Shobhit University

EDUCATION EMPOWERS

RUDRAKSHA

(Research work to reveal its Science and Secrets)

Centre for Research on Rudraksha (CeRR)

Join Collaboration

Shobhit University, Gangoh

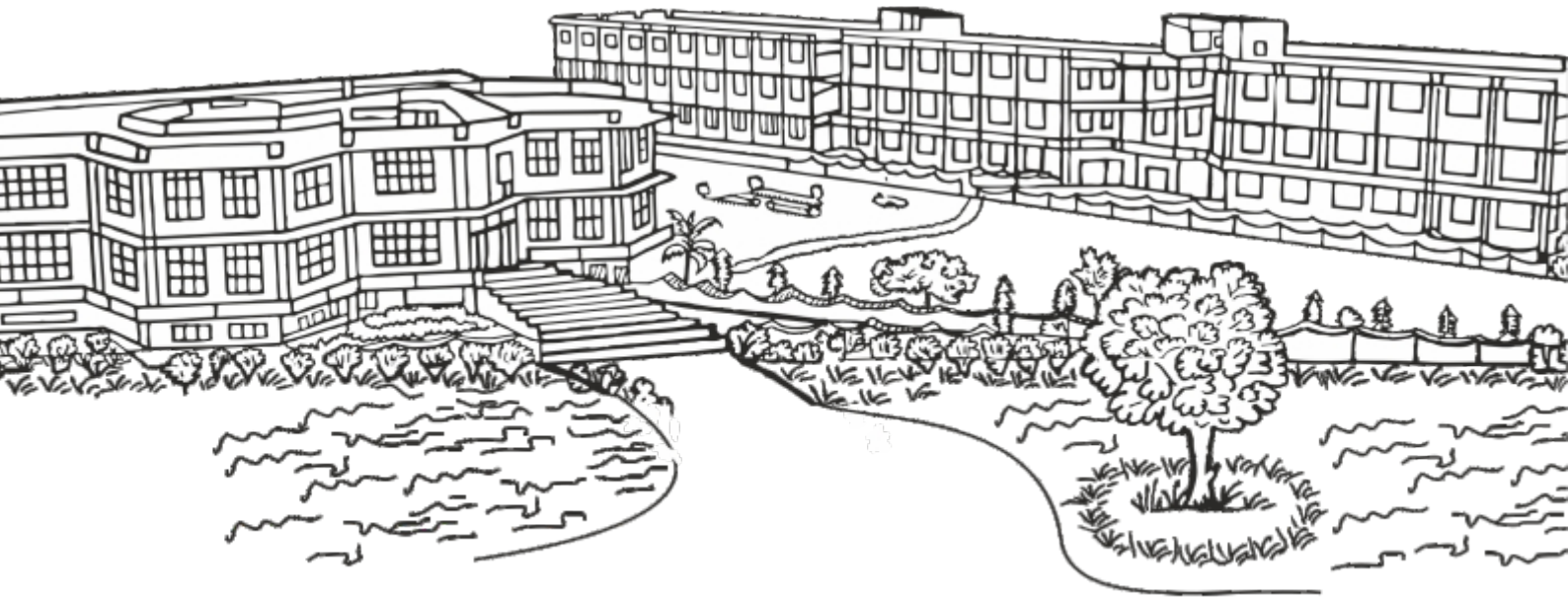
(Established by UP Shobhit University Act No. 3, 2012)

Adarsh Institutional Area, Babu Vijendra Marg, Gangoh, Saharanpur, UP

Shobhit Institute of Engineering and Technology

(Deemed to be University established u/s 3 of UGC Act. 1956)

NH-58, Modipuram, Meerut, Delhi NCR, India



About the CeRR

Centre for Research on Rudraksha (CeRR) was established in 2018 under School of Engineering and Technology, Shobhit Institute of Engineering and Technology (Deemed to be University) with an aim to promote scientific basis of Rudraksha for sustainable and healthy society. Rudraksha is a “wonder bead” with eminent medicinal and holistic properties. According to ancient literature (Vedas and Purans) Rudraksh means tears of 'Lord Shiva' ('Rudra' means 'Shiva' and 'Aksh' means 'tear') and botanically it's a seed that belongs to tree of Elaeocarpus spp. CeRR has taken up the challenge to generate scientific evidences about Rudraksha through its infrastructural and intellectual capital as acclaimed in traditional system of medicine. The Centre strives to leverage Engineering and Technology principles to produce innovative outcomes from Rudraksha plant material for the development of sustainable society.

Objective of CeRR

1. Creation of general awareness and promotion of scientific temperament about Rudraksha globally.
2. Scientific validation of therapeutic potential of Rudraksha and its formulations in the amelioration of psychosomatic stress.
3. Tissue culture propagation of Rudraksha for mass production.
4. Mass plantation of Rudraksha plant by adopting good agricultural practice.
5. Innovative product development using Rudraksha through nanotechnology and bioengineering principles.
6. Development of sustainable solutions for rural population by transforming Rudraksha based technologies into employment generation skills.
7. Strengthening human resources by promoting Doctoral and Post Doctoral research on its thrust areas.
8. Developing skilled human resources by offering skill based training programs for various technologies and product developed at the Centre.
9. Participation in social activities for the promotion, advocacy, and awareness of Rudraksha.
10. Supporting innovative research ideas for the development of entrepreneurs under the given thrust area

About Rudraksha

Rudraksha (Elaeocarpus ganitrus) owes an important place in the Indian traditional system of medicine (Ayurveda) and Indian mythology for its curative and spiritual benefits. The word Rudraksha is a combination of two Sanskrit words Rudra and Aksha; Rudra stands for Shiva and the word Aksha stands for tears. According to Hindu mythology, the tree is born from the eye of Lord Shiva. Rudraksha has been cited for its pharmacological actions against a plethora of medical ailments including lack of concentration, anxiety, depression, insomnia, palpitation, hypertension, rheumatism, infertility, asthma, and stress.

The holistic benefits of Rudraksha have been mentioned in several Puranas like Shivpurana, Bhagwatpurana, Skandpurana, Padmapurana, Upanishads, and other ancient resources. Rudraksha means tears of 'Lord Shiva' ('Rudra' means 'Shiva' and 'Aksh' means 'Tear') and is highly acclaimed “wonder bead” for its medicinal and holistic benefits.

दिव्य वर्ष सहस्त्रं तु चक्षुः उन्मीलितं मया ! पश्चन्ममा कुलाक्षीभ्यः पतिता जलबिंदवः!!
तत्र अश्रुबिंदुतो जाता महारुद्राक्ष वृक्षकाः ! ममाज्ञया महासेन सर्वेषां हित काम्यया !!
(Shivpurana, Chapter 25, Vidhveshwar Sahita)

These traditional literatures stated that Rudraksha can provide sustainable and holistic wellness through its darshana (by seeing), sparshan (by touching), sevana (by oral consumption), and yoga sadhana (wearing of Rudraksha in a particular manner by the yogi's). Darshana (looking) of Rudraksha is like thrataka (staring at a single point) in yoga that promotes psychic abilities. Sparshan (touch and inhalation) deals with japa using Rudraksha mala or rubbing Rudraksha acupressure plates. Sevana (oral consumption) of Rudraksha products includes use of churan, hima (cold infusion), gargle decoction, milk, bhasma, vibhuti, oil, water, eye drops and paste. Yoga sadhana in Rudraksha mandap or wearing kireetam (on the head) or rosary (on the waist) during yantra, manthra, thanthra, and kshudra prayogas has been believed to create a healthy environment within the local region. In Ayurveda, Rudraksha has been stated to have Vatahara and vata-pitta action on the body.

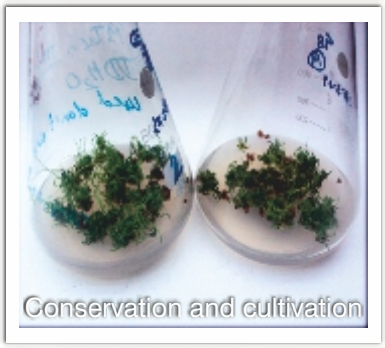
दर्शनात्स्पर्शनाज्जप्यात्सर्वपापहरः स्मृतः॥
रुद्राक्षैरूपवीतंचनिर्मियाद्भक्तितत्परः॥
रुद्राक्षेणजपन्मत्रंपुण्यंकोटिगुणंभवेत्।
दशकोटिगुणंपुण्यंधारणाल्लभतेनरः ॥
(Shivpurana, Chapter 25, Vidhveshwar Sahita)

Further, in local medicinal practices, different Mukhi Rudraksha (1-14 Mukhi Rudraksha) have been quoted for specific therapeutic benefits. For instance one Mukhi Radraksha have been mentioned to increase concentration, three Mukhi for psychosomatic disorders, four Mukhi for memory, five mukhi for metabolic disorders and so on. According to Hindu mythology, the wearer of Rudraksha achieves physical and mental power for spiritual enlightenment by virtue of its electromagnetic properties it imposes on the human body which reduces psychosomatic stress ailments. However, the documentation and evidences of these local practices are not systematically available. SIET works in the direction of knowledge accumulation from the traditional literature followed by the scientific validation and technological development of this ancient wisdom of Rudraksha. This Centre rigorously works to serve as the unique Knowledge and Research Centre about traditional practices of Rudraksha and the application of ancient wisdom in regaining the holistic balance in the current society living in unsustainable environment.

Geographical distribution of Rudraksha

Elaeocarpus ganitrus Roxb. (Syn. E. angustifolius Blume, E. sphaericus Gaertn.) belongs to the Elaeocarpaceae family and is usually known as Rudraksha in Sanskrit and Rudraki in Hindi (Kumari et al., 2018). Elaeocarpus ganitrus (Roxb.) belongs to the Plantae kingdom, Magnoliophyta division, Magnoliopsida class, Oxalidales order, Elaeocarpaceae family, Elaeocarpus genus, and E. ganitrus species. The genus Elaeocarpus has more than 360 known species worldwide (from Madagascar in the west to New Zealand in the East; covering the regions of Southeast Asia, Southern China, Japan, Philippines, Malaysia, Australia, New Guinea, Fiji, and Hawaii). Subtropical and tropical regions all around the world have dense forest of the Rudraksha. Out of these 360 species, while 127 species were reported in Asian countries (India, Nepal, Indonesia, Bhutan, Pakistan, Bangladesh, Java, Tibet, and Sri-lanka) and marked the western limit of Elaeocarpus distribution, 27 species existed in India alone. In India its abundance range from the Gangetic Plain to the foothills of the great Himalaya, Arunachal Pradesh, Bihar, Assam, Bengal, Garhwal, Maharashtra, Sikkim, Madhya Pradesh, and the Konkan Ghats. E. sphaericus or E. ganitrus species specifically belongs to the Uttar Pradesh, Maharashtra, Bihar, Madhya Pradesh, Assam, Arunachal Pradesh, and Meghalaya states of India. The trees of E. ganitrus occur sporadically in all districts of Assam but are more frequent in Arunachal Pradesh. In Assam, E. ganitrus is found in places like Charaideu, Digboi, Margherita, Dibrugarh, Jorhat, and Golaghat. In Arunachal Pradesh, it is common in the foothills districts, except Tawang and upper Subansiri. Over the distinct regions of India, these trees are also known by their vernacular name such as Rudraksha, Bhootanasana, Neelakandaksha, Sivaksha Sivapriya (Sanskrit), Rosery nut Rudraksham (Malayalam); Ludrai (Sylhet), Dubichi (Chakma), Ludrak (Garo).

Thrust Areas of Rudraksha


Conservation and cultivation

Conservation and Cultivation

1. Mass cultivation of Rudraksha plant by adopting good agricultural practice
2. Cultivating the plant by layering method
3. Tissue culture propagation of Rudraksha for mass production

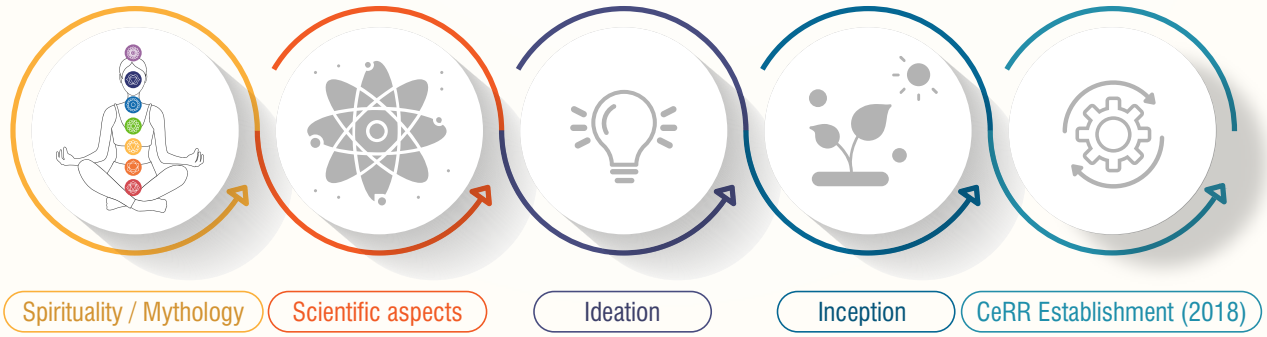
Scientific Acceptability

Scientific Acceptability

1. Scientific validation of medicinal properties of Rudraksha and its formulations.
2. Structural, compositional, and phytochemical characterization of Rudraksha
3. Development of chemical and molecular markers of Rudraksha
4. Creation of general awareness and promotion of scientific temperament about Rudraksha.
5. Innovative product development from Rudraksha with biomaterials, therapeutic and nutraceutical values.

Utilization

1. Development of sustainable solutions for rural population by transforming Rudraksha based technologies into employment generation skill
2. Development of useful product for prompt utilization



Different Mukhi's of Rudraksha and their medicinal Benefits

Name		Health Benefits
Ek Mukhi Rudraksha/ One facet		Ek Mukhi Rudraksha improved concentration, confidence and managed the disease like headache, heart problems and eye disorders.
Dwi Mukhi/ Double faced		Dwi Mukhi Rudraksha good for mental peace and pregnancies and mitigate eye, kidney & intestine disorders.
Tri-Mukhi/ Triple faced		Tri Mukhi Rudraksha cured blood defect, plague, small pox, digestive problems, blood pressure, weakness, disturbed menstrual cycle, spontaneous abortion and ulcer. It also helped to the wearer in learning, improve concentration and knowledge.
Chatur Mukhi/ Four faced		Chatur Mukhi Rudraksha governed logical, concrete, and structural thinking therefore improved wit and intelligence. Cures mental disease, paralysis, yellow fever, and nasal disease.
Panch Mukhi/ Five faced		Panch Mukhi Rudraksha worked to cure health problems related to bone marrow, liver, kidney, feet, thigh, ear diseases as well as the disorders related to fat and diabetes.
Shan Mukhi/ Six faced		Shan Mukhi Rudraksha protected a person from the mental stress, fits and the other ailments related to reproductive organs, urinary tract, prostate, throat and mouth.
Sapt Mukhi/ Seven faced		Sapt Mukhi Rudraksha are helpful in diseases like colic, bone and muscular pain and also deals with paralysis, impotency, worries and hopelessness.
Astha Mukhi/ Eight faced		Astha Mukhi Rudraksha benefitted to protect from paralytic attack, lung, feet, skin and eye, hydrocele related disease.
Nav Mukhi/ Nine faced		Nav Mukhi Rudraksha helped to manage the heart disease, wearer of this Rudraksha blessed with energy, power, dynamism and fearlessness. It is also good for the peoples with lack self-confidence and suffering from depression. Besides, it maintains ailments related to the lungs, eye, bowel, skin. Best results are quoted to manage the body pains and fever,.
Das Mukhi/ Ten faced		Das Mukhi Rudraksha provided peace of mind and works for the overall wellbeing of the human.
Ek dasha Mukhi/ Eleven faced		Ek Dasha Mukhi Rudraksha used to maintain of entire neurophysiology
Dhavdasha Mukhi/ Twelve faced		Dhavdasha Mukhi Rudraksha is recommended for heart, lung, eyesight, and skin diseases.
Tridasha Mukhi/ Thirteen faced		Tridasha Mukhi Rudraksha are best quoted for meditation and spiritual attainments.
Chaturdasha Mukhi/ fourteen faced		Chaturdasha Mukhi cured several diseases and improved the concentration.

Structure of Rudraksha

The word Elaeocarpus is derived from the Greek work Elaeo = olive and carpus = fruit (referring to olive-like fruits produced by the genus). Overall, the fruit of Rudraksha consisted of three layers viz the outer layer known as epicarp (pulp) which is green in color in ripened fruit and brown color in dried fruit, the inner layer endocarp (bead) which comes out after the removal of epicarp (pulp) and there is the seed inside the bead that is known as the third layer of Rudraksha. Morphologically beads are of rough texture, spherical in shape, and with a variable number of vertical perforations that run from top to bottom. Each bead has a varied number of vertical lines running down on its surface that forms 'Mukhis' or faces of the bead. Mukhi's are defined based on vertical lines over the surface of the Rudraksha and others are the naturally joined Rudraksha.

Rudraksha Leaves

Inflorescence

Developed Fruits

Ripen Rudraksha beads with pulp

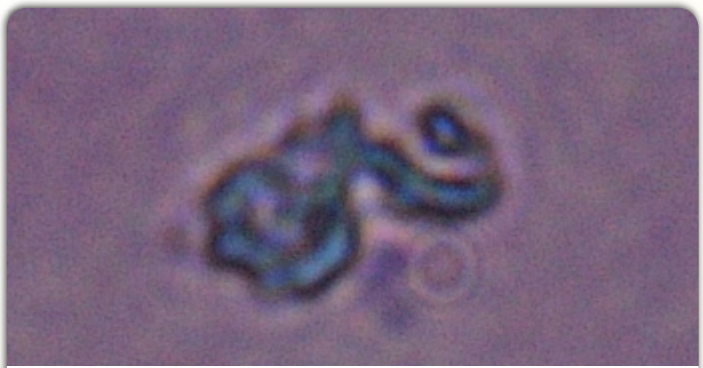
Rudraksha beads

Microscopic structure of the interior of the Rudraksha

Scientific Studies at CeRR

Validation of Mythological Wisdom

In the basic research at SIET, Rudraksha was found to possess tubular structures at microscopic levels taking the shape of sacred “Om”. This is a beautiful connection of spiritualism with science which needs to be further explored.



Microscopic image of powdered Rudraksha bead stained with Hematoxylin-Eosin dye.
Image captured at 40X magnification

Scientific Studies at CeRR

Physicochemical Analysis

Rudraksha tends to reduce the pH of the normal control water therefore shifting the slightly alkaline normal water into slightly acidic in nature. Total dissolve solids (TDS), conductivity and salinity increase in the presence of water.

Compositional Analysis:

Compositional analysis of Rudraksha has been carried out and results revealed the presence of biochemical compounds (fat, protein and Carbohydrate), Phyto-constituents (flavonoids, tannins, phenolics, anthocyanin, ascorbic acid, saponins, alkaloids, terpenoids), Functional groups (Poly Hydroxyl. Alkanes, Carbonyl, Aryl Ketone, Amine, Aromatic, Nitro, Acid, Amine, Cyclic Ether); **elemental analysis**.

Morphological Analysis:

Results showed ridges and the long cylindrical line passing from apex to bottom in all three Mukhi Rudraksha. Morphology also indicates the empty space between the ridges that is showing irregular symmetry of the Rudraksha. Cylindrical lines were wider in mid of the Rudraksha and narrower at the apex whereas larger working distance at lower magnification stated roughness.

Electromagnetic Properties:

Rudraksha beads possess unique combination of wood and metal components, which makes it a “natural magnetic wood” with weak ferromagnetic properties. Therefore, Rudraksha beads activate body's energy wheel, which in turn influences the bioelectrical properties of human body and heals various chronic diseases like blood pressure, heart rate, diabetes, gynaecological problem, neurological disorders, mental problem, insomnia and rheumatism.

Micro propagation:

Rudraksha is an endangered species; Shobhit University has developed the facility with the aim to produce more than 20000 plants every year.

Nanoparticle Development:

We have developed Rudraksha extracts mediated green silver nanoparticles (RBE-GSNPs) were found to be mostly spherical in shape and in the size range of 13.6–36.3 nm. The medicinal potential of Rudraksha augments the therapeutic value of RBEGSNPs depicted in the form of its significant antibacterial properties against notable food borne pathogens, thus enhancing the role of silver nanoparticles to be employed in the nanomedicine domain.

Antimicrobial Activities:

The therapeutic properties of Rudraksha bead extract were depicted in the form of ignificant antibacterial potential against gram positive bacteria Listeria monocytogenesa and gram negative bacteria Escherichia coli.

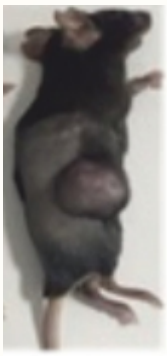
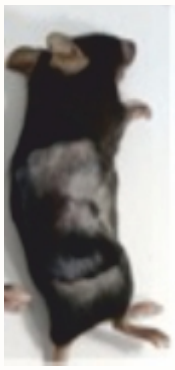
Pilot Clinical Studies:

Findings of this study revealed that wearing of Rudraksha is highly effective over behavioral disorders. Significant improvement was observed over psychological, psychomotor and biological factors (Cognitive, Hypertension and Menstrual Disorders).

Therapeutic Measures

The therapeutic properties of Rudraksha mediated nanoparticles and Rudraksha extract shows effective results against cancer, neurodegenerative diseases, inflammation, and diabetes.

Our findings indicates Rudraksha mediated silver nanoparticles possess potent antioxidant, anti-cancer, and anti-neurogenerative properties. These nanoparticles exhibit anti-inflammatory and anti-diabetic properties, targeting key enzymes involved in disease progression. Through inhibition of proteinases, alpha amylase, and acetylcholinesterase enzymes, they offer a multifaceted approach to combating chronic illnesses. In vivo studies display impressive results in cancer treatment around nearly 80% inhibition of tumour growth, highlighting the therapeutic potential of Rudraksha extract mediated silver nanoparticles in real-world scenarios.

Self Help Groups at CeRR

Gender-Inclusive Economic Development: To promote sustainable development and empower the home makers, with a primary focus on gender equality. This includes the creation of Rudraksha-based products like Rudraksha Soap. facepack, dhoopbatti, Rudraksha based oil, Vinegar, Herbal Pey and Rudraksha Jewelry to generate employment opportunities, particularly for women.

Societal Awareness and Improvement: Raise awareness in society about Rudraksha conservation and its socio-economic benefits. Improve demographic conditions and create job opportunities while fostering connections between stakeholders and the audience for sustainability.





Research Outcomes

Research Publications:

1. Sharma, S., Rawat, B., Jayanand, D. V. R., & Rastogi, M. (2018). Bioelectrical and mineralogical properties of Elaeocarpus Ganitrus (Rudraksha) bead. Biochem Cell Arch, 18, 1699-1703.
2. Rai, D. V., Sharma, S., & Rastogi, M. (2019). Scientific research on Elaeocarpus ganitrus (Rudraksha) for its medicinal importance. Durg V. Rai, Shiva Sharma and Manisha Rastogi, 69(1)
3. Sharma, S., Rai, D. V., & Rastogi, M. (2019). Magnetic characteristics of different Mukhi Rudraksha beads: a comparative analysis. Int J Sci Technol Res, 8(11), 3329-3333.
4. Sharma, S., Rai, D. V., & Rastogi, M. (2021). Compositional characteristics of Rudraksha (Elaeocarpus ganitrus Roxb.). Plant Archives (09725210), 21(1).
5. Rishia, H. V., Aryac, R., & Garga, A. P. (2021) Influence of low light and dark treatment on callus survival of Elaeocarpus ganitrus.
6. Kumar, S., & Arya, A. (2021). Effect of Nitrogen on in Vitro Propagation of Endangered Medicinal Plant: Swertia Chirayita Roxb. Ex Flaming.
7. Sharma, S., Rai, D. V., & Rastogi, M. (2022). Physical, Physicochemical, and Structural Characteristics of Three, Four, and Five Mukhi Rudraksha. In Electronic Systems and Intelligent Computing: Proceedings of ESIC 2021 (pp. 601-608). Singapore: Springer Nature Singapore.
8. Rishi, H Vishwakarma, S Kumar, M D Joshi, A P Garg. Molecular studies relating Genomic DNA isolation from Elaeocarpus ganitrus (Roxb.) callus and leaf tissue. . Adv. Biores. Vol 12 [4] July 2021. 145-149
9. Rishi, Vishwakarma H, Arya R, Garg A. P. In Vitro Callus Induction from Immature Fruits of Elaeocarpus Ganitrus: A Tissue Culture Approach. Biosc.Biotech.Res.Comm. 2022;15(2).
10. Garg, P. (2022). Influence of phytohormones and additives on in vitro shoot initiation from nodal explants of Elaeocarpus ganitrus and Adansonia digitata in liquid medium. Bull. Env. Pharmacol. Life Sci, 11, 70-75.
11. Sharma, S., Rai, D. V., & Rastogi, M. (2022). Physical, Physicochemical, and Structural Characteristics of Three, Four, and Five Mukhi Rudraksha. In Electronic Systems and Intelligent Computing: Proceedings of ESIC 2021 (pp. 601-608). Singapore: Springer Nature Singapore.
12. Sharma, S., Rastogi, M., Rai, D. V., Singh, N., Sharma, G., & Singh, K. (2023). Electrical behavior of plant based material. Materials Today: Proceedings, 79, 349-354.
13. Khushwaha, J., Joshi, A., Sharma, S., & Das, S. K. (2023). Phytochemical Characterization of Bio-active Compounds in Hydroethanolic Extract of Elaeocarpus ganitrus leaves using HPLC, LC-MS, and HPTLC Analyses. bioRxiv, 2023-10.
14. Khushwaha, J., & Joshi, A. (2023). Phytochemical Screening And Comparative Antioxidant Potential Of Different Extracts Isolated From E. Ganitrus Leaves. Plant Archives (09725210), 23(2).

Research Outcomes

Research Publications (contd.)

15. Kushwaha, J., & Joshi, A. (2023). In silico characterization and phylogenetic analysis of Elaeocarpus ganitrus based on ITS2 barcode sequence. bioRxiv, 2023-07.
16. Sharma, S., Hussain, S., Rai, D. V., & Singh, A. N. (2023). A comprehensive analysis on the ecosystem services of Elaeocarpus L.(Elaeocarpaceae): a review. Journal of Phytology, 15, 12-37.
17. Prashant Kumar Pandey, Milind Sagar, Shiva Sharma, (2024) Manisha Rastogi Characterization and in Vitro Antioxidant, Anti-Cancer, and Anti-Neurogenerative Properties of Rudraksha Alkaloids Rich Extract doi: 10.33472/AFJBS.6.6.2024.5921-5934
18. Milind Sagar1, Prashant Kumar Pandey1, Shiva Sharma1, Manisha Rastogi1* (2024)Evaluation of Anti-cancer Efficacy of Eleaocarpus Ganitrus (Rudraksha) Bead Mediated Silver Nanoparticles in Mouse Lewis lung carcinoma tumour model Afr.J.Bio.Sc. 6(9) (2024) ISSN: 2663-2187.
19. Milind Sagar1, Prashant Kumar Pandey1, Shiva Sharma1, Manisha Rastogi1* Evaluation of in vitro anticancer efficacy of Eleaocarpus ganitrus (Rudraksha) bead derived Silver Nanoparticles (2024) Research Journal of Biotechnology (Accepted)
20. Chaudhary, M., Rehman, M. U., Joshi, M. D., & Kumar, S. (2024). Effect of Media and Calcium on the Micropropagation of Rudrakhsa (Eleocarpus ganitrus Roxb.). PLANT CELL BIOTECHNOLOGY AND MOLECULAR BIOLOGY, 25(3-4), 81-93.
21. Shiva Sharma, Manisha Rastogi (2024), Therapeutic Significance Of Rudraksha (Elaeocarpus Ganitrus Roxb): A Comprehensive Review, CRC Publication (Accepted)
22. Yoginder, Nisha Rani, Shiva Sharma, Manisha Rastogi1 (2024) Inherited Materialistic Properties Of Rudraksha, CRC Publication (Accepted)
23. Subrata K. Das, Sandeep Kumar, Shiva Sharma1, Manisha Rastogi (2024) Rudraksha Hearbal Medicine And Its Spiritual Significance, , CRC Publication (Accepted)
24. Prashant Kumar Pandey, Milind Sagar, Shiva Sharma1, Manisha Rastogi1 (2024) Compilation Of Pharmacological And Biological Properties of Elaeocarpus Ganitrus (Rudraksha) Bead Extract CRC Publication (Accepted)
25. Dipika Sharma, Nikki Sharma, Sweety Pal (2024) Impact of Rudraksha As A Catalyst In Overcoming Depression, CRC Publication (Accepted)
26. Vipin Dhiman, Gaurav,Sangeeta, Teena, Shiva Sharma, Manisha Rastogi (2024) Herbal Medicines And Rudraksha Beads For Neurological Disorders,CRC Publication (Accepted).
27. Milind Sagar, Prashant Kumar Pandey, Shiva Sharma, Manisha Rastogi (2024) Nanotechnology Of Rudraksha Mediated Biogenic Silver Nanoparticles CRC Publication (Accepted)
28. Jyotsana Khushwaha, Alpana Joshi, Fangjun Lin, And Xinxin Zhao (2024) Phytochemical Evaluation And Dna Barcoding Of E. Ganitrus (Rudraksha) And Related Species CRC Publication (Accepted)

Research Outcomes

Gene Sequence Submitted.

1. Khushwaha, J. and Joshi, A.; Elaeocarpus ganitrus isolate CERR-1 maturase K (matK) gene, partial cds; chloroplast; GenBank: PP000849.1; https://www.ncbi.nlm.nih.gov/nuccore/PP000849.1/
2. Khushwaha, J. and Joshi, A. ; Elaeocarpus ganitrus isolate CERR-R1 5.8S ribosomal RNA gene, partial sequence; internal transcribed spacer 2, complete sequence; and large subunit ribosomal RNA gene, partial sequence; GenBank: OR059254.1; https://www.ncbi.nlm.nih.gov/nuccore/OR059254
3. Khushwaha, J. and Joshi, A. ; Elaeocarpus ganitrus isolate CERR-R1 ATP synthase CF0 subunit I (atpF) gene, partial cds; atpH-atpF intergenic spacer, complete sequence; and ATP synthase CF0 subunit III (atpH) gene, partial cds; chloroplast; GenBank: OR073888.1; https://www.ncbi.nlm.nih.gov/nuccore/OR073888
4. Khushwaha, J. and Joshi, A. ; Elaeocarpus ganitrus isolate CERR-R1 RNA polymerase beta subunit (rpoB) gene, partial cds; chloroplast GenBank: OR073889.1; https://www.ncbi.nlm.nih.gov/nuccore/OR073889
5. Khushwaha, J. and Joshi, A. ; Elaeocarpus ganitrus isolate CERR-R1 acetyl-CoA carboxylase carboxyltransferase beta (accD) gene, partial cds; chloroplast; GenBank: OR073890.1;
   https://www.ncbi.nlm.nih.gov/nuccore/OR073890
6. Khushwaha, J. and Joshi, A. ; Elaeocarpus ganitrus isolate CERR-R1 NADH-plastoquinone oxidoreductase subunit J (ndhJ) gene, complete cds; chloroplast; GenBank: OR073891.1;
   https://www.ncbi.nlm.nih.gov/nuccore/OR073891

Patents:

1. Application No-IN 202311049113 Title- Rudraksha Extract Based Soap Composition
   Date of Filing-July 20,2023
2. Title- Rudraksha Face Pack comprising of Rudraksha leaf and bead extracts
   Date of Filing-July 8, 2023

CeRR – Outcomes – Making it a Nationwide Mission

Join Collaboration

Shobhit University, Gangoh
(Established by UP Shobhit University Act No. 3, 2012)
Adarsh Institutional Area, Babu Vijendra Marg, Gangoh, Saharanpur, UP

Shobhit Institute of Engineering and Technology
(Deemed to be University established u/s 3 of UGC Act. 1956)
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Shobhit University
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