

173. Samartin A, Vieitez AM & Vieitez E (1986) Rooting of tissue cultured camellias. J. Hort. Sci. 61: 113-120.
174. Sandal I, Bhattacharya A & Ahuja PS (2001) An efficient liquid culture system for tea shoot proliferation. Plant Cell Tissue Organ Culture. 65: 75-80.
175. San-Jose MC & Vieitez AM (1990) *In vitro* regeneration of *Camellia reticulata* cultivar 'Captain Rawes' from adult material. Sci. Hortic. 43: 155-162.
176. San-Jose MC & Vieitez AM (1992) Adventitious shoot regeneration from *in vitro* leaves of adult *Camellia reticulata*. J. Hort. Sci. 67: 677-683.
177. San-Jose MC & Vieitez AM (1993) Regeneration of *Camellia* plantlets from leaf explant cultures by embryogenesis and caulogenesis. Sci. Hortic. 54: 303-315.
178. San-Jose MC, Vidal N and Vieitez AM (1991) Improved efficiency of *in vitro* propagation of *Camellia reticulata* cv. captain leaves. J. Hort. Sci. 66: 755-762.
179. Sarathchandra TM, Upali PD & Wijewardena RGA (1988) Studies on the tissue culture of tea (*Camellia sinensis* (L.) O. Kuntze) 4. Somatic embryogenesis in stem and leaf callus cultures. Sri Lank. J. Tea Sci. 52: 50-54.
180. Sarathchandra TM, Upali PD & Arulpragasam, P.V. 1990. Progress towards the commercial propagation of tea by tissue culture techniques., Sri Lankan J. Tea Sci. 59: 62-64.
181. Sarwar M (1985) Callus formation from explanted organs of tea (*Camellia sinensis* L.). J. Tea Sci. 54: 18-22.
182. Seneviratne, P., Latiff, R. and Arulpragasam, P.V. 1988. Studies on the tissue culture of tea (*Camellia sinensis* (L.) O. Kuntze). 2 Rooting of shoots produced in culture. Sri Lankan J. Tea Sci. 57:16-19.
183. Savolainen V, Manen JF, Douzery E & Spichigen R (1994) Molecular phylogeny of families related to Celastrales based on rbcL 5' flanking sequences. Mol Phylo. Evol. 3:27-37.
184. Seurei P (1996) Tea improvement in Kenya: A review. Tea. 17: 76-81.
185. Sharma M, Sood A, Nagar PK, Prakash O & Ahuja PS (1999) Direct rooting and hardening of tea microshoots in the field. Plant Cell Tissue Org Cult. 58: 111-118.
186. Shibata M & Kuranuki Y (1993) Improvement of medium components for *in vitro* cuttings of tea plant. 1. Effects of concentration of some components of MS medium and comparison between MS medium and woody plant medium. J. Tea Sci. 77: 39-45.

187. Shimokado T, Murata & Miyaji Y (1986) Formation of embryoid by anther culture of tea. Jpn. J. Breed. 36: 282-283.
188. Singh HP & Ravindranath SD (1994) Occurrence and distribution of PPO Activity in floral organs of some standard and local cultivars of tea. J. Sci. Food. Agric. 64: 117-120.
189. Singh, I.D. 1978. Applications of plant cell, tissue and organ cultures in tea research and development. Two and a Bud. 25 :63-69.
190. Singh ID (1980) Non conventional approaches to the breeding of tea in north-east India. Two and a bud. 27: 3-6.
191. Singh, R and Jain S,M.1989. Biotechnology of tea : In work shop session: Fruit Trees and Beverages: FAO/CTA Symp: Plant Biotechnology for Developing countries. Luxmanbourg pp251-254.
192. Singh M, Bandana & Ahuja PS (1999) Isolation and PCR amplification of genomic DNA from market samples of Dry tea. Plant Mol. Biol. Rep. 17:171-178.
193. Soltis DE, Soltis PS, Nickrent DL, Johnson LA, Hahn WJ, Hoot SB, Sakamoto JA, Kuzoff RK, Kron KA, Chase MW, Swensen SM, Zimmer EA, Chaw SM, Gillespie LJ & Systma KJ (1995). Phylogenetic relationships among angiosperm inferred from 18s rDNA. EMBL Accession No. U42815.
194. Sood A, Palni LMS, Sharma M, Rao DV, Chand G & Jain NK (1993) Micropropagation of tea using cotyledon culture and encapsulated somatic embryos. J. Plant. Crops. 21: 295-300.
195. Sood, A., Dwivedi, S and Chakrabarty, D.N. 1991. *In vitro* propagation of tea *Camellia sinensis* (L.) O. Kuntze-A preliminary study. J Plant. Crops 18 (suppl): 132-134.
196. Spoth HJ, Yoshikawa N, Parks CR (1999) Middlemist Red: Evidence for the genetic identity of old cultivars. Int.Camellia J. 22-26.
197. Tahardi JS & Shu W (1992) Commercialization of clonal micropropagation of superior tea genotypes using tissue culture technology USAID/CDR Network meeting on Tea Crop Biotech Costa Rica.
198. Takeda Y (1994) Differences in caffeine and tanin contents between tea cultivars and application to tea breeding. Jap Agric Res. Quart. 28: 117-123.
199. Takeuchi A & Matsumoto S (1999) Submitted to EMBL. Accession No. AB018686.
200. Takeuchi A, Matsumoto S & Hayatsu M (1994a) Amplification of β -tubulin cDNA from *Camellia sinensis* by PCR. Bull. Nat. Res. Inst. Veg. Orna. 7:13-20.
201. Takeuchi A, Matsumoto S & Hayatsu M (1994b) Chalcone Synthase from *Camellia sinensis*: Isolation of the cDNAs and the organ-specific and sugar responsive expression of the genes. Plant Cell Physiol. 35(7): 1011-1018.

202. Tanaka JI, Sawai Y & Yamaguchi S (1995) Genetic analysis of RAPD markers in tea. *J. Jpn. Breed.* 45(2): 198-199.
203. Tanaka JI. & Yamaguchi S (1996) Use of RAPD markers for the identification of parentage of tea cultivars. *Bull. Nat. Res. Inst. Veg. Orna. Plant Tea.* 9: 31-36.
204. Thakor BH (1997) A re-examination of the phylogenetic relationships within the genus *Camellia*. *Int Camellia J.* 29: 130-134.
205. Tian-Ling, L 1982. Regeneration of plantlets in cultures of immature cotyledons and young embryos of *Camellia oleifera*. *Abel. Acta Biol. Exp.Sin.* 15:393-403.
206. Tiao-Jiang, X and Christie, C.B. 1997. Identification of closely related *Camellia* hybrids and mutants using molecular markers. *Int. Camellia J.* 111-116.
207. Tiao-Jiang, X., Li-fang, X and Christie, C.B. 1994. Identification of *Camellia reticulata* Lindley by using random amplified polymorphic DNAs (RAPD) as genetic markers. *Proceeding International Camellia Congress.* Channel Islands.
208. Tomimoto Y, Yamaguchi S, Ogi Y, Nagatomi S, Ikehashi H & Kowayama Y (1996) Polymorphism of PR-1-like protein detected in pistil of *Camellia*. *Breeding Sci.* 46: 293.
209. Tavasrtkiladze, O.K. and Kutubidze, V.V. 1984. In vitro culture of lateral bud *Thea sinensis*: Abstr. *Int. Symp. Plant tissue and cell culture application to crop improvement.* Olomouc Czech. pp189.
210. Torres KC & Carlisi JA (1986) Shoot and root organogenesis of *Camellia sasanqua*. *Plant Cell Rep.* 5: 381-384.
211. Tosca A, Pondofi R, & Vasconi S (1996) Organogenesis in *Camellia x williamsii*: cytokinin requirement and susceptibility to antibiotics. *Plant Cell. Rep.* 15: 541-544.
212. Ueno S, Tomaru N, Yoshimaru H, Manabe T & Yamamoto S (2000) Genetic structure of *Camellia japonica* L. in an old-growth evergreen forest, Tsushima, Japan. *Mol Eco.* 9:647-656.
213. Tsushida, T. and Doi, Y. 1984. Caffeine, theanine and catechine content in calluses of tea stem and anther. *Nippon Nogeikagaku Kaishi.* 58: 1131-2233.
214. Ueno S, Yoshimaru H, Tomaru N, Yamamoto S (1999) Development and characterization of microsatellite markers in *Camellia japonica* L. *Mole. Eco.* 8:335-336.
215. Vieitez AM & Barciela J (1990) Somatic embryogenesis and plant regeneration from embryonic tissues of *Camellia japonica* L. *Pl Cell Tissue Org. Cult.* 21: 267-274.

216. Vieitez AM (1994) Somatic embryogenesis in *Camellia* spp. In: Jain S, Gupta P & Newton R (eds) Somatic Embryogenesis in Woody Plants (pp235-276) Kluwer Academic Publishers, The Netherlands.
217. Vieitez AM, Barciela J & Ballester A (1989a) Propagation of *Camellia japonica* cv. Alba Plena by tissue culture. J. Hort. Sci. 64: 177-182.
218. Vieitez AM, San-Jose C, Vieitez J & Ballester A (1991) Somatic embryogenesis from Roots of *Camellia japonica* plantlets cultured *in vitro*. J. Amer. Soc. Hort. Sci. 116: 753-757.
219. Vieitez AM, San-Jose MC & Ballester A (1989b) Progress towards clonal propagation of *Camellia japonica* cv. Alba Plena by tissue culture techniques. J. Hort. Sci. 64: 605-610.
220. Vieitez AM, Vieitez ML, Ballester A & Vieitez E (1992) Micropropagation of *Camellia* spp. In: Biotechnology in Agriculture and Forestry, Vol. 19, High Tech and Micropropagation III. (Bajaj Y.P.S. ed.). Springer-Verlag, Berlin Heidelberg. pp 361-387.
221. Wachira F & Ogado J (1995) *In vitro* regeneration of *Camellia sinensis* (L.) O. Kuntze by somatic embryo. Plant Cell Rep. 14: 463-466.
222. Wachira FN, Powell W & Waugh R (1997) An assessment of genetic diversity among *Camellia sinensis* L. (cultivated tea) and its wild relatives based on randomly amplified polymorphic DNA and organelle specific STS. Heridity. 78(6): 603-611.
223. Wachira FN, Waugh R, Hackett CA & Powell W (1995) Detection of genetic diversity in tea (*Camellia sinensis*) using. RAPD markers. Genome. 38: 201-210.
224. Wachira FN. 1990. Desirable tea plants: An overview of a search for markers. Tea. 11(1): 42-48.
225. Wachira, F.N. 1994. Breeding and clonal selection in relation to black tea quality: A Review. Tea. 15(1): 56-66.
226. Wendel JF & Parks CR (1982) Genetic control of isozyme variation in *Camellia japonica* L. J. Hered., 73: 197-204.
227. Wendel JF & Parks CR (1983) Cultivar identification in *Camellia japonica* L. using allozyme polymorphisms. J. Amer. Soc. Hort. Sci. 108: 290-295.
228. Wickremaratne MR (1981) Variation in some leaf in tea (*Camellia sinensis* L.) and their use in the identification of clones. Tea. Q. 50: 183-189.
229. Wright LP, Apostolides Z, Louw AI (1996) DNA fingerprinting of clones. In: (Whittle, A.M., Khumalo, F.R.B) Proceeding of the 1st Regional Tea Research seminar. Blantyre, Malawi. 22-23. March. 1995. pp 44-50.
230. Wu CT, Huang TK, Chen GR. & Chen SY (1981) A review on the tissue culture of tea plants and on the utilization of callus derived plantlets In: Rao

AN (ed) Tissue culture of Economically Important plants (pp104-106) Proc. Costed. Symp Singapore.

231. Wu KS & Tanksley SD (1993) Abundance, polymorphism and genetic mapping of microsatellite in rice. *Mol. Genet.* 241: 225-235.
232. Xu H, Ton Q & Zhuang W (1987) Studies on genetic tendency of tea plant hybrid generation using isozyme technique. In: *Pro. Int. Tea. Quality and Health Symposium.* (pp21-25).
233. Yamaguchi S, Kunitake T & Hisatomi S (1987) Interspecific hybrid between *Camellia japonica* cv. choclidori and *C. chrysantha* produced by embryo culture. *Jpn. J. Breed.* 37: 203-206.
234. Yamaguchi, S. and Takyu, T. 1991. Liquid-endosperm and condition media for embryo formation in callus culture and planting density in anther culture in *Camellia sinensis*. In: *Proc. Int. Symp. Tea Sci., Shizuka, Japan.* The organising Committee. ISTS pp 400-404.
235. Yan MQ & Ping C (1983) Studies on development of embryoids from the culture cotyledons of *Thea sinensis* L. *Sci. Silv. Sin.* 19: 25-29.
236. Yan MQ, Ping C, Wei M & Wang YH (1984) Tissue culture and transplanting of *Camellia oleifera* *Sci. Silv. Sin.* 20: 341-350.
237. Yang Y & Sun T (1994) Study on the esterase isoenzyme in tea mutagenic breeding. *China Tea.* 16: 4-9.
238. Yoshikawa K & Yoshikawa N (1990) Interspecific hybridization of *Camellia*. *Bull Seibu Maizuru Botanical Institute.* 5: 56-75.
239. Zagorskina, N.V and Zaprometov, M.N. 1979. Effect of naphylacetic acid on growth and phenolic compound formation in tea tissue culture. *Fiziol. Rast.* 26:681-687.
240. Zagorskina, N.V ., Fedoseeva, VG., Frolova, L.V., Azarenkova, N.D. and Zaprometov, M.N. 1994. Tissue culture of tea plant: differentiation, ploidy level and formation of phenolic compounds. *Plant Physiol (Russian).* 41(5): 762-767.
241. Zagorskina, N.V.Klkin, V.V and Lynbavina, O.V. 1993. Lignin of tea plants and callus cultures. *Plant Physiol. (Russian).* 40(3): 465-469.
242. Zagorskina, N.V., Usik, T.B and Zaprometov, M.N. 1979. Tea plant tissue culture: Activity of L-phenylalanine ammonia lyase, formation of phenolic compounds and their seasonal patterns. *Fiziol. Rast.* 37: 511-517.
243. Zagorskina, N.V., Usik, T.B and Zaprometov, M.N. 1991. Effect of illumination time on phenol metabolism of photomixotrophic tea callus cultures. *Fiziol. Rast.* 37: 1089-1095.
244. Zakai, B., Raiarathnam, S and Mohanty, B.D. 1991. Somatic embryogenesis in cotyledon culture of tea. *J. Hort Sci.* 66(4): 465-470.

245. Zaprometov MN., Zagoskina MV & Elkin, V.V 1993. Comparative study of lignins produced by the tea plant and by tea plant derived callus tissue. *Phytochemistry*. 32:709-711.
246. Zaprometov MN, Subbotina, G.A and Nikolaeva, T.N 1994. Effects of kinetine on the synthesis of phenolics and ultrastructural organization in tea plant callus tissue. *Plant Physiol. (Russian)*. 41(3) 354-358.
247. Zaprometov MN, Zagoskina MV ., Koretskaya, TF. 1976. Effects of certain precursors on synthesis of phenolic compounds in tea plant tissue cultures. *Fiziol. Rast.*23: 1274-1279.
248. Zaprometov MN & Zagoskina MV (1979) One more evidence for chloroplast involvement in the biosynthesis of phenolic compounds. *Plant Physiol. (Russian)*. 34: 165-172.
249. Zaprometov MN & Zagoskina MV (1987) Regulation of phenolic compounds formation in cultured cells of tea plant (*Camellia sinensis*). In: *Proc Intl. Tea Quality. Human Health Symp. China*. (pp62-65).
250. Zehra M, Banerjee S, Mathur AK & Kukreja AK (1996) Induction of hairy roots in tea (*Camellia sinensis* (L.) using *Agrobacterium rhizogenes*. *Curr Sci*. 70: 84-86,
251. Zhan Z Ke N & Chen B (1987) The cytology of tea clonal cultivars fujian shuixian and their infertile mechanism. *Proc of Intl Tea quality. Human Health Symp. China* (pp 46).
252. Zhuang C & Liang H (1985a) *In vitro* embryoid formation of *Camellia reticulata* L. *Acta Biol. Exp. Sin.* 18: 275-281.
253. Zhuang C & Liang H (1985b) Somatic embryogenesis and plantlet formation in cotyledon culture of *Camellia chrysantha*. *Acta Bot. Yunn.* 7: 446-450.
254. Zhuang C, Duan J, & Zhou J, (1988) Somatic embryogenesis and plantlets regeneration of *Camellia sasanqua*. *Acta Bot. Yunn.* 10: 241-244

Acknowledgement: I am thankful to Dr P.S. Ahuja, Dr A. Bhattacharya, Dr M. Sharma, Dr A. Sood of IHBT, Palampur, India. I am also grateful to Prof. Ana Vieitez, Spain, Prof. C.R.Parks, USA, Dr S. Matsumoto, Japan for sending their reprints and the referees for proving valuable information.