

Dr. Swapna Alex

Professor & Course Director

B. Sc.-M. Sc. (Integrated) Biotech Course

Dept. of Molecular Biology & Biotechnology

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Summary

Having post graduated in General Biotechnology and awarded Ph. D in Molecular Biology of cancer, I have a wide exposure in the different areas of Biotechnology. I am involved in teaching Biotechnology at UG, PG and Ph.D level right from the inception of these courses at Kerala Agricultural University. I was a team member for establishing the Plant Molecular and Biotechnology Centre at College of Agriculture, Vellayani in 1997. I was also a team member, for securing grant of Rs. 1.9 crore from Government of Kerala for starting the B.Sc.-M.Sc. (Integrated) Biotechnology Programme in 2009 at the Kerala Agricultural University and has also served as the Course Director of the programme. I was also team member for establishment of Advanced Centre for Integrated Biotechnology worth Rs.2.38 crores at the College of Agriculture, Vellayani in 2013. After joining in Kerala Agricultural University my research interests include plant tissue culture, molecular characterization of economically important traits, secondary agriculture etc. My current research area includes nanobiotechnology.

Research Highlights

- First report of use of silver nanoparticles for bacterial transformation and biolistic gene delivery in plants.
 - Associated with technology development for natural dyeing of fabrics.
 - Protocol development for micropropagation of commercially important crops and medicinal plants.
 - Molecular characterization of economically important spike branching trait in black pepper.
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Experience

Joined Kerala Agricultural University as Assistant Professor (Biotechnology) in the year 1997

Education

- Graduated in Botany from University of Kerala (1991)
 - Post Graduation in Biotechnology from Cochin University of Science and Technology, Kochi, (1993)
 - Ph.D in Molecular Biology from Regional Cancer Centre, Thiruvananthapuram, Kerala (2001)
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Area of Specialization

Plant tissue culture, Molecular characterization, Nanobiotechnology

Awards & Recognitions

- Rank holder for B. Sc. (Botany) Degree examination of University of Kerala, 1991
 - Receptient of Rajah Sir T. Madhava Rao Gold Medal for securing highest percentage of marks in Botany in B. Sc. (Botany) degree examination of University of Kerala, 1991.
 - Rank holder for M. Sc. (Biotechnology) Degree examination of Cochin Unviersity of Science and Technology, 1993
 - CSIR -JRF for doing Ph.D
 - Qualified GATE 1994, GATE 1995
 - Jawaharlal Nehru Memorial Fund Award 2001.
 - Best poster award in 25th Kerala Science Congress, 2013
 - Felicitated by General Council, Kerala Agricultural University for securing Best Poster Award in Kerala Science Congress, 2013.
 - Co-author of paper won Best research paper award in the National Symposium of Plant Health Management: Current Trends and Novel Mitigation Strategies organised by Indian Phytopathological Society (Southern Zone) at ICAR, CTCRI, during 11-12 September, 2023.
 - Co-author of paper won Best paper presentation award at the International Seminar on 'Plant Chemisty, Gene Prospecting and Clinical Biology' organized by the 'Kerala Academy of Sciences' and Department of Chemistry, Mar Ivanios College, Thiruvananthapurm during 10-11 November, 2022
 - Co- author of Best Poster Award in International Symposium on Advances in Plant Biotechnology and Nutritional security conducted at ICAR, National Institute for Plant Biotechnology, 2020
 - Co-author of Best Poster Presentation Award in Theme: Transgenics and genome editing research in International E conference on Advances and Future Outlook in Biotechnology and Crop Improvement for Sustainable Productivity, 24-27th Novemembr, 2020, University of Horticultural Science, Baglkot, India.
 - Co-author of publication received Harbhajan Sigh Memorial Award for best publication in Vegetable Science, 2020.
 - Major advisor of student won Best Research Scholar Award for work in Plant Science Indian Plant Science Congress, Chennai, 2019
 - Advisory committee member of thesis selected for 'Dr. P.K.R. Nair Prize 2019' awarded for Best Ph.D thesis
 - Co-author of paper awarded Best oral presentation in Kerala Science Congress, 2018
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Research Projects

Completed

1. Molecular characterization of spike branching trait in black pepper (*Piper nigrum* L.). Funded by Kerala State Council for Science Technology and Environment, Government of Kerala, India
2. Induction of *in vitro* flowering in Dendrobium Development of bacterial endophytes for insect pest management. Funded by Kerala State Council for Science Technology and Environment, Government of Kerala, India
3. Establishment of Advanced Centre for Integrated Biotechnology-Bioenergy production from industrial waste, Department of Agricultural Research and Education, Indian Council of Agricultural Research, Government of India.

Publications

Journal Articles (Scopus indexed)

1. **Enose, S.**, Molykutty, J. and Balaram, P. (1998). Expression and activation of c-ERBB2 and epidermal growth factor receptor in Gestational Trophoblastic Diseases (GTD). *Biomedicine* 18(3), 173-176.
2. **Enose, S.**, Molykutty, J., Rajalekshmy, T.N., Vijayasree, S.R., Krishnan, N.M. and Prabha, B. (1998). Lack of association of gestational trophoblastic diseases (GTD) with syphilis and AIDS. *Indian journal of pathology & microbiology* 41(3), 277-279. **(IF-0.773)**
3. Molykutty, J., Rajalekshmy, T.N., Balaraman, N.M., **Enose, S.**, Krishnan, N.M. and Balaram, P. (1998). Proliferating cell nuclear antigen (PCNA) expression in gestational trophoblastic diseases (GTD). *Neoplasma* 45(5), 301-304. **(IF-3.409)**
4. Balaram, P., John, M., Rajalekshmy, T.N., Mathew, A., **Enose, S.** and Gangadharan, V.P. (1999). A multivariate analysis of prognostic indicators in complete hydatidiform moles (CHM). *European Journal of Obstetrics & Gynecology and Reproductive Biology* 87(1), 69-75. **(IF-2.831)**
5. Molykutty, J., Schultz, G., Rajalekshmy, T.N., **Enose, S.**, Nair, M.K. and Balaram, P. (1999). Immunolocalization and quantitation of transforming growth factor alpha in hydatidiform mole. *Tumori Journal* 85(3), 183-187. **(IF-2.438)**
6. Balaram, P., John, M., **Enose, S.** and Simaladevi, P.K. (2001). Demonstration of TGF- α -EGFR and EGF-EGFR autocrine loops and their relation to proliferation in complete hydatidiform moles (CHM). *International Journal of Gynecologic Cancer* 11(5), 397-402. **(IF- 4.8)**
7. Prabha, B., Molykutty, J., **Alex, S.**, Rajalekshmi, T.N. and Gangadharan, V.P. (2001). Increased expression of interleukin-1 beta is associated with persistence of the disease and invasion in complete hydatidiform moles (CHM). *European Journal of Gynaecological Oncology* 22(1), 50-56. **(IF-0.20)**
8. **Alex, S.**, Panikkar, B., Devi, C. and Balaram, P. (2002). Expression of nm23-H1 protein in relation to myometrial invasion in complete hydatidiform moles. *The Journal of the Society for Gynecologic Investigation* 9, 111-115.
9. **Alex, S.**, Panikkar, B., Shyamala, P.K. and Balaram, P. (2002). Viral etiology of Complete Hydatidiform Moles (CHM). *Indian Journal of Biotechnology* 1, 175-179. **(IF- 0.324)**
10. Balaram, P., **Alex, S.**, Panikkar, B. and Rajalekshmi, T.N. (2004). Adhesion-related proteins E-cadherin, P-cadherin, CD44, and CD44v6, and antimetastatic protein nm23H1 in complete hydatidiform moles in relation to invasion potential. *International Journal of Gynecologic Cancer* 14(3), 532-539. **(IF- 4.8)**
11. Naseema, A., Dhanya, B., Anjanadevi, I.P., Sheena, K.G., and **Alex, S.** (2008). Isolation and regeneration of protoplasts from the mycelium of *Fusarium pallidorozeum*—a potential biocontrol agent of water hyacinth [*Eichhornia crassipes* (Mart.) Solms]. *Journal of Tropical Agriculture* 46, 67-69. **(NAAS- 4.85)**
12. Pradeep Kumar, T., Stephen, F. and **Alex, S.** (2009). Studies on *in vitro* seed culture in vanilla. *Indian Journal of Horticulture* 66(4), 547-548. **(IF- 0.178)**
13. Lekshmi, R.S., Soni, K.B., **Alex, S.**, Rajmohan, K. and Anith, K.N. (2014). Callus induction and *Agrobacterium tumefaciens* mediated transfer of hydroxy methyl glutaryl CoA reductase (HMGR) gene in *Centella asiatica* L. *Journal of Tropical Agriculture* 52 (1), 67-73. **(NAAS- 4.85)**
14. **Alex, S.**, Saira, A., Nair, D. S., Soni , K.B., Sreekantan, L., Rajmohan, K. and Reghunath, B. R. (2017). Bioethanol production from watermelon rind by fermentation using *Saccharaum cerevisiae* and *Zymomonas mobilis*. *Indian Journal of Biotechnology* 16, 663-666. **(IF- 0.324)**
15. Deepa, E., Nair, D.S., **Alex, S.**, Soni, K.B. and Viji, M.M. (2018). Effect of plant stimulants on shoot proliferation from nodal segments of *Aegle marmelos* L. (Corr.). medicinal plants. *International Journal of Phytomedicines and Related Industries* 10(1), 58-64. **(IF-0.136)**

16. Prakash, A.V., Nair, D.S., **Alex, S.**, Soni, K.B., Viji M.M. and Reghunath, B.R. (2018). Calcium alginate encapsulated synthetic seed production in *Plumbago rosea* L. for germplasm exchange and distribution. *Physiology and Molecular Biology of Plants* 24(5), 963–971. **(IF- 3.023)**
17. Lal, R., Soni, K.B., **Alex, S.**, Sreekantan, L. and Reghunath, B.R. (2018). Identification and characterization of a protease encoding metagenome clone from dairy effluent. *Journal of Scientific and Industrial Research* 77(10), 583-586. **(IF- 0.555)**
18. Nagamani, G., **Alex, S.**, Soni, K.B., Anith, K.N., Viji, M.M. and Kiran, A.G. (2019). A novel approach for increasing transformation efficiency in *E. coli* DH5 α cells using silver nanoparticles. *3 Biotech* 9, 113. **(IF- 2.893)**
19. Hembade, V.L., **Alex, S.**, Soni, K.B., Sreekantan, L., Nair, D.S. and Reghunath, B.R. (2019). Presence of integrase core domain in mutant type black pepper (*Piper nigrum* L.) “Thekken” with altered inflorescence architecture. *Indian Journal of Experimental Biology* 57, 770-773. **(IF- 0.818)**
20. Nair, D.S., Reghunath, B.R., Soni, K.B. and **Alex, S.** (2019). Cryopreservation of Encapsulated Axillary Buds of *Clitoria ternatea* (L.). *CryoLetters* 40(1), 28-35. **(IF- 1.066)**
21. Lekshmi, R. S., Harshitha, C. K., Soni, K. B. and Alex, S. (2021). Transgenic banana plants carrying ihpRNA cassette targeting viral replicase gene show resistance against Banana bract mosaic virus. *Journal of Horticultural Science and Biotechnology* 96, 324–329. **(IF-2.893)**
22. Vishnu, G.M., **Alex, S.**, Soni, K.B., Kiran, A.G., Krishnan, G.A. and Shanas, S. (2020). Molecular phylogeny of south Indian *Aphthona* species (Coleoptera: Chrysomelidae: Galerucinae: Alticini) with evidence for colour polymorphism. *Entomon* 45(1), 1-6. **(NAAS- 4.69)**
23. Manikanta, C.H.L.N., Beena, R., Stephen, R., Manju, R. V, Viji, M.M. and **Alex, S.** (2020). Physio morphological plasticity of rice (*Oryza sativa* L.) genotypes exposed to water-stress. *Journal of Tropical Agriculture* 58(1), 139- 145. **(NAAS- 4.85)**
24. Sony, M., Sumithra, T.G., Anusree, V.N., Amala, P. V, Reshma, K.J., **Alex, S.** and Sanil, N.K. (2021). Antimicrobial resistance and virulence characteristics of *Vibrio vulnificus*, *Vibrio parahaemolyticus* and *Vibrio harveyi* from natural disease outbreaks of marine/estuarine fishes. *Aquaculture* 539,736608. **(IF-4.5)**
25. Rajkumari, N., **Alex, S.**, Soni, K.B., Anith, K.N., Viji, M.M. and Kiran, A.G. (2021). Silver nanoparticles for biolistic transformation in *Nicotiana tabacum* L. *3 Biotech* 11, 1–7. **(IF-2.893)**
26. Mathew, K.S.A., Subramanian, A., Soni, K.B., **Alex, S.**, Sreekumar, J. and Kiran, A.G. (2021). Computationally predicted virus responsive miRNAs in banana (*Musa AAB*). *Research Journal of Biotechnology* 16 (7), 150-179. **(IF-0.346)**
27. Thomas, A., Beena, R., Lakshmi, G., Soni, K.B., **Alex, S.** and Viji, M.M. (2022). Changes in sucrose metabolic enzymes to water stress in contrasting rice genotypes. *Plant Stress* 5, 100088. **(IF-5.0)**
28. Benny, A., **Alex, S.**, Soni, K.B., Anith, K.N., Kiran, A.G. and Viji, M.M. (2022). Improved transformation of *Agrobacterium* assisted by silver nanoparticles. *BioTechnologia* 103, 311-317. **(IF-0.17)**
29. Bijula, V. L., **Alex, S.**, Soni, K. B., Anith, K.N., Joy, M., Deepa, S., Beena, R. and Benny, A. (2022). Algicidal effects of green synthesized nanoparticles using *Tinospora cordifolia* on *Chlamydomonas reinhardtii*. *Journal of Pure and Applied Microbiology* 16, 2. **(IF-0.8)**
30. Dongare, M.D., **Alex, S.**, Soni, K.B., Sindura, K.P., Nair, D.S., Stephen, R. and Jose, E. (2023). Cross-species transferability of IRAP retrotransposon markers and polymorphism in black pepper (*Piper nigrum* L.). *Genetic Resources and Crop Evolution* 70, 2593–2605. **(IF-1.876)**
31. Nasreena, C., **Alex, S.**, Soni, K.B., Dinkar, D.M., Kiran, A.G. and Manju, R. V. (2023). Selection of stable housekeeping genes for gene expression studies in different varieties of black pepper (*Piper nigrum* L.). *Plant Science Today* 10, 26–36. **(IF- 0.832)**
32. Thasni, A., Sarada, S. and **Alex, S.** (2023). *In vitro* bud proliferation response in ivy gourd (*Coccinia grandis* (L.) Voigt.) cv. Sulabha nodal explants with cytokinin levels *Journal of Tropical Agriculture* 60(2), 222-226. **(NAAS- 4.85)**

Articles not indexed in Scopus

1. Anita, S., Priya, L., Rajmohan, K. and **Alex, S.** (2000). Comparison of chlorophyll content, water loss, and anatomical features of leaves of the normal, in vitro cultured and, hardened *Dendrobium* hybrid plants. *The Journal of the Orchid Society of India* 14(1-2), 41-46. **(NAAS- 4.52)**

2. Rajmohan, K., Soni, K.B., **Alex, S.**, Nazeem, P.A. and Suku, S.S. (2010). Use of copper sulphate for controlling systemic contamination in black pepper (*Piper nigrum* L.) cultures. Journal of Food, Agriculture and Environment 8, 569-571.
3. Bhasi, S., **Alex, S.**, Rajmohan, K. and Soni, K.B. (2010). Morphological and genetic variability among black pepper *Piper nigrum* L. variety Panniyur-1 clones. International Journal of Tropical Agriculture 28, 465-470. (NAAS- 3.94)
4. Kamala, S., Soni, K.B. and **Alex, S.** (2010). Recent advances in flow cytometry. Millennium Zoology 11(1), 54-57.
5. **Alex, S.**, Rani, P.M.R., Soni, K.B., Nair, D.S. and Reghunath, B.R. (2012). Biosynthesis of silver nanoparticles with antibacterial activity using leaf extract of *Michelia champaca*. Journal of Plant Science and Research 28(1), 121-126. (NAAS- 4.1)
6. Vimarsha, H.S., Sowjanya, M.S., Rajmohan, K., Soni, K.B. and **Alex, S.** (2014). Atf1-1 gene homolog in spike branching black pepper type (*Piper nigrum* L.) and local variety Karimunda. Journal of Medicinal Plants Studies 2, 1-4.
7. Subba A., **Alex S.**, Soni K. B., Nair D. S. and Reghunath B.R. (2014). Isolation of genomic DNA from mature leaves and spikes of black pepper (*Piper nigrum* L.). Journal of Plant Science and Research 30 (1), 21-25. (NAAS- 4.1)
8. Vimarsha, H.S., Sowjanya, M.S., Rajmohan, K., Soni, K.B. and **Alex, S.** (2014). Diversity studies for characterization of spike branching black pepper (*Piper nigrum* L.) type collected from Idukki district of Kerala. Journal of Medicinal Plants Studies 2(2), 69-75.
9. Ponsubrya, R.K., **Alex, S.**, Rajmohan, K. and Soni, K.B. (2014). Polymerase chain reaction based detection of banana bunchy top virus using coat protein based primers. International Journal of Agriculture Environment and Biotechnology 7(4), 765-767. (NAAS 4.54)
10. Nair. D.S., Reghunath, B.R. Soni, K.B. and **Alex, S.** (2016). *In vitro* regeneration and conservation of Indigo (*Indigofera tinctoria* L.) by slow growth induction. International Journal of Agriculture Environment and Biotechnology 1(4), 873-884. (NAAS 4.54)
11. Jadhav, P. R., Soni, K. B., Charles S. and **Alex, S.** (2018). An in silico phylogenetic analysis and homology modelling of coat protein of banana bract mosaic virus. Journal of Pharmacognosy and Phytochemistry 7 (5), 1957-1962.
12. Lachyan, T.S., Jayalekshmy, V.G. and **Alex, S.** (2019) SSR Polymorphism Survey between CRMS31A and Aruna (MO8) for Marker Assisted Backcross Breeding in Rice. International Journal of Current Microbiology and Applied Sciences 8, 2555-2563.
13. Malavika, M. R., Viji, M. M., Soni, K. B., **Alex, S.** and Beena, R. (2020). Standardized protocol for in vitro seed germination of *Withania somnifera*. Indian Journal of Applied Research 11, 1-2.
14. Shaji, S., Vijayakumar, A., KB, S., **Alex, S.** and MM, V. (2020). Genetic diversity analysis using SSR markers for high temperature tolerance in tomato (*Solanum lycopersicum* L.). Vegetable Science 47, 176-182.
15. Ajil, M.S., Nair, D.S., Sreekala, G.S. and **Alex, S.** (2022). Propagule selection and pretreatment for nursery plant establishment of *Symplocos cochinchinensis* (Lour.) S. Moore. Med Plants-International Journal of Phytomedicines and Related Industries 14, 429–440.
16. Karapareddy, S., **Alex, S.**, B, S. and G, K. (2022). Expression profiling of auxin responsive genes during inflorescence development in black pepper (*Piper nigrum* L.) using Real time PCR (RT-QPCR). Multilogics in Sciences 12, 54-59.
17. Arya, K., Sindura, K.P., **Alex, S.** and Soni, K.B. (2022). Bioinformatics tools for marine-derived chemotherapeutic drug discovery and designing. Informatics Studies 9(3), 7-24.
18. Amrutha, E. A., Manju, R. V., Viji, M. M., Stephen, R., John, J., **Alex, S.** and Meera. A. V. (2022). The influence of Biofertilizers on Growth and Yield of Rice (*Oryza sativa* L.). Biological Forum 14(4a), 23-28. (NAAS 5.11)
19. Vijayan, N., **Alex, S.**, Soni, K.B., Sindura, K.P., Sarada, S. and Dongare, M.D. (2023). Induction of Embryogenesis in Anthers of *Capsicum annuum* var. Arka Meghana. Mysore Journal of Agriculture Science. 57 (1), 186-196.
20. Unni, B., Sindura, K.P., **Alex, S.** and Soni, K.B. (2023). Biological Databases on Medicinal Plants: A Review. Informatics Studies 10, 47–60.
21. Jacob, M.E., Nair, D.S., Sreekala, G.S., **Alex, S.**, Rani, S.T. and Viji, M.M. (2023). Effect of chitosan foliar spray on plant growth parameters in Ashwagandha. The Pharma Innovation Journal 12(9), 1393-1398. (NAAS 5.23)

Popular Articles

1. Rajmohan, K., **Alex, S.**, and Soni, K.B. (2023). Biotechnology for the advancement of floriculture. *Karshikolsavam* 69-72.

2. **Alex, S.** and Soni, K.B. (2010). Intellectual property rights (IPR) & intellectual property protection (IPP) in biotechnology. Readers Shelf 7(1), 11-13.
3. **Alex, S.** and Soni, K.B. (2011). Banana bunchy top disease- a menace during banana cultivation. Agrobios., 9(3): 41-42.
4. **Alex, S.** Vinitha, G. and Soni, K.B. (2011). *In vitro* flowering- an aid for orchid improvement. Readers Shelf 7(4), 5-6.
5. **Alex, S.** and Soni, K.B. (2011). Black pepper- The King of Spices. Agrobios 9(8), 27-28.
6. Abhinand, C.S., Soni, K.B. and **Alex, S.** (2011). Computational approach for gene prediction. Agrobios 9(12), 14-15.
7. **Alex, S.** (2014). *Sasyaaroogyamariyaan Virus Indexing. Keralakarshakan* 59(11), 65.
8. **Alex, S.**, Benny, A., Rajkumari, N., Soni, K.B. and Anith, K.N. (2022). Silver nanoparticles for improved genetic transformation efficiency. Biotica Research Today 4(12), 818-820.
9. Pimpale, P.A., **Alex, S.**, Soni, K.B., Bhasi S.(2023). Artificial Intelligence in Agriculture. Biotica Research Today 5(3), 255-257.
10. Pimpale, P.A., **Alex, S.** and Soni, K.B. (2023). Biomimetics- The technology powered by Nature. Biotica Research Today 5(6), 436-438.
11. Thasni, A., Sharada, S. and **Alex, S.** (2023). *Kovayka kazhikku aarogyam samrakshikku: Tissue culture thaikal ini kovalilum. Karshakan* 1, 12-13.

Books/Chapters in Books

1. Deepa S.Nair, **Alex, S.**, and Soni, K.B. (2015) Tissue culture production and cultivation practices. NARP (SR), KAU & NABARD publishers.
2. Benny, A., **Alex, S.**, and Soni, K. B. (2020) Nanoparticles for genetic transformation. In: Advances in agriculture: Recent perspectives Jaya publishing group

Student Guidance (Major Advisor)

M. Sc.

Completed: 16

Ph. D

Completed: 1

Ongoing : 2

Other Institutional Responsibilities

1. Co-ordinator of Internal Quality Assurance Cell
2. Currently acting as student Advisor/faculty mentor of 5 IBC students.
3. Currently Member Secretary of Institutional Biosafety Committee, College of Agriculture, Vellayani campus.
4. Member of Project Co-ordination Group in Biotechnology, Biochemistry and Plant Physiology
5. Course Director, B. Sc.- M. Sc. (Integrated) Biotechnology Programme, May, 2014 to November, 2016 and November, 2019 till date.
6. Served as Head of the Department of Plant Biotechnology, College of Agriculture, Vellayani from November, 2016 to November, 2019
7. Served as Member, District Level Vetting and Monitoring Committee, Department of Agriculture and Farmers Welfare, Govt. of Kerala.

Membership in Professional Associations

1. Life member Kerala Academy of Sciences

2. Life member Indian Association of Cancer Research