## Academic Profile of Faculty Member

1. Name: **Dr. Tapan Kumar Nailwal**
2. Designation: **Sr. Associate Professor**

**3**. Qualification: **PhD**

**GBPUA&T, Pantnagar University**

**4.** Area of Specialization/Research Field: **Plant Molecular Biology**

**5.** Awards/Recognitions: **CSIR-NET-2001**

**6.** Number of Research Projects:

**i) Completed**

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| --- | --- | --- | --- | --- |
| S/N | Title of the project | Funding Agency | Amount (Rs.) | Year (from-To) |
| 1. | IN VITRO MICROPROPAGATION OF RHODODENDRON ARBOREUM SM. (VERN., BURANS) AN IMPORTANT FOREST SPECIESOF UTTARANCHAL HILLS. | DBT,  Govt. of India | 15.25 Lacs | Mar2007- Mar 2010 |
| 2. | IN VITRO MICROPROPAGATION OF MEIZOTROPIS PELLITA (VERN., PATWA AVERY RARE, ENDANGERED & ENDEMIC PLANT OF PATWADANGER, NAINITAL-UTTARAKHAND-INDIA | UCOST,  Govt. of Uttarakhand | 06.15 Lacs | Sep 2007-Sep 2009 |
| 3. | IN VITRO MASS MULTIPLICATION OF SUPERIOR CLONES OF APPLE (Pyrusmalus L) CULTIVARS OF RAMGARH REGION OF MUKTESHWAR KUMAUN HILLS, UTTARAKHAND | UGC  Govt. of India | 12.508 Lacs | July 2012- July 2015 |
| 4. | IN VITRO MACRO AND MICRO PROPAGATION WITH BIOCHEMICAL AND MOLECULAR CHARACTERIZATION OF ACONITUM BALFOURI Staph., AND PICRORHIZA KURROA Royle ex Benth, IMPORTANT PLANT SPECIES OF UTTRAKHAND | USBD  Govt.of  Uttarakhad | 10.00 Lacs | June2012-June 2015 |

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| 5. | GENETIC TRANSFORMATION THROUGH AGROBACTERIUM RHIZOGENES FOR ENHANCED PRODUCTION OF POTENTIAL ALKALOIDS IN BERBERIS Spp OF KUMAUN HIMALAYAN REGION | USBD  Govt. of Uttarakhand(CO-PI) | 5.38 Lacs | Nov 2012-  Nov 2015 |
| 6. | STUDIES ON CONSERVATION OF GINKGO BILOBA Linn. (GINKGOACEAE): A RARE EXOTIC MEDICINAL PLANT | UGC  Govt. of India  (CO-PI) | 8.018  Lacs | July 2012-  July 2015 |
| 7. | ASSESSMENT OF ANTIMICROBIAL AND ANTIOXIDANT POTENTIALITY OF SOME GYMNOSPERMS OF KUMAUN HIMALAYA | DBT  Govt. of India  (CO-PI) | 12.0  lacs | July 2014-  July 2017 |

**7.** Number of PhD awarded: **7**

**8.** Number of candidates working for PhD award: **6 (registered)**

**9.** Publications:

**i)** Books:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Author(s)** | **Title** | **Publisher** | **Year of Publication** |
| **1.** | Pankaj, **Tapan K. Nailwal**  **(2018)** | Crop Improvement Through Microbial Technology: a Step Towards Sustainable Agriculture | “Crop improvement through Microbial Biotechnology” ed`s: Ram Prasad, S. S. Gill and Narendra Tuteja. Elsevier, USA | Published |
| **2.** | Md Shahbaz Anwar, Anupam Pandey, Manoj Kumar Singh, Nazia Firdous, Amit Verma, Mohammad Wahid Ansari and **Tapan Kumar Nailwal (2018)** | Ethnobotanical uses of a highly medicinal plant *Prunella vulgaris* and its diversity | IT International Publisher | Published |
| **3.** | Anupam Pandey, Priyanka H Tripathi, Satish Chandra Pandey, Tara Singh Bisht, Vinay Mohan Pathak, **Tapan Kumar Nailwal (2018)** | Removal of toxic pollutants from soil using microbial biotechnology | IGI Global International Publisher | Published |
| **4** | Lalit M.Tiwari, Brij M.Upreti, Neetu Bohra, Mamta Bharti, Naveen Pandey, Neha Chopra, Geeta Tewari, **Tapan Nailwal (2017)** | Conservation of *Ginkgo bioloba* L. through in-vitro techniques and its Molecular characterization | Discovery Publishing House Pvt.Ltd., New Delhi (India) | Published |
| **5** | S.Bhandari, S.Sinha, **Tapan .K Nailwal (2018)** | Youth migration- Reasons and impact on hill agriculture of Uttarakhand. Migration from Indian Himalayas Region Challenges and Strategies. | Jagdamba Publishing Company. New Delhi (India). | Published |
| **6** | KhushbooDasauni, **Tapan K. Nailwal** | The Biodiversity of Microbial life | Recent Advancements in Microbial Diversity, Elsevier | In-Press |
| **7** | Khushboo Dasauni, **Tapan K. Nailwal** | Zinc finger proteins: Novel sources of genes for abiotic stress tolerance in plants | Transcription Factors for Abiotic Stress Tolerance in Plants, Elsevier | In- Press |
| **8** | Khushboo Dasauni, Deepa Bisht and **Tapan K. Nailwal** | Novel nanotechnology based approaches in the treatment of Leishmaniasis | Pathogenesis,Treatment and Prevention of Leishmaniasis, Elsevier | In- Press |
| **9** | Deepa Bisht, Khushboo Dasauni, **Tapan K. Nailwal** | Neoteric strategies for vector control and identification of zoonotic reservoirs | Pathogenesis,Treatment and Prevention of Leishmaniasis, Elsevier | In- Press |
| **10** | Lokesh Tripathi, **Tapan K. Nailwal** | Metagenomics: Applications of functional and |Structural approaches and meta-omics | Recent Advancements in Microbial Diversity, Elsevier | In-Press |
| **11** | S.Bhandari, S.Sinha**, Tapan K. Nailwal** | Nanotechnological: an approach for ehhancement of plant system in terms of Tissue culture | Nanotech. In life science,  Phytonanotechnology  Springer | In- Press |
| **12** | S.Bhandari, S.Sinha**, Tapan K. Nailwal** | Exploration of Microbial communities of Indian Hot springs and their potential Biotechnological applications | Recent Advancements in Microbial Diversity, Elsevier | In-Press |
| **13** | Lokesh Tripathi, **Tapan K. Nailwal** | Leishmaniasis: An Overview of Classification, Evolution, Distribution and Historical Aspects of Parasite and its Vector | Pathogenesis, Treatment and Prevention of Leishmaniasis, Elsevier | In-Press |

**ii) Research articles published**

1. **T.K. Nailwal,** V.K. Gupta, N.K. Sand and R.C. Pant. Role of ethylene in tillering of sugarcane (*Saccharum officinarum* L.). (**2004**). *Physiol. Mol. Biol. of Plants*. 10(1): 127-130. **IF: 0.56**

2. K. Anitha Gomathi, **Tapan Kr. Nailwal**, Gurdeep Bains, Alok Shukla and R.C. Pant. A rapid and efficient protocol for isolation of high quality genomic DNA from mango (*Mangifera indica* L.). (**2005**). *Physiol. Mol. Biol. of Plants* 11(2): 169-171. **IF: 0.56**

3. M.W. Ansari, **T.K. Nailwal**, A. Gomathi, A.K. Singh, G. Bains, A. Shukla, H.S. Chaube, U.S. Singh and R.C. Pant. Mangiferin (1,3,6,7-tetrahydroxyxanthone-C­­­­2-B-D-glucoside­), a phenolic metabolite of mango (*Mangifera indica* L.), affects germination of spore of *Fusarium* sp. (**2005**). *J. Plant Biol*. 32(3): 155-159 **IF: 1.284**

­­4. **T. K. Nailwal,** K. Anitha Gomathi, Gurdeep Bains, N.K. Sand, Alok Shukla and R.C. Pant. Mango (*Mangifera indica* L.) malformation: role of stress ethylene and cyanide. (**2006**). *Physiol. Mol. Biol. of Plants*. 12(2): 163-165 **IF: 0.56**

5. M.W. Ansari, **T.K. Nailwal**, G. Bains, A. Shukla, U.S. Singhand R.C. Pant. Effect of ethrel on germination of spores of *Fusarium* sp. from *Mangifera indica* L. **(2008)***. Pantnagar J Research.* 6(2)

6. A.G. Krishnan, **Tapan K. Nailwal**, Alok Shukla, and Ramesh Chandra Pant. Mango (Mangifera indica. L) malformation an unsolved mystery. **(2009**). *Researcher*. 1(5): 20-36

7. Priti Kumari, Lalit M. Tewari, **Tapan K. Nailwal**, Lalit Singh, Geeta Tewari and Bibbesh K. Singh. Chromosomal abnormalities arising under the action of antibiotics in *Pisum sativum*. (**2009**). *Nature and Science*. 7(3):104-112

8. Mamta Rani, Y.P.S. Pangtey, Lalit M. Tewari, Sanjay Kumar, Jeeven Singh Jalal, Anita Martolia, Kanchan Upreti and **Tapan K. Nailwal**. Taxonomic studies on the family Pteridiaceae Ching and Pterdaceae Ching (Pteridophyta) in Uttarakhand. (**2009**). *Researcher*. 1(4):15-41

9. Manmohan S. Khanka, Lalit M. Tewari, Sanjay Kumar, Lalit Singh and **Tapan K. Nailwal**. Extraction of high quality DNA from *Diploknema Butyracea*. **(2009)**. *Researcher*. 1(3):33-35

10. Rohit Joshi, **Tapan K. Nailwal**, Lalit M Tewari and Alok Shukla. Exploring biotechnology for conserving Himalayan biodiversity. (**2009**). *Researcher*. 1(3):36-45

11. Lalit M. Tewari, Geeta Tewari, **Tapan K. Nailwal** and Y.P.S. Pangtey. Bark factors affecting the distribution of epiphytic ferns communities. (**2009**). *Nature and science*.7(5): 76-81

12. Manisha Pant, **Tapan K. Nailwal**, Lalit M. Tewari, Sanjay Kumar, Priti Kumari, Hemlata Kholia and Geeta Tewari. Molecular characterization of *Valeriana* species with PCR, RAPD and SDS PAGE. (**2009**). *Nature and Science* . 7(7):41-49

13. Prabhat Singh, Anand Singh, Arvind K. Shukla, Lalit Singh, Veena Pande, **Tapan K. Nailwal**. Somatic embryogenesis and *in vitro* regeneration of an endangered medicinal plant Sarpgandha (*Rauvolfia serpentina* L*.*). (**2009**). *Life Science Journal*. 6(2):55-60 **IF: 0.165**

14. Chirag Goel, Pankaj Verma, Naseer Ahmad, **Tapan K. Nailwal**. Molecular characterization of the Nettle Plant *Urtica parviflora* based on RAPD marker. (**2011**). *J. of pharmaceutical and biomedical sciences*. 5(21)

15. Renu Singh, Manoj Kumar Singh, Lovy Raj Chandra, Deepa Bhat, Manmeet Singh Arora, **Tapan K. Nailwal**, Veena Pande. *In vitro* antioxidant and free radical scavenging activity of *Macrotyloma uniflorum* dal from Kumaun region. (**2012**), *Int. J. Fundam Appl Sci.* 1(1): 9-11

16. Shweta Nailwal, **Tapan K. Nailwal**, Meenakshi Sharma and Shivangi Garg. Physico-chemical characterization of algal oil (oilgae) of Kumaun Himalayan origin for potential biofuel application.(**2013**), *J Applied Phytotechnology in Environ Sanitation* 2(4): 91-98 **IF 0.605**

1. Shweta Mishra, **Tapan K. Nailwal,** Ramesh Chandra Pant*In vitro* study of role of ethylene during tillering in sugarcane (*Saccharum officinarum* L.).(**2013)**, *Sugartech*. 16 (3):255-263 **IF: 0.5**
2. Lalit Singh, **Tapan K. Nailwal**, Lalit Tewari.. An *in Vitro* Approach for the Conservation of *Meizotropis pellita*: An Endangered and Endemic Plant. (**2013)**. *American Journal of Plant Sciences*. 4:1233-1240 **IF: 0.81**
3. Shweta Nailwal and**Tapan K. Nailwal.** Evaluation of antioxidant capacity and total phenolic content of selected microalgae of kumaun himalayan region.**(2013)**. *International Journal of Pharma and Bio Sciences*. 4(3): 344-355 **IF: 0.67**
4. Vineeta Pandey, **Tapan K. Nailwal**, Rachana bajpai, Geeta Tewari, Kamal Kishor and Lalit M. Tewari.Studies on Morphological, Chemical and Molecular Aspects of *Ocimum* species From Central Himalaya, India.**(2013)**. *Report and Opinion*. 5 (9): 31-35
5. Shweta Mishra, **Tapan K. Nailwal**, Sashi Bhusan Agrawal. Study on Individual and Interactive effects of supplemental UV-B radiation and heavy metals on *Spinacea oleracea*. **(2014)**. *Journal of Environ Biol*. 35(2): 333-340 **IF: 0.68**
6. Shweta Nailwal, Md. Shahbaz Anwar, Kamal Kant Budhani, Amit Verma, **Tapan K. Nailwal**. Burkholderia sp. from rhizosphere of Rhododendron arboretum: Isolation, identification and plant growth promontory (PGP) activities.**(2014)**. *Journal of Applied and Natural Science*. 6(2):473-479
7. Pankaj, **Tapan K. Nailwal**, Lalit Singh and Amit Panwar.Isolation and characterization of rhizobial isolates from rhizospheric soil of an endangered plant Meizotropis pellita.**(2014)**. *Asian Jr. of Microbio. Biotech. Env. Sc*.16(2): 301-306

24. Mohammad Shahbaz Anwar, Mohammad Tahir Siddique, Amit Verma, Yalaga Rama Rao, **Tapan K. Nailwal,** Mohammad Wahid Ansari and Veena Pande. Multitrait palnt growth promoting (PGP) rhizobacterial isolates from *Brassica juncea* rhizosphere, keratin degradation and growth promotion. **(2014)**. *Communicative and Integrative Biology 7* (1): e72683; 1-9 **IF: 1.6**

25. Neelu Joshi, Alok Shukla , **Tapan K. Nailwal** . Taxonomic and phytomedicinal properties of *O. indicum*(L.) Vent: A wonderful gift of nature. **(2014)**. *Journal of Medicinal Plant* Research. 8(38): 1148-1155*.*

26. Aseem Kerketta, Vijay Sirohi and **Tapan K. Nailwal**. Antioxidant activity of *Meizotropis pellita*: A critically endangered and endemic plant of Himalayan region. **(2014)**. *Indian J. Sci. Res.*4(1): 140-144

27. M. K. Singh, Charu Joshi, Neelu Joshi, Ruchika Sharma, Latika Brijwal, Ravi shekhar Kumar, **Tapan K. Nailwal**. Scrutinizing the antioxidant potential of *Prunella vulgaris* L.: A medicinal plant from central Himalayan region. **(2015)***International Journal of Fundamental and Applied Science* .4(1): 1–8.

28. Geeta tewari, Brijmohan, Lalit tewari, Kamal Kishor, **Tapan K. Nailwal** and Manoj Singh. Comparative phytochemical composition and antimicrobial potential of leaf and twig extracts of *Ginkgo biloba* L. from India. **(2015)**. *G- Journal of Environmental Science and Technology*. 2(6)

29. Geeta Tewari, Brij Mohan, Kamal Kishor, Lalit M. Tewari, and **Tapan K. Nailwal**. Volatile constituents of Gingo Biloba L. Leaves from Kumaun : a source of (E)-nerolidol and phytol. **(2015).** J. Indian Chem. Soc., 92(1583-1586)

30. M. Dhaka and **Tapan K Nailwal**. High efficiency macropropagation of potato (*Solanum tuberosum* L.) cv. Kufri jyoti in Kumaun Hills. **(2015).** Journal of plant breeding and crop Science, 7(7) 203-210

31. Ravi Shekhar Kumar, Charu Joshi, and **Tapan Kumar Nailwal**. Callus Induction and Plant Regeneration from Leaf Explants of Apple (*Pyrus Malus l*.,) cv. Golden Delicious. **(2016)** International Journal of Current Microbiology and Applied Science 2(502-510)

32. Charu Joshi, Ravi Shekhar Kumar and **Tapan Kumar Nailwal**. Effect of Gibberellic Acid, Potassium Nitrate and chilling on seed germination response of Apple. (*Pyrus Malus L*.,) cv. red delicious . **(2016).** International journal of advance research. 4(1141-1155)

33. Neelu Joshi and **Tapan Kumar Nailwal.** High Frequency Shoot Proliferation of Medicinal

Forest Tree Shyonak (*Oroxylum indicum)* Promotedby Silver Nitrate **(2016). (communicated)**

34. Manoj Kumar Singh, Pravesh Mishra, Ruchika Sharma, **Tapan Kumar Nailwal.** Antimicrobial potential of wild and micro-propagated Meizotropis pellita- an endemic and endangered plant of Kumaun Himalayas. (2017). International journal of advance research in science and Engineering

35. OjoMicheal Oseni, Veena Pande and **Tapan Kumar Nailwal (2018).** A review on plant tissue culture, A technique for propagation and conservation of endangered plant species. ***International Journal of Current Microbiology and Applied Sciences. ISSN: 2319-7706 Vol. 7 Number 07.***

36. Majumder B., Pandey A. K., Oksanen E., **T. K. Nailwal, Pandey** V. **(2018).** Evaluation of impact of tropospheric ozone on gladiolus cultivars using ethylene diurea. **Journal of Emerging Technologies & Innovative Research. 5(7): 31-41. 35.**

37. S. Sinha., A. Pandey, **T. K. Nailwal** **(2018).** Comaparative quantification of Baicalein and heavy metal in various aerial parts of *Oroxylum Indicum (L.) Kurz* from Jharkhand and Uttarakhand States of India. **Journal of Medicinal Plant Research. (Accepted manuscript ID JPMR/21.02.18/6572).**

38. OjoMicheal Oseni, **Tapan Kumar Nailwal** and Veena Pande **(2020).** Germination of *Mansonia altissima* (A. Chev.) A. Chev. Var. *altissima*: An endangered valuable timber species in Africa. **Acta Scientiarum Biological Sciences.(Accepted manuscript; ManuscriptURL:http://periodicos.uem.br/ojs/index.php/ActaSciBiolSci/author/submission/47448).**

40. Neelaxi Pandey, Satpal Singh Bisht, MahendraRana, **Tapan Kumar Nailwal**, Vinay Singh**(2019).** Antibiotic potential of few wild Edible fruits of Family Rosaceae. *Bulletin of Environment, Pharmacology and Life Sciences*.,Vol 8 [Suppl.2] PP: S55-S59

**iii)** Papers presented in Conferences/Seminars

|  |  |  |  |
| --- | --- | --- | --- |
| Sl. No. | Title of the paper | Title of conference/seminar | Year |
| 01. | Genetic fidelity using molecular marker and in vitro regeneration of *Meizotropis pellita*: an endangered and endemic forest plant species of Uttarakhand Sneha Bhandari\* and **Tapan K. Nailwal** | Proc. of the International Conference Advancement in Technologies & its applications in Current Era (ICATACE-2018). | 2018 |
| 02. | Betel farming economically important plant for Uttarakhand **Dasauni K., Tasleem M., T.K Nailwal**. | Reinventing Biochemical networks and Nutrition sand Health in post genomic Era *(Poster presentation)* | 2018 |
| 03 | *In vitro* Antimicrobial  Activity of Essential Oils of Medicinal Plants Against Pathogenic Bacteria | International Conference on  Medicinal, Aromatic and  Nutraceutical Plants from  Mountainous Areas  (ACMAP). | 2019 |
| 04. | Next Generation sequencing and role of Bioinformatics in its analysis | International Conference on Emerging Trends in Engineering, Management & Sciences, *(Oral Presentation).* | 2019 |

iv) Articles/Review articles published in books/journals:

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| --- | --- | --- | --- | --- | --- |
| Sl. No. | Title of the paper | Title of the book/journal | Editor/Publisher | Year of publication | Page No. |
| 01. | Ascertanining the Paradigm of Secondary Metabolism Enhancement through gene level modification in therapeutic plants. Swati Sinha, Kajal Sandhu, Neema Bisht, **Tapan Kumar Nailwal,** Ishan Saini and Prashant Kaushik. | J Young Pharm, |  | 2019 | 11(4):337-343. |
| 02. | *Meizotropis pellita* (Patwa): An Endangered Plant Species Khushboo Dasauni, **Mohd Tasleem**, Megha Pant, Deepa Bisht, **T.K.Nailwal** | National Environmental Science Academy  (NESA) | (NESA) | March-2020. | Vol-23 Issue-03 |
| 03. | *Dhatura stramonium* L. as a potential medicinal plantMegha Pant , Mohd Tasleem , KhushbooDasauni,  and **T.K. Nailwal** | National Environmental Science Academy  (NESA) | (NESA) | March-2020. | Vol-23 Issue-03 |
| 04. | Broken bones tree or midnight horror  *Deepa Bisht , Mohd Tasleem , Khushboo Dasauni ,*  *Megha Pant* and *T.K. Nailwal* | National Environmental Science Academy  (NESA) | (NESA) | March-2020. | Vol-23 Issue-03 |
| 05. | 'Role of Brassinosteroids in Mitigating Abiotic Stresses in Plants' authored by Sneha Bhandari and **Tapan K. Nailwal.** | *Biologia* Journal, Springer | Paper has been considered for publication. |  |  |

v) Monographs/Reports (if any) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

vi) IPR Registred/Award \_\_\_\_\_Nil\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Conference/ Seminar organized:

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| --- | --- | --- | --- |
| **S/N** | **Status as organizer** | **Title of the conference/ seminar** | **Year and dates** |
| 1 | Co-organized | All INDIA 27th (BTISnet) Bioinformatics Centre Coordinators Annual Meet | 3-5 March 2016 |
| 2 | Coordinator | “Hands on Training on Modern Techniques in Biotechnology” (Microbial Biotechnology) | 2nd – 11th Jan 2013 |
| 3 | Co-organized | 2nd Uttarakhand Youth Festival | 24-28 Feb 2013 |
| 4 | Co- coordinator | “Hands on Training on Plant Tissue Culture and Molecular Biology” | April 20-29, 2012. |
| 5 | Organizing  Secretary | National Science Day | March 28, 2012 |
| 6 | Co- coordinator | National workshop on “Intellectual Property Rights & Patent Awareness” | July 6, 2011 |
| 7 | Co- organized | Bioinformatics training on “Application of Bioinformatics to Study Genetic Diversity” | 2-4 sep, 2008, |
| 8 | Co- organized | National Seminar on “Patents and IPR Issues in Innovation Management” | 17th August 2007 |
| 9 | Co- organized | Short training Course on “Bioinforamtics” | 30 Aug-1 Sep, 2007 |
| 10 | Co- organized | **“**Biotechnology Innovation Systems of India: Policy Measures and Support Mechanisms” | 6-7 Oct, 2006 |
| 11 | Co- organized | National Workshop on “Patenting: What, Why and How” | March 10, 2006 |

11. Academic / Administrative positions held

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| **S/N** | **Chairman/Member/Secretary** | **Committee/Board** | **Year (From-To)** |
| 1 | Member Secretary | Institutional Biosafety Committee, of Kumaun University Nainital | 2016 onwards |
| 2 | Member | Commission for Scientific and Technical Terminology, GOI (Biotechnology, English to Hindi Dictionary) | 2013 onwards |
| 3 | Warden | Babu Jagjivan Ram Boys Hostel, Bhimtal Campus, Kumaun University Nainital | 2016 onwards |
| 4 | Programme Officer | National Service Scheme (NSS) | 2006-2009 |
| 5 | Member | Flying Squad | 2006-2009 |

12. Membership to professional Organization/Associations

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| --- | --- | --- |
| **S/N** | **Name of the Association/Organizations** | **Status of membership** |
| 1 | Society of Biological Chemists | Life Membership |
| 2 | The Indian Science Congress Association | Life Membership |
| 3 | Global Initiative of Academic Networks | Life Membership |

13. Any other information: R&D is going on developing *in vitro* regeneration, mass propagation protocols for important, medicinal, endangered plants, and active content analysis by HPLC etc.

(**Tapan Kumar Nailwal**)