

CURRICULUM VITAE

DR. NIHAR RANJAN NAYAK

Senior Scientist

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Working Area

1. Biodiversity Conservation and Utilization
2. Orchid Propagation, Improvement & Conservation
3. Biomass Production & Utilization

Experience

	Name of the Position	Name of the Institution	Time Period
1.	Senior Scientist	Regional Plant Resource Centre IRC Village, Bhubaneswar-751015.	From 16 th October- continuing
2.	Ramalingaswami Fellow of Dept. of Biotech., Govt. of India	Regional Plant Resource Centre IRC Village, Bhubaneswar-751015.	10 th May 2011- 15 th October, 2012
3.	Postdoctoral Fellow	College of Agriculture, University of Kentucky, Lexington, Kentucky, U.S.A.	September 2002 – December 2010
4.	Research Associate	Indian Agricultural Research Institute, Pusa, New Delhi, India	March 2000 - September 2002
5.	Senior Research Fellow	Department of Botany, Utkal University, Bhubaneswar, Odisha, India.	November 1997 - March 2000

Projects successfully completed

1. Life cycle assessment and genetic engineering of native plants for bioenergy production in Odisha as a model for eastern India
2. Genetic improvement and conservation of wild orchids of Odisha
3. Standardization of Mass Propagation Methods and Agronomic Practices of *Dendrobium* and *Phalaenopsis* Hybrids and conservation of wild orchids of Odisha
4. Evaluation Production Potential of *Saccharum bengalense* and *Sesbania grandiflora*.
5. Mass propagation of banana through tissue culture
6. Conservation of orchids of Odisha through reintroduction of in vitro raised seedlings to their natural habitats.
7. Mass propagation, standardization of cultivation practices and development of molecular markers of ornamental orchids
8. Cloning and characterization of cellulose synthase genes of sugarcane
9. Production of quality plantlets of ornamental orchids
10. Restoration of orchid population through reintroduction of in vitro raised seedlings
11. Enzymatic saccharification of different lignocellulosic biomass produced in Odisha towards production of bioethanol
12. Establishment of Tissue Culture Based Mass Propagation Facility of Banana and Plantains
13. Conservation of *Dendrobium regium* and *Cymbidium bicolor* through introduction of in vitro raised seedlings.

14. Production of healthy, genetically uniform, virus free planting materials of ornamentals *Dendrobiums* through tissue culture.
15. Population analysis of *Dendrobium regium* Prain: one of the extremely rare and endemic orchids of India.
16. In Vitro Propagation of *Tainia penangiana* Hook.f , *Phaius tankervilleae* (Banks) Blume and *Pomatocalpa decipiens* (Lindl.) J.J.Sm. for introduction into the Natural Habitats.
17. Establishment of Mass Propagation and Breeding Facility for Orchids
18. Evaluation of drought and salt tolerance potential of one of the wildy growing species of *Saccharum* genus (*Saccharum bengalense* Retz.)
19. Elucidation of genetic network for cell wall maturation of sugarcane towards biofuel production
20. Restoration of wild Orchid population in Chandaka & RPRC through Reintroduction of IN vitro raised seedlings
21. Elucidation of Genetic Network with response to salt and drought stress in *Saccharum bengalense* Retz.
22. Mass production of selected medicinal plants of Odisha through Tissue Culture
23. Standardization of efficient tissue culture based propagation methods for *Pomatocalpa dicipiens* (Lindl.)Sm. And *Phaius tankervilleae*: Rare Orchids of Odisha.

Scholarship/ academic distinction own

1. Ramalingaswami Fellowship from Department of Biotechnology, Government of India.
2. Senior Research Fellowship (SRF) by Council of Scientific and Industrial Research (CSIR), Government of India.

Academic credentials

Name of the Degree	Name of the Institution in India	Name of the University/Council in India and Year of Completion	Specialization
1. Bachelors of Science (B. Sc.)	Nayagarh College Nayagarh, Odisha	Utkal University, Odisha.1989	Botany
2. Masters of Science (M. Sc.)	Post- Graduate Department of Botany, Utkal University, Bhubaneswar, Odisha	Utkal University, Odisha.1991	Cytogenetics
3. Masters of Philosophy (M. Phil.)	Post- Graduate Department of Botany, Utkal University, Bhubaneswar, Odisha	Utkal University, Odisha.1993	Plant Tissue Culture
4. Doctorate of Philosophy (Ph.D.)	Post- Graduate Department of Botany, Utkal University, Bhubaneswar, Odisha	Utkal University, Odisha. 1998	Plant Tissue Culture

Number of seminars/conferences attended/poster presented

1. National Symposium on Role of Plant Tissue Culture in Biodiversity Conservation and Economic Development held at G.B.Pant Institute of Himalayan Environment and Development, Almora, India. From 7th to 9th June 1999.

2. Soy 2004, 10th Biennial Conference on the Cellular and Molecular Biology of Soybean. Columbia, Missouri, USA. August 8th to 11th, 2004.
3. Experimental Biology 2006, Organized by the American Society for Biochemistry and Molecular Biology. Sanfransisco, California, April 1st to 5th, 2006.
4. Soy 2006, 11th Biennial Conference on the Cellular and Molecular Biology of Soybean. Lincoln, Nebraska, USA. August 5th to 8th 2006.
5. 99th Indian Science Congress, Bhubaneswar, India. January 3rd to 7th, 2012:
Recent strategies for biofuel production in India, Nitesh Kumar Mund, Nihar Ranjan Nayak, Patap Chandra Panda and Ajay Kumar Mahapatra, Indian Science Congress, Bhubaneswar, India. 3rd -7th January, 2012
6. Regeneration of multiple shoots from cotyledonary nodes of *Acacia auriculiformis* A.Cunn Ex Benth. : A potential plant for bioenergy production, Nitesh Kumar Mund, Suchismita Behera, Priya Ranjan Behera, Ajay Kumar Mahapatra and Nihar Ranjan Nayak, International Conference on Biotechnology Advances: Omic Approaches and Way Forward (ICBA-2012), 20th-22nd December, 2012. Organized by Siksha (O) Anusandhan University, Bhubaneswar.
7. Strategies for Bioethanol Production Using Sugar Crops in Odisha , Nitesh K. Mund, Prassannajit Mishra, P.K. Nayak, and Nihar R. Nayak, Symposium on Bioenergy for Sustainable development – The Potential Role of Sugar Crops, 23-25 June, 2014, Coimbatore, India , Organized by Society or Sugarcane Research and Development and Sugarcane Breeding Institute (Indian Council of Agricultural Research), Coimbatore , India
8. Wood Quality Optimization in Trees for Biofuel Production, Nitesh Kumar Mund, Prasannajit Mishra and Nihar Ranjan Nayak, Symposium on Agroforestry Options for Climate Resilient Farming, July 2014 , Organized by All India Coordinated Research Project on Agroforestry, Orissa University of Agriculture and Technology , Bhubaneswar, Odisha , India
9. National conference cum workshop on “Advances in orchid biology with focus on climate change, medicinal and floricultural plants and sustainable economic utilization & orchid show” organized by The Orchid Society of India (TOSI) on 26th – 28th February 2016.

Member of professional associations

1. Orissa Botanical Society, India
2. Biotechnological Society of India
3. Plant Lovers Association, Bhubaneswar, India

Editorial experience

- 1) Reviewed research papers for the International Journal “**Scientia Horticulturae**” published by Elsevier publisher.
- 2) Reviewed research papers for the “**African Journal of Biotechnology**”
- 3) Review research papers for the “ **Biochemical Journal**”

Personal details

1. **Country of citizenship:** India

2. **Date and place of birth:** 07 /19/1969, Nayagarh, Odisha
3. **Gender:** Male
4. **Religion:** Hindu
5. **Fathers name:** Sj.Dandapani Nayak
6. **Address in India:** S/O Dandapani Nayak, Newrajabati, Nayagarh
752069, Odisha .Telephone :(06753)253621
7. **Marital status:** Married

List of publication

Research papers

1. Dash, D., Mund, N.K., Nayak, S., Mishra, P. and Nayak, N.R., 2025. Efficient release of fermentable glucose from the Agave leaf biomass using phosphoric acid as the pretreating agent for bioethanol production. *Biomass Conversion and Biorefinery*, pp.1-13.
2. Justine, A.K., Kaur, N., Dolker, D., Nayak NR *et al.* Novel and cost-effective approach for long-term in vitro culture producing genetically stable G9 banana plants. *Plant Cell Tissue Organ Cult* **160**, 2 (2025) pp 1-16. <https://doi.org/10.1007/s11240-024-02936-w>.
3. Biswal, D.P., Pradhan, B., Jena, S.S. Nayak NR *et al.* Root growth in Orchid *Dendrobium* cv. Sonia requires shade avoidance response of phytochromes along with regulation of auxin pathway genes. *Plant Physiol. Rep.* **29**, 395–407 (2024). <https://doi.org/10.1007/s40502-024-00781-9>.
4. D. Dash, N. K. Mund, D. Upadhyay, P. Mishra, S.K. Dash, and **N. R. Nayak** (2023). Evaluation of alkali and cellulose solvent pretreatments for fermentable sugar production from the biomass of *Phragmites karka* (Retz.) Trin. ex Steud.: a high biomass producing grass. *Biomass Conversion and Biorefinery*. 13: 7725-36.
5. 4.N. K. Mund, D. Dash, P. Mishra and **N. R. Nayak** (2022). Cellulose solvent–based pretreatment and enzymatic hydrolysis of pineapple leaf waste biomass for efficient release of glucose towards biofuel production. *Biomass Conversion and Biorefinery*. 12: 4117-4126.
6. Manoj Majee, Santosh Kumar, Praveen Kumar Kathare, Shuiqin Wu, Derek Gingerich, **Nihar R. Nayak**, Louai Salaita, Randy Dinkins, Kathleen Martin, Michael Goodin, Lynnette M. A. Dirk, Taylor D. Lloyd, Ling Zhu, Joseph Chappell, Arthur G. Hunt, Richard Vierstra, Enamul Huq, and A. Bruce Downie. (2018). KELCH F-BOX protein positively influences Arabidopsis seed germination by targeting PHYTOCHROME-INTERACTING FACTOR1. *PNAS* April 24, 2018 115 (17):E4120-E4129.

7. N. K. Mund, D. Dash, C. R. Barik, V. V. Goud , L. Sahoo, P. Mishra and **N. R. Nayak** (2017). Evaluation of efficient glucose release using sodium hydroxide and phosphoric acid as pretreating agents from the biomass of *Sesbania grandiflora* (L.) Pers.: a fast growing tree legume. *Bioresource Technology*. 236:97-105.
8. N. K. Mund, D. Dash, C. R. Barik, V. V. Goud , L. Sahoo, P. Mishra and **N. R. Nayak** (2016). Chemical composition, pretreatments and saccharification of *Senna siamea* (Lam.) H.S. Irwin & Barneby: An efficient biomass producing tree legume. *Bioresource Technology*. 207:205-212.
9. **N. R. Nayak**, A. A. Putnam, B. Addepalli, J. D. Lowenson, T. Chen, E. Jankowsky, S.E. Perry, R. D. Dinkins, P.A. Limbach, S. G. Clarke and A. B. Downie. (2013). An Arabidopsis ATP-dependent, DEAD-BOX RNA HELICASE loses activity upon isoasp formation but is restored by PROTEIN ISOASPARTYL METHYLTRANSFERASE. *The Plant Cell*, 25: 2573–2586.
10. S. T. Chen, **N. R. Nayak**, S. M. Majee, J. Lowenson, K. R. Schäfermeyer, A. C. Eliopoulos, T. D. Lloyd, S. Villa, R. Dinkins, S. E. Perry, N. R. Forsthoefel, S. G. Clarke, D. M. Vernon, Z. Zhou, T. Rejtar, and B. Downie (2010). Substrates of the *Arabidopsis thaliana* PROTEIN ISOASPARTYL METHYLTRANSFERASE1 identified using phage display and biopanning. *Journal of Biological Chemistry*. 285:37281-37292.
11. . **N. R. Nayak** *, R. D. Dinkins *, S. M. Majee*, D. Martin, Q. Xu, M. P. Belcastro, R. L. Houtz, C. M. Beach and A. B. Downie. (2008). Changing transcriptional initiation sites and alternative 5'-and 3'-splice site selection of the first intron deploys Arabidopsis Protein isoaspartyl methyltransferase 2 variants to different subcellular compartments. *Plant Journal*. 55:1-13. (* Authors equally contributed to the manuscript.).
12. L. M. Dirk, J. J. Schmidt , Y. Cai , J. C. Barnes , K. M. Hanger, **N. R. Nayak**, M. A. Williams, R. B. Grossman , R. L. Houtz and D. Rodgers. (2008). Insights into substrate specificity of plant PEPTIDE DEFORMYLASE, an essential enzyme with potential for the development of novel biotechnology applications in agriculture. *Biochemical Journal*. 41:417-27.
12. R. L. Houtz, R .Magnani, **N. R. Nayak** and L. M. Dirk. (2008). Co- and post-translational modifications in rubisco: unanswered questions. *Journal of Exp. Bot.* 59:1635-45.

13. R. Magnani, **N. R. Nayak**, M. Mazarei, L. M. A. Dirk and R. L. Houtz. (2007). Polypeptide substrate specificity of PsLSMT, *Journal of Biological Chemistry*. 282:27857-27864.
14. **N. R. Nayak**, S. Sahoo, S. Patnaik and S. P. Rath. (2002). Establishment of thin cross section (TCS) culture method for micropropagation of *Cymbidium aloifolium* (L.)Sw. and *Dendrobium nobile* Lindl. (Orchidaceae). *Scientia Horticulturae*. 94:107-116.
15. **N. R. Nayak**, P. K. Chand, S. P. Rath and S. N. Patnaik. (1998). Influence of plant growth regulators on the growth and organogenesis of *Cymbidium aloifolium* (L.)Sw. seed- derived rhizomes in vitro. *In Vitro Cell. Dev. Biol. Plant*. 34:185-188.
16. **N. R. Nayak**, S. P. Rath and S. N. Patnaik. (1998). High frequency plant regeneration from alginate encapsulated protocorm - like bodies of *Spathoglottis plicata* Bl. a terrestrial orchid. *Phytomorphology*. 48 (2):179-186.
17. **N. R. Nayak**, S. P. Rath and S. N. Patnaik. (1997). *In vitro* propagation of three epiphytic orchids, *Cymbidium aloifolium* (L.)Sw. *Dendrobium aphyllum* (Roxb.) Fisch. and *Dendrobium moschatum* (Buch- Ham) Sw. through thiadiazuron- induced high frequency shoot proliferation. *Scientia Horticulturae*. 71: 243-250.
18. **N. R. Nayak**, S. Patnaik and S. P. Rath. (1997). Direct shoot regeneration from foliar explants of an epiphytic orchid, *Acampe praemorsa* (Roxb.) Blatter and Mc Cann. *Plant Cell Reports*. 16:583-586.

Book chapters

1. **N. R. Nayak**, Tanaka M and Da Silva J. A. T. (2006). Biotechnology of *Cymbidium*- an overview of recent progress and future opportunities. **In: Floriculture, Ornamental and Plant Biotechnology, Advances and Topical issues**. Ed. J.A.T. Da Silva. Global Science Books Ltd. England.
2. **N. R. Nayak**, S. P. Rath and S. N. Patnaik (2002) Strategies of in vitro culture for conservation of orchids, In: **Role of plant tissue culture in biodiversity conservation and economic development**. (Ed. S.K Nandi *et al.*) Gyanodaya Prakashan, India. pp 531-543.

3. **S. S. Jena, P. K. Dash and N. R. Nayak (2023) Conservation of Orchids of Odisha, In: Green Technology for Environment Management.**, Proceedings of the National Seminar on Green Technology for Environment Management (Eds. A.K Biswal & H. N. Thatio) Astral International Private Limited. , India. pp 531-543.

Book

1. A brief introduction to Conservation of Orchids of Odisha. **ISBN 978-93-5258-692-9.**

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