

Spices News

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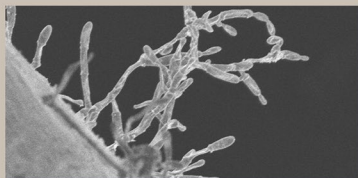
Research Updates: New species of insect pathogenic fungus, *Metarhizium indicum* infecting leaf hopper pest of Malabar tamarind identified in Kerala

Contributor: Dr. C.M Senthilkumar

A new species of entomopathogenic fungus, *Metarhizium indicum*, which derives its species epithet after its Indian origin has been reported. The fungus was found to cause natural epizootics in leafhopper (*Busoniomimus manjunathi*) infesting *Garcinia gummi-gutta* (Malabar tamarind), an evergreen spice tree native to South and Southeast Asia, known for its use as a culinary flavourant, dietary supplement and traditional remedy for various human ailments. The fungus was found to cause more than 60% mortality in field collected insects. The finding has been published in the "Journal of Invertebrate Pathology", a premier international journal that publishes findings on the diseases of invertebrates, including insects.



Leafhopper infected by *Metarhizium indicum*



An electron micrograph of the newly discovered *Metarhizium indicum* conidia

Research updates

Germplasm exploration unveils a treasure trove of Spices diversity

Contributors: Dr. K.V. Sajji, Mr. Muhammed Nissar V. A., Dr. Shivakumar M. S, and Dr. Muhammed Azharudheen T. P.

A germplasm exploration was conducted in Vazhachal, Sholayar, and Charpa forest ranges of Kerala and Valparai of Tamilnadu during 13-16 February 2023 and collected 16 accessions of wild Piper comprising of *P. mullesua*, *P. hapnium*, *P. galeatum*, *P. barberi* and *P. velaudhanii*, 6 accessions of Cinnamomum including of *C. riparium*, *C. malabratrum* and two unidentified species and 3 accessions of Garcinia consisting of *G. morella*, *G. wightii* and *G. gummi-gutta*. The collection also includes a wild accession of cardamom (*Elettaria cardamomum*), a wild ginger (*Zingiber officinale*) and a wild species of Amomum (*A. ghaticum*).



P. galeatum



P. hapnium



P. barberi



C. riparium



G. wightii

Germplasm exploration unveils a treasure trove of Spices diversity

Contributors: Dr. M.S. Shivakumar and Dr. S.J. Ankegowda

Scientists of ICAR-IISR, RS, Appangala identified and collected a unique black pepper line from the Boothanakadu estate, Madikeri. The genotype has a long spike with an average spike length of 27.20 cm with a good setting and its berry number ranging from 140-180 nos. per spike with an average of 166.40 mature berries per spike. The average number of immature berries per spike and berry size were found to be 67.70 and 5.32mm, respectively. The genotype recorded an average 5-spike weight of 83.2 g, the bulk density ranged between 600-620 g/lit with an average of 612.50 g/lit. The collected line is being multiplied for screening studies.

Research updates

Tapping Turmeric's Potential: High-Yield Pre-Breeding Lines Revealed

Contributors: R. Gobu, Aarthi S and Prasath D

The yield and yield-attributing traits of seedling progenies, somaclones, and inbreds of turmeric have been evaluated in mini beds using augmented design. Among them, three accessions (69/5/22/19/11, 69/5/22/19, 69/5/22/19/14) produced high fresh rhizome yield per plant (> 450 g/plant). Eleven accessions (SC-57, SC-75, SC-65, 138/23/13, 69/5/22/111/11, 69/5/22/111, SC-68, SC-74, SC-32, 138/74/4 and SC-51) showed primary rhizome length of more than 11 cm, which will serve as a good pre-breeding line.



A Glimpse of promising pre-breeding lines grown in IISR, EF, Peruvannamuzhi

Exploring the Clove Wonderland

Contributors: Mr. Muhammed Nissar V. A. and Dr. Anees K

A field visit was conducted by the team to Pathenpara, a small clove-growing tract of Kannur district on 02-02-2023 and collected two accessions of clove consisting of high-yielding and regular bearer and a pink flowered variant.



The pink flowered variant of clove, collected during the trip

Spraying for Success: How Chemistry Revolutionizes harvesting of clove buds

Contributors: Anees K., K S Krishnamurthy, C. N. Biju, V. Srinivasan, Lijo Thomas and Muhammed Nissar V. A.

A chemically induced method for harvesting clove buds was successfully demonstrated in a large-scale field trial (500 trees) at Thottilpalam. The current technology brings down the cost of harvest from Rs. 350/- to Rs 66 per kilogram of dried clove. Moreover, the problem faced by farmers due to the lack of skilled labour in the clove plantations during peak harvesting time, resulting in the opening of the clove



Clove tree after spraying ready for collecting falling buds

bud, could be solved due to this technology. The current technology requires only two manpower on the ground to operate the harvesting procedure. After spraying the formulation, the bud fall is initiated on 4th day and continues upto the 78th day. The fallen buds are collected in a shade net, spread on the ground on 5th and 8th day.

Research updates



Field view of the black pepper at Ma Danteshwari Herbal Products & Research Centre farm, Kontagaon



ICAR- IISR scientists along with the Dr. Rajaram Tripathi

UPGMA dendrogram of 48 *Phytophthora* isolates (24 *P. capsici* and 24 *P. tropicalis* isolates) based on combined RAMS and REP-PCR data

Arbuscular mycorrhizal colonization alters biochemical, molecular defense responses and root exudate composition in black pepper -*Phytophthora capsici* host-pathosystem

Contributors: C Sarathambal, A Jeevalatha, R Sivaranjani, CN Biju, Sona Charles, V Srinivasan and Priya George

The effect of mycorrhizal colonization on biochemical, molecular defense responses, and root exudates composition in the black pepper- *Phytophthora capsici* host-pathosystem was investigated. Four biochemical parameters such as total phenols, *orthodihydroxy (OD) phenols*, *peroxidase activity*, and *lignin* were studied to delineate the effect of *mycorrhizal colonization* upon pathogen inoculation. The quantitative polymerase chain reaction analysis showed that AM pre-inoculation led to upregulation of pathogenesis-related genes viz., *cAP-X*, *Osmotin* and

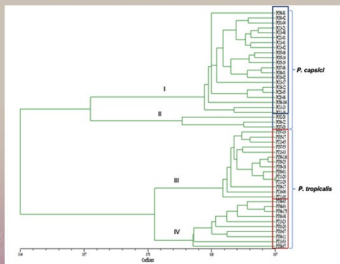
results could be completed in about 30 min. The assays were validated using field samples of black pepper and mealybug vectors.

Genetic diversity of two *Phytophthora* species infecting black pepper as revealed through RAMS and REP PCR analysis

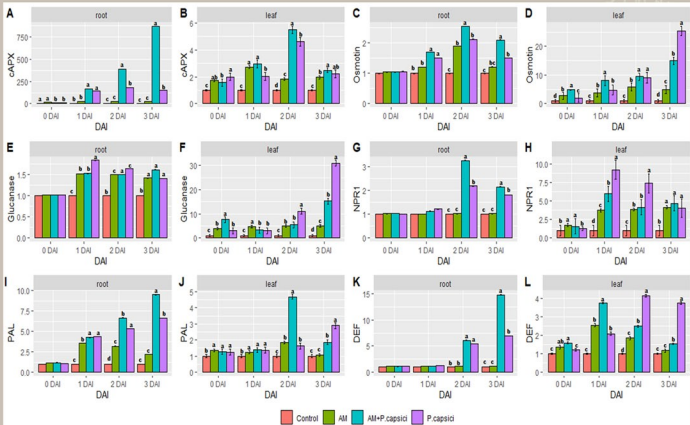
Contributors: Ms. Fathimath Zumaila, Dr. A. Jeevalatha, Dr. C.N.Biju

The genetic diversity of *Phytophthora* species infecting black pepper was analyzed using RAMS (Random amplified microsatellites) and REP (Repetitive Extragenic Palindromic) fingerprinting. Forty-eight isolates, 24 each of *P. capsici* and *P. tropicalis* collected from major black pepper growing states such as Karnataka, Kerala, Tamil Nadu and Goa were used in the study. The analyses revealed a total of 160 loci of which 150 (93.75%) were polymorphic. UPGMA cluster analysis clearly grouped the *P. capsici* and *P. tropicalis* isolates into two clusters which were further divided into four sub-clusters viz., I & II (*P. capsici*) and III & IV (*P. tropicalis*).

β -1,3-glucanase, phenylalanine ammonia-lyase and NPR 1 in black pepper leaves and roots upon of *P. capsici* inoculation. Root exudates of AM colonized plants showed higher fatty acid/fatty acyl compounds viz., *tetradecanoic acid*, *n-hexadecanoic acid*, *octadecanoic acid*, and *nonacos-1-ene* compared to *P. capsici* inoculated plants

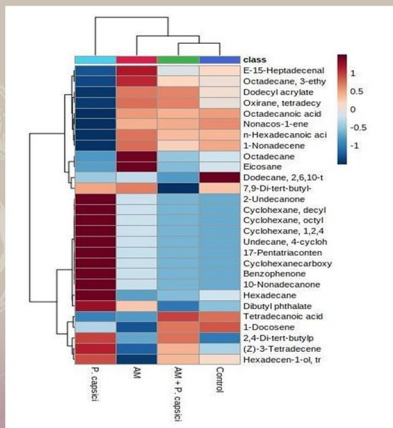


Research updates



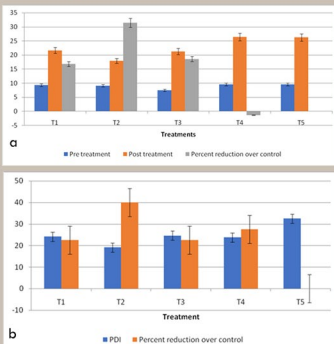
Differential expression of

eroxidase (*cAPX*) Osmotin gene (*PR5*), Glucanase gene (*PR2*), *NPR1* gene, *PAL* gene, *DEF* gene in roots and leaves



Research updates

Heat map of relative abundance of volatile compounds in the root exudates of black pepper



The graph depicting the PDI and Percentage reduction over control for different fungicide treatments in the management of Ginger rhizome rot (a) and Cardamom leaf blight (b)

Unveiling the Turmeric Nematode Chronicles: A Year-Long Population Dynamics Study

Contributor: C Sellaperumal

Population dynamics of lesion nematode *Pratylenchus* spp infecting on turmeric was studied that the nematode population recorded at different monthly intervals from May 2022 to January 2023. The minimum and maximum nematode populations were recorded from May 2022 to January 2023 which was found that from June 2022 onwards population was increasing up to November 2022 then got declined from December 2022 onwards. The maximum population was recorded during November 2022 at 202/100cc soil and the minimum population was during June 2022 at 30/100cc soil. None of the lesion nematode populations was recorded in the month of May 2022 and January 2023.

Unmasking Fluopyram potential: Turmeric's Shield against emerging root lesion nematode *Pratylenchus* spp threats

Contributor: C Sellaperumal

The bio-efficacy of new nematicides Fluopyram has been tested against lesion nematode *Pratylenchus* spp infecting on turmeric under field conditions based on the above underlined. The experiment was laid out in the experimental farm, ICAR-IISR, Peruvnamuzhi, Kozhikode since 2020-23. Recommendation of technology: Fluopyram 34.48 SC (400 g/L) (Velum Prime) @ 0.5ml/L of water has to be drenched on turmeric beds after 15 days of planting which will be reduced significantly in terms of nematode population in soil and rhizome, and enhance the plant growth parameter as well as yield. The above technology has been approved in July 2023 IRC held in ICAR-IISR.

Evaluation of Fungicides against Rhizome Rot and Leaf Blight in Small Cardamom

Contributors: Mohammed Faisal Peeran, Biju CN, SJ Ankegowda

Upon evaluating the efficacy of fungicides in controlling rhizome rot in ginger and leaf blight in small cardamom, a separate two-year trial was initiated in 2020, incorporating five treatments for each disease. For rhizome rot in ginger, treatments T1 (Spray and drench tebuconazole @1ml/L), T2 (Spray and drench fenamidone + mancozeb@2g /L), and T3 (Spray and drench metalaxyl- mancozeb @1.25 g/L) showed the lowest disease incidence at 21.66%, 17.91%, and 21.20% in 2022, while T4 (Spray and drench Copper oxy chloride @ 2g/L) had the highest at 26.39%. Regarding leaf blight in cardamom, T2 (Spray hexaconazole @2ml/L) exhibited the lowest disease incidence at 19.16% in 2022, followed by T1 (Spray carbendazim + mancozeb@2g/L), T3 (Spray mancozeb @2 g/L), and T4 (Spray tebuconazole @1ml/L). Treatment T5 (Recommended POP) had the highest incidence at 32.50%. The study suggests potential fungicide-based management options to protect ginger and small cardamom crops and enhance yields.

Extension activities

- Dr. Aarthi S coordinated a training programme on 'Capacity building of farmers of Kozhikode district on plant propagation methods and formation of SHG to enhance quality planting materials production of the district' on 14 – 16 February, 2023.
- Dr. Sivaranjani R, Dr. Aarthi S, and Dr. Sarathambal, C organized a farmers training on 'Improved technologies



• Demonstration on the use of drone technology in agriculture

ICAR-IISR EF, Peruvannamuzhi demonstrated the application of drone technology in agriculture from 16 – 23 March, 2023. Farmers from Chakkittappara, Maniyur, Velom, Maruthonkara, and Perambra Panchayate given



Drone demonstration in vegetable fields at Perambra Panchayat

Demonstration on use of drone in agriculture was conducted from ICAR-IISR RS, Appangala during 16.03.2023 to 23.03.2023. Demonstrations were conducted in Kodagu, Mysore, Mandya, Hassan and Chikmagalur districts in different agriculture and horticulture

- for higher income from turmeric cultivation' on 08 – 10 March, 2023. Dr. Sharon conducted a front-line demonstration on "micro rhizome-based disease-free planting material production in ginger" at Meenangadi
- Dr. E. Jayashree conducted an entrepreneurship development programme on 'Value addition in millets' on 3 – 4 May, 2023 at ICAR-IISR, Kozhikode.



Ginger harvested from invitro produced microrhizome

demonstrations on various agricultural and horticultural crops such as rice, black pepper, banana, cinnamon, nutmeg, cloves, rambutans, mango, arecanut, coconut, and many more. Around 100 flights of drone were executed to accomplish the demonstration.--



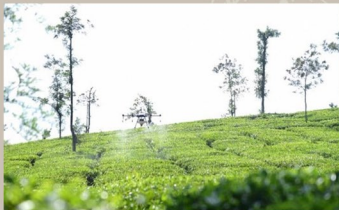
Drone demonstration in clove plantations at Pashukkadavu, Maruthonkara Panchayat

crops viz., coffee, cinna-tchi, sapota, citrus, rambutan, vegetables, guava, arecanut, banana, cardamom, pepper, sugarcane, groundnut, coconut, paddy, tea, mango, tobacco and maize. A total of 200 flights were conducted

Extension activities

Demonstration on use of drone technology in farm

ICAR-IISR EF, Peruvannamuzhi demonstrated the application of drone technology in farm activities from March 16 to March 17, 2023.



Drone technology demonstration by ICAR-IISR, Experimental Farm, Peruvannamuzhi

Exhibitions

☑ ICAR-IISR participated in the VAIGA Exhibition organized by the Department of Agriculture and Farmers Welfare, Government of Kerala 25 February – 02 March, 2023.

☑ The exhibition stall of ICAR-IISR won the first prize in ICAR/KVK Category during the agricultural exhibition in connection with National Horticulture Fair organized by ICAR-IIHR, Bengaluru during 22-25 February 2023



Training programmes

On campus programmes

☒ ICAR-IISR, Kozhikode, Kerala, held a tech transfer training for Lysterra LLC, Moscow, Russia, following an MoU between Agrinnovate, Lysterra LLC, and ICAR-IISR on 21.02.23. The patented microbial encapsulation technology titled 'A novel method of storing and delivering PGPR/Microbes through Biocapsules' aims to revolutionize the biofertilizer and biopesticide industry globally. The technology has been licensed to six firms, including a Russian client. The two-day online training saw participation from top officials and Lysterra's team.

☒ ICAR - IISR, Kozhikode conducts a one-month Summer Internship Programme on 'Advanced techniques in Microbiology, Biochemistry, Biotechnology, and Bioinformatics' from 02-31 May, 2023. Twelve students from various universities underwent the training

to gain hands-on training in cutting-edge techniques. The training was coordinated by Dr. Manimaran B, Dr. Mukesh Sankar, and Ms. Alfiya P V.

☒ ICAR-IISR organized a two-day Entrepreneurship Development Programme on 'Value Addition in Millets' as part of the International Year of Millets Celebration-2023 from 3-4 May, 2023. Dr. B. Dayakar Rao delivered the keynote address on 'Landscape of Millet Nutrition, Production, Processing, and Commercialization.' Ms. Bindu Gowri along with IISR staffs provided hands-on training on millet-based value-added products to 64 participants.

☒ Ms Hibba N, joined in Bioinformatics Centre, IISR for six-month Post-MSc Training in the field of metagenomics data analysis using bioinformatics tools under the guidance of Dr. Sona Charles.

On campus Off-Campus Training Programme programmes

One-day Seminar on Organic turmeric farming

A one-day Seminar on Organic turmeric farming was conducted at Parappara SC colony for the benefit of SC farmers on 13 February 2023. The seminar was organized by ICAR IISR under the SCSP component in collaboration with Krishi Bhavan, Thalakkulathur. Technical sessions were handled by Dr. C K Thankamani, Head, Division of Crop Production and Post-Harvest Technology. 58 SC farmers participated in the seminar.

Library strengthening under SPICEY programme at Kalpetta initiated

The Indian Institute of Spices Research (IISR) christened a special program "TSP-Support Programme for Increasing Capacity in Education for Youth" (TSP-SPICEY) with an aim to inculcate reading habits among tribal school children, by providing technical support and guidance. The programme is a joint initiative between the IISR and the Tribal Sub Plan (TSP) of the Government of India, which aims to improve the socio-economic conditions of tribal communities by bringing behavioral change among school students. The first school to receive the support was Government Vocational Higher Secondary School, Kalpetta

with more than 400 tribal students studying in various classes. The IISR has provided expertise in selecting appropriate literature and books for the library, as well as training for teachers on how to encourage reading habits among students on 02.03.2023. The TSP-SPICEY programme is expected to benefit thousands of tribal school children across India, helping them to improve their literacy skills and overall educational outcomes.

The institute provided three-month long livelihood support and skill training on tailoring for 12 tribal women beneficiaries from Wayanad in collaboration with MSSRF, Wayanad. The training was conducted from January to March 2023. Two commercial sewing machines were provided to the beneficiaries

Input Distribution to SC Prematric Hostel for Boys, Thachinganadam, Perinthalmanna

The IISR provided educational aid for SC students belonging to Prematric Hostel for Boys, Thachinganadam, Perinthalmanna. They were provided basic educational facilities such as 20 seed kits, 20 kg AMC, 400 notebooks, 16 umbrellas, 20 instrument boxes,

Training programmes



50 bed sheets, 32 T-shirts, and 25 plastic chairs. The distribution of inputs to the students will encourage



the student to undertake their basic education.

Lectures delivered

- Dr. Anees K Delivered a lecture on 'Production technology of Ginger and Turmeric'

- During one-day training programme on Spices organized by DASD at Naduvannur, Kozhikode on 16 February 2023

- Dr. Anees K delivered lecture on "Advances in protein chemistry: New Concept of Protein Folding" as part of Summer internship programme on Advanced techniques in microbiology, Biochemistry, Biotechnology and Bioinformatics during 02-31 May 2023.

- Dr. Anees K delivered lecture on "Deciphering Biosynthetic pathway: Tools and Techniques" as part of Summer internship programme on Advanced techniques in microbiology, Biochemistry, Biotechnology and Bioinformatics during 02-31 May 2023.

- Dr. Anees K delivered lecture on "Techniques for protein-protein interaction studies" as part of Summer internship programme on Advanced techniques in microbiology, Biochemistry, Biotechnology and Bioinformatics during 02-31 May 2023.

- Dr. Anees K delivered lecture on "Determination of total phenolic content in plant extracts" as part of Summer internship programme on Advanced techniques in microbiology, Biochemistry, Biotechnology and Bioinformatics during 02-31 May 2023.

- Dr. Anees K delivered lecture on "Determination of anti-oxidant activity through DPPH radical scavenging assay" as part of Summer internship programme on Advanced techniques in microbiology, Biochemistry,

- Biotechnology and Bioinformatics during 02-31 May 2023

- Dr. E Jayashree delivered a lecture in virtual mode on 'Entrepreneurship Opportunities in Turmeric and Ginger processing' during the training programme on "Agril. Food

- Processing, Packing & Marketing" conducted by Odisha Univ. of Agriculture & Technology, Bhubaneswar on 3-1-2023.

- Dr. E Jayashree delivered a lecture in virtual mode on 'Spice Processing and value addition' during the training programme on "advances in food process engineering and preservation" for B.Tech./M.Tech engineering students under SCSP scheme conducted by ICAR-CIFT on 16-1-2023.

- Dr. E Jayashree delivered a lecture in virtual mode on 'Spice Processing and value addition' during the training programme during the seminar in connection with Calicut Flower show 2023 on 24-1-2023.

- Dr. E Jayashree delivered lecture on 'Turmeric Processing' to the trainees of Kudumbasree Mission, Aryankavu, Trivandrum on 28-2-2023

- Dr. E Jayashree delivered lecture on 'Incubation and entrepreneurship challenges for grassroots applications related to Food Processing' during the workshop on Social Innovation and Entrepreneurship for sustainable development' jointly organized by National Innovation and National Institute of Technology

Training programmes

at NIT-C on 01-03- 2023.

• Dr. E Jayashree delivered a lecture on 'Processing of Turmeric and its Value addition' for the farmers of Kallakuruchi Ramnath district of Tamil Nadu at ICAR-IISR on 9-03-2023.

• Dr. E Jayashree delivered on 'Value addition in Nutmeg' organized by Spices Board for farmers from Thiruvambady village 13-3-2023.

• Dr. E Jayashree delivered lecture on 'Processing of Black pepper and turmeric' to the members of FPO from Aryankavu, Kollam on 16-3-2023.

• Dr. E Jayashree delivered lecture on Entrepreneurship development in agriculture during the training programme on "Advance Irrigation Technique for youth" organized by Centre for Water Resource Development, Kozhikode on 17-3-2023.

• Dr. E Jayashree served as resource person for the Panel Discussion on "Spices Processing and Value Addition" during the National Workshop on Export promotion of processed Agricultural Goods and other commodities of Wayanad (Aspirational District) at Kalpetta, Wayanad organized by Regional office Ministry of Micro, Small and Medium Enterprises, Thrissur on 21-3-2023.

• Dr. E Jayashree delivered a lecture on 'Post Harvest Processing and value addition in spices' during the Kalpa Vajra celebration of the institute on 13-5-2023 CPCRI Kayamkulam on 13-5-2023

• Dr. E Jayashree delivered a lecture on 'Post Harvest Processing and value addition of black pepper and ginger' during the summer internship training programme on Advanced techniques in Microbiology, Biochemistry, Biotechnology and Bioinformatics' at ICAR-IISR on 29-5-2023.

• Dr. K Kandiannan delivered lecture on Ginger and Turmeric propagation for trainees of "Capacity building of farmers of Kozhikode district on plant propagation methods and formation of SHG to enhance quality planting materials production of the district" organized during 14 – 16 February 2023 by ICAR-IISR, Kozhikode, on 16 Feb 2023.

☒ Dr. K Kandiannan delivered lecture on Production

technologies for major spices – during National Workshop on "Hi tech cultivation of spice crops cum Farmers training" at Coconut Research Station, TNAU, Aliyar Nagar, Jointly organized by Horticultural College & Research Institute(TNAU), Coimbatore, Directorate of Arecanut and Spices Development, Calicut and Society for Promotion of Horticultural Science & Technology (SoPHoST), Coimbatore on 27th Feb 2023.

• Dr. K Kandiannan delivered lecture on Improved production technologies in Black pepper (Online), National Workshop and Farmers training on "Hi tech cultivation of Chilli and Black pepper" at Vegetable Research Station (TNAU), Palur. Jointly organized by Horticultural College & Research Institute(TNAU), Coimbatore, Directorate of Arecanut and Spices Development, Calicut and Society for Promotion of Horticultural Science & Technology (SoPHoST), Coimbatore on 30 March 2023,.

• Dr. K Kandiannan delivered lecture on Climate change and crop production for Summer Internship programme on 'Advanced techniques in Microbiology, Biochemistry, Biotechnology and Bioinformatics' at ICAR – IISR, Kozhikode on 22 May, 2023.

• Dr. A. Ishwara Bhatt organized a brainstorming session on label claim expansion for spices on 18th April 2023 at ICAR-IISR, Kozhikode

• Dr. A. Ishwara Bhatt organized 7th Dr. Y R Sarma Memorial Lecture on 9th June 2023.

☒ Dr. E Jayashree served as Reviewer for Journal of Spices and Aromatic Crops and Society for promotion of Horticulture

• Ms. Alfiya P V delivered a lecture on 'Post-harvest processing of turmeric' during the summer internship training Fprogramme on Advanced techniques in microbiology, biochemistry, biotechnology and bioinformatics during 02-31 May 2023.Spices and Aromatic Crops and Society for promotion of Horticulture

• Ms. Alfiya P V delivered a lecture on 'Post-harvest processing of turmeric' during the summer internship training Fprogramme on Advanced techniques in microbiology, biochemistry, biotechnology and bioinformatics during 02-31 May 2023.

Training programmes

Capacity building programs attended by Staffs

Sl. No.	Name of Official	Name of Training	Organized by	Date
Scientific Staff				
1.	Dr. R Gobu	CAFT training programme on "Advances in Statistical Techniques for Efficient Agricultural Experimentation	ICAR-IASRI, New Delhi	04 – 24 January, 2023
2.	Dr. C Sarathamabal	Advanced Microscopic techniques	KSCSTE Malabar Botanical Garden	03 February, 2023
3.	Mr. S Mukesh Sankar			
4.	Mr. S Mukesh Sankar	Training programme on "Multivariate Data Analysis" (Online Mode)	ICAR-NAARM, Hyderabad.	20-27 March, 2023
4.	Dr. Anees K	Laboratory Assessors Training Course as per ISO/IEC 17025:2017	NABL at ICAR-NIVEDI	06-10 2023
5.	Ms. R. Sivaranjani	Hands on Workshop on "Zebrafish in biomedical research"	Agharkar Research Institute and IISER, Pune	20 – 24 March, 2023
6.	Dr. Honnappa Asangi	Winter school training programme on Approaches for doubling farmers income through secondary and smart agriculture: A way forward	ICAR-IARI, New Delhi	10 – 30 March, 2023
Technical Staff				
7.	Ms. N. Karthika	Online training programme on Trace level analysis of pesticides, phytochemical, sugars and organic acids	ICAR-IARI, New Delhi	15 – 21 February, 2023
8.	Mr. K. Jayarajan	Geo-tagging of RKVY assets	Govt of Kerala	14 February, 2023

Participation in Symposia/Seminars/Workshops/Conferences/Meetings

- Dr. A. Ishwara Bhatt participated in the workshop on Virus Indexing in horticultural crops College of Agriculture, RARS (Southern Zone), KAU, Vellayani, Thiruvananthapuram, March 2-3, 2023.
- Dr. R Praveena participated in Platinum Jubilee Conference on Plant and Soil Health Management: Issues & Innovations organized by Indian Phytopathological Society, University of Mysore, Mysuru, Karnataka, India, February 2-4, 2023.
- Muhammed Nissar V. A., participated in the international seminar on gingers held at KSCSTE- Malabar Malabar Botanical Garden and Institute for Plant Sciences, Kozhikode during 1-3 March 2023.
- Sharon Attended 19th Review meeting of Distinctiveness, Uniformity and Stability test centres, organized by PPVFRA, Department of Agriculture & Farmer's welfare at ICAR-IIHR, Bengaluru on 22-23 May 2023 and presented the progress report on DUS testing of ginger, turmeric, black pepper and nutmeg.
- Dr. E. Jayashree attended the seminar on Post Harvest Technologies and value addition' of Spices at

Training programmes

at CPCRI Kayamkulam on 13.05.2023 during the Kalpa Vajra celebration of the Institute on 13-5-2023.

- Dr. K Kandiannan 13th National Symposium on Fostering Resilient Coastal Agro-Ecosystems on 22 – 25 February, 2023 at Regional Agricultural Research Station, Tirupati, Acharya N.G. Ranga Agricultural University, Andhra Pradesh organized by Indian Society for Coastal Agricultural Research, Canning Town, West Bengal.
- Dr. K Kandiannan attended Global Conference "Precision Horticulture for Improved Livelihood, Nutrition and Environmental Services" on 28 – 31 May, 2023 held at JISL, Jalgaon, Maharashtra, organized by Amit Singh Memorial Foundation, New

Delhi and Jain Irrigation Systems Limited, Jalgaon, Maharashtra.

- Dr. K Kandiannan attended the Seventeenth Annual Review meeting of the MIDH programmes implemented through the Directorate of Arecanut and Spices Development, 8 – 9 June, 2023 at Agricultural Research Station, Mandor, Agricultural University, Jodhpur, Rajasthan.
- Dr. K Kandiannan co-chaired Theme I Session II: "Management of horticultural crops and plant protection measures" during 13th National Symposium on Fostering Resilient Coastal Agro-Ecosystems 22 – 25 February, 2023 at Regional Agricultural Research Station, Tirupati Acharya N.G. Ranga Agricultural University, Andhra Pradesh.

Representation in external committees

- Dr. K Kandiannan for accreditation of spices nursery - Evaluation in Kozhikode, Kannur and Kasaragod during 2-3 February 2023, Private Nursery I Kozhikode, KAU-Pepper Research Station, Panniyur, Kannur Dist., and College of Agriculture, Padannakkad, Kasaragod, Kerala.

- Dr. K Kandiannan for spice nursery accreditation during 15-16 May 2023, visited High Altitude Research Station (OUAT), Pottangi, Odhisa and Horticultural Research Station (Dr YSRHU), Chintapalli, Andhra Pradesh.

Important meetings

- Dr. N K Leela attended 'interactive session with the Scientific Panels of FSSAI' on 7 Jun 2023. Vigyan Bhawan, New Delhi.
- Dr. N K Leela attended 17th Meeting of Scientific Panel on Spices and culinary herbs SP19 held on 20/3/2023 at the Conference Hall, 5th Floor, Food Safety and Standard Authority of India, FDA Bhawan, Kotla Road, New Delhi.
- Dr. E. Jayashree attended the Brainstorming session on "Current status and future prospects value addition of Chilli & Turmeric" on 06.06.2023 (Virtual Mode) organised by ICAR-CTRI, Rajahmundry.
- Dr. A Ishwara Bhatt attended a meeting on expansion of label claims of pesticides for use in spices, Spices Board, Kochi, 3rd February 2023.
- Dr. Anees K Attended Review meeting of the Ongoing/Completed Projects under Technology Development Programme (TDP) on 26th April 2023 at Presidency University, Bengaluru.

- Dr. Anees K attended Techno-commercial Assessment and Standard Terms Committee/ ICAR-IISR, Calicut on Jan 3, 2023
- Dr. Anees K Participated in the presentation of DST SATHI project on April, 2023 at Jawaharlal Nehru Centre for Advance Scientific Research, Jakkur, Bengaluru.
- Anees K Attended meeting on "Review of ITMUs/ ABIs under NAIF Scheme" organized by ZTMU-IIHR, Bengaluru on 23rd May 2023.
- Dr. Anees K attended Brainstorming session on "Current status and future prospects value addition of Chilli & Turmeric" on 06.06.2023 organised by ICAR-Central Tobacco Research Institute (CTRI), Rajahmundry.
- Dr. Anees K Attended online meeting organized by Horticulture SMD regarding discussion on technology day 2023.

Institute Technology Management Unit Activities

Institute collaborative initiatives

- ICAR-Indian Institute of Spices Research signed a Memorandum of Understanding (MoU) with Jain Irrigation Systems Ltd, Jalgaon, Maharashtra for collaborative research on black pepper, ginger, and turmeric in an event at IISR, Kozhikode on 27th June 2023. Jain Irrigation Systems Ltd is a multinational firm with diversified agricultural goals. The firm leads the world market in Micro-irrigation products and has ultra-Modern R & D facilities, a Hi-Tech Tissue culture division, and processing facilities for fruits, vegetables, and spices.

- KMCT Dental College, Mukkang entered into an MoU with ICAR- Indian Institute of Spices Research, Kozhikode on 27th June 2023 to facilitate collaborative research, inter-institutional faculty interaction, and capacity building across multiple domains of mutual interest. KMCT dental college owns a NAAC A+ accredited status and is a recognized center for research under the Kerala University of Health Science. The collaboration will benefit the researchers, faculty, and students associated with both institutions.

- Under the proposed Kerala Revival and Development project with World Bank aid and to be implemented by Kerala Government. A team of World Bank officials with officers of the Department of Agriculture and Farmers Welfare Kerala were on a preparatory study visit. They held discussions with scientists on topics like climate change, climate resilience, and value addition in spices on March 8 2023 at IISR, Kozhikode.

- Technologies commercialized: Licenses were issued for IISR Pragati to Ms. Febin T Nabeel on Ms. Febin T Nabeel, M/s Curcuma Agro Solutions Kozhikode, Kerala, on 8.02.2023 and to Mr. Sandeep Lamba, Saroj Lamba & Ranvir Singh Lamba, Chandigarh, on 22.03.2023.

- Application filed for trademark registration of 'iFAME'- Incubation Facility for Microbial Encapsulation, the newly established incubation facility of IISR

- Three license agreements were executed for utilizing the Spice Processing facility at HQ/ Peruvannamuzhi

- Facilitated the consultancy visit of IISR scientist to black pepper plantations of Elkhill Estates, Codagu, Karnataka and New Ambadi Estates, Kanyakumari, Tamil



MoU signing as part of Institute collaborative initiatives

Nadu.

- Completed technology know-how transfer cum training programme for the international Licensee Lysterra LLC, Moscow, Russia for the technology A novel method of storing and delivering PGPR/Microbes through biocapsules on 9th June 2023.

- Conducted virtual interactive session as part of World Intellectual Property day on 26th April 2023 under the theme "Women and IP: Accelerating Innovation and Creativity". Ms. Amrita G (Registered Patent Agent, R.K. Dewan and Co.) delivered a lecture on the topic on the

Institute Technology Management Unit Activities

topics "Sowing the seeds of innovation and IP in agriculture" during the occasion.

- Executed the assignment deed ICAR-IISR and National Research Development Corporation (NRDC) for parallel marketing of the technology 'Granular Lime Based Microbial Formulation and A Process for its Preparation'

on 17th May 2023.

- Executed the collaborative research agreement between ICAR-IISR and Jain Irrigation Systems Ltd, Jalgaon, Maharashtra for research on Black pepper, Turmeric and Ginger and any other possible crops on 27th June 2023.



Technology transfer and knowhow training to Lysterra LLC, Moscow, Russia

Training/workshop/Seminar attended

Sl. No	Name of Programme (Training/workshop/Seminar etc.) attended	Organized by	Date	Participant (Name)
1	Pooppoli 2023	Department of Agriculture, Kerala	1 – 15 January, 2023	ITM-ABI staff
2	VAIGA international exhibition	Department of Agriculture and Farmers Welfare, Kerala	25 February – 02 March, 2023	ITM-ABI staff
3	Delivered a talk on 'Commercialized technologies and value-added products from spices and the support of IISR to entrepreneurs'	Chelannur Block Panchayat, Kozhikode	5 March, 2023	ITM-ABI staff
4	ICAR-Industry Stakeholder Consultation meet	Agrinnovate India Ltd	6 March, 2023	Dr. T E Sheeja
5	Kalpa Vajra 2023, Jubilee celebration year at ICAR – CPCRI, Kayamkulam	ICAR – Central Plantation Crops Research Institute, Kasaragod.	13 – 14 May, 2023	ITM-ABI staff

Institute Technology Management Unit Activities



MoU Execution with Jain Irrigation Systems Ltd for collaborative research

Agri-Business Incubator

- Inaugurated 'Kisan Seva Kendra'- Bio Input Resource Centre. The facility intends to support farmers across the country by facilitating easy access to ICAR technology-based farm bio inputs. All products are also available online through the website <https://spiisry.in>. The unit was inaugurated by Dr. Abdul Hameed E, Former Scientist, Kerala State Council for Science & Technology Education (KSCSTE)- CWRDM as part of World Environment Day celebrations on 5th June 2023
- Signed MoA with Elements Homestead Products Pvt Ltd. on 9th June 2023 for marketing of selected products through ABL sales counter "SPIISRY" and online portal <https://spiisry.in>. The fairly traded and organic certified products of Elements Organic Pvt Ltd. will be marketed under the theme 'Partnering Biodiversity Preservation'.
- Organized an entrepreneurship development programme in collaboration with MSME Development & Facilitation Office, Thrissur on 12th Jan 2023 for 39 participants. Dr. TE Sheeja delivered talk on 'Technology commercialization and facilities available under ABL -IISR for entrepreneurs.
- Launched traditional "Curry blends" developed by a women entrepreneur Mrs. Nisha Manimala of Kattipara Coconut Industries Pvt. Ltd as part of International Women's Day celebrations on 8 March, 2023.
- Received cosmetic manufacturing license from Drugs Control Department, Government of Kerala for manufacturing hair oil and hair cream.
- Institute technology-based products were exhibited at the G20 meeting held at Varanasi from 17 – 19 April, 2023.
- Mr. Abdul Razak, Business Manager delivered a talk on 'Value added products from spices and the support of IISR to entrepreneurs' in an investor's meet at Chelannur Block Panchayath, Kozhikode on 5th March 2023.



'Kisan Seva Kendra' – Bio Input Resource Centre at ICAR -IISR

Institute Technology Management Unit Activities



Launch of 'Mill e' Meal' by Dr. Beena Philip, Honourable Mayor, Kozhikode



Launch of the traditional "Curry blends" by Dr. Beena Philip, Honourable Mayor, Kozhikode

News from AICRP on Spices

Dr. D Prasath takes over as the new Project Coordinator, AICRP on Spices, ICAR-IISR,

On the recommendations of the Agricultural Scientist Recruitment Board (ASRB), New Delhi, Dr. D Prasath has assumed charge as the Project Coordinator, AICRP on Spices, ICAR-Indian Institute of Spices Research, Kozhikode on May 02, 2023. He is from the 1998 batch of ARS (Agriculture Research Service). A Principal Scientist in Horticulture, Dr. Prasath has 25 years of research experience in horticultural crops genetic resources, breeding, and applied genomics. He did his post-doctoral research at the University of Guelph, Canada under the 'BOYSCAST Fellowship'. Also, a recipient of the Australian Government's 'Endeavour Fellowship' (University of Queensland, Brisbane, Australia).

He has released five high-yielding varieties in turmeric, cardamom, and ginger and was involved in the release of another six varieties as a collaborator. He identified and registered four unique germplasm accessions in Spices. He was also involved in the identification of promising ginger genotypes through mutation and polyploidy breeding. He also commenced work to identify the basal defense mechanisms against bacterial wilt resistance in ginger through mRNA sequencing, which will



be helpful in developing wilt-resistant varieties. He has in his credit two technologies for the production of quality planting materials in ginger and black pepper. He is a Fellow of the National Academy of Agricultural Sciences and the Indian Academy of Horticultural Sciences. He is also the recipient of the prestigious ICAR-Fakhruddin Ali Ahmed Award for outstanding research and the Young Scientist Award from Indian Academy of Horticultural Sciences. He has published 75 peer-reviewed research papers, 25 book chapters, and 2 books.

News from AICRP on Spices

Central Varietal Release Committee Approves Six New Spice Varieties for Cultivation in India

The 30th meeting of the Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Horticultural Crops was held on 4th May, 2023 under the chairmanship of Dr. A.K. Singh, Deputy Director General (Horticulture), ICAR, in Krishi Bhawan, New Delhi. During the meeting, six varieties of spice crops were considered for release and notification in the committee. These included Coriander (CG Raigarh Dhaniya-3/RCC 12-7), Ajwain (Gujarat Ajwain 2 and Chhattisgarh Ajwain-1 (CG Ajwain-1)), Nigella (CG Karayat-1), Turmeric (Chhattisgarh Raigarh Haldi-3/IT 36), and Saffron (Shalimar Saffron-1 /SD-1-13).



CG Raigarh Dhaniya-3 (RCC 12-7)



Gujarat Ajwain 2 (JA-112)



Chhattisgarh Ajwain-1
(CG Ajwain-1)



CG Karayat-1



Chhattisgarh Raigarh Haldi-3 (IT 36)



Shalimar Saffron-1 (SD-1-13)

News and Events from Experimental Farm, Peruvannamuzhi

Republic day Celebration



Republic day celebration at ICAR-IISR EF, Peruvannamuzhi

World Environment Day

On June 5, 2023, World Environment Day was observed at the ICAR-IISR Experimental Farm in Peruvannamuzhi. 42 trees of various species viz., *Grevillea robusta*, *Garcinia morella*, *Garcinia dhanikhariensis*, *Garcinia talbotii*, *Garcinia pedunculata*, *Garcinia sibeswarrii*, *Garcinia indica*, *Garcinia celebica* and *Garcinia acuminata* were planted as part of the celebration's tree-planting initiative. All participants took the LIFE Pledge at the event.



World Environment Day observed at the ICAR-IISR Experimental Farm in Peruvannamuzhi

International Yoga Day

As part of International Yoga Day on June 21, 2023, ICAR-IISR Experimental Farm and KVK, Peruvannamuzhi organized a programme on "Yoga therapy for emotional and mental well-being." Ministry of AYUSH's "Y-Break Protocol" was introduced to the personnel of Experimental Farm and KVK, Peruvannamuzhi, so that they may de-stress, revitalize, and refocus during their office work. The staff members registered for the International Yoga Day got certificate from Morarji Desai National Institute of Yoga. The employees practiced yoga in accordance with the "Common Yoga Protocol – 2023" devised by the Ministry of AYUSH, Government of India.



Staffs Practising Yoga



ICAR-IISR Experimental Farm staffs taking LIFE Pledge

News and Events from Experimental Farm, Peruvannamuzhi

Sugandhi Recreation Club activities



Mini-gymnasium established at IISR, Experimental farm, Peruvannamuzhi

Agri Business Incubator



ABI unit works at ICAR-IISR, Experimental farm, Peruvannamuzhi

News and events from ICAR-IISR RS, Appangala

DASD sponsored farmers training programme

ICAR- Indian Institute of Spices Research, Regional Station, Appangala organized a district level farmers training programme on "Scientific and technological approaches for sustainable black pepper production in Malnad region" on 07.02.2023 at TMS hall, Sirsi. The training was sponsored by the Directorate of Arecanut and Spices Development, Calicut. This training was conducted in association with Horticultural Research and Extension Centre (UHS), Sirsi and Taluka Agricultural Produce Co-operative Marketing Society Ltd. (TMS), Sirsi. The program was inaugurated by Dr. H. P. Maheshwarappa, Director of Research, UHS, Bagalkot in the presence of Dr. M. H. Tatagar, Dean, College of Horticulture, Sirsi; Dr. M. N. Venugopal, Former Principal Scientist & Head, ICAR-IISR, RS, Appangala; Shri G. M. Hegde Hulagola, President, TMS, Sirsi and Dr. K. Kandianan, Principal Scientist & PI of the project, ICAR-IISR, Kozhikode. The training programme emphasized on recent advances in production and processing of black

pepper. During the training lectures were given on cultivation diversity of black pepper by Dr. M. S. Shivakumar, Scientist, ICAR-IISR, RS, Appangala; nursery techniques for quality planting material production in black pepper by Dr. K. S. Krishnamurthy, Principal Scientist, ICAR-IISR, Kozhikode; scientific cultivation practices in black pepper by Dr. S. J. Ankegowda, Principal Scientist & Head, ICAR-IISR RS, Appangala; pest and disease management in black pepper by Dr. Mohammed Faisal, P., Scientist, ICAR-IISR RS, Appangala; harvest and post-harvest technology in black pepper by Dr. V. Srinivasan, Principal Scientist, ICAR-IISR, Kozhikode and present scenario and future prospects of black pepper cultivation in Uttara Kannada by Dr. M. N. Venugopal, Former Principal Scientist & Head, ICAR-IISR RS, Appangala. Dr. Abdul Kareem, Head, HREC, Sirsi proposed vote of thanks. More than 110 farmers from different parts of Uttara Kannada district attended the training programme.



Events conducted at ICAR-IISR Regional Station, Appangala

- In connection with World Environment Day 2023, a massive tree planting programme was conducted at ICAR-IISR, Kozhikode, Regional Station, Appangala, Experimental Farm, Peruvnamuzhi and KVK, Kozhikode. The staff from IISR RS, Appangala, visited the Govt. Higher Primary School, Bettageri, where fruit tree saplings were planted with the involvement of students and teachers.

News from Krishi Vigyan Kendra, Kozhikode

Twenty Third Scientific Advisory Committee (SAC) meeting

The Twenty Third Scientific Advisory Committee (SAC) meeting of ICAR-IISR, Krishi Vigyan Kendra, Peruvanamuzhi was held on 23.01.2023 in the Committee Room of Indian Institute of Spices Research, Calicut under the Chairmanship of Dr. R. Dinesh, Director, ICAR-IISR, Kozhikode. Dr K. Thimmapa, Nodal Officer and Principal Scientist, ICAR - Agricultural Technology Application Research Institute, Zone VIII, Bengaluru presided the programme. Dr P. Jayaraj, Associate Director (Research) & Programme Coordinator, KVK, Kannur represented Director of Extension, KAU, Thrissur.

In his chairman remarks, Dr. R. Dinesh, Director, ICAR - IISR stressed the importance of SAC meeting and lauded the entire KVK team for their achievements in the mandatory activities, DFI success story, inputs submission and special programmes like NICRA, CFLD etc. He also stressed the importance of interventions under International Year of Millet and income enhancing and farmer friendly approaches.

On Farm Trials

- Assessment of okra varieties for yield and YVM disease resistance.
- Assessment of different traps against mango fruit flies.
- Assessment of strawberry varieties for grow bag cultivation.
- Assessment of marigold varieties for cultivation in Kozhikode.

Farmers' Field School

Disease free seed production of ginger variety IISR Vajra

Entrepreneurship Development Programmes

- EDP on quality planting material production of IISR Black Pepper varieties
- Extraction of banana fibre and value-added products
- Millets based value added products development

Front Line Demonstrations

- Farmer participatory seed production of a high yielding variety of elephant foot yam namely Gajendra
- Demonstration of a high yielding, late bolting, multi-cut variety of red amaranth viz. KAU Vaika
- Demonstration of production technology of IISR Thevam in homestead
- Demonstration of grafted pepper as a mixed crop on areca nut
- Demonstration of mixed cropping of high yielding nutmeg Keralasree in irrigated areca nut/ coconut garden
- Demonstration on integrated management of Tanjore wilt of coconut (continuing for 3rd year)
- IPM in banana
- Demonstration of tricho cake for bud rot management in coconut
- Demonstration on efficacy of Doramectin for parasitic infestation in cattle.
- Demonstration of CIFAX for fish health management
- Culture of snake head fish (Murrels)
- Scientific farming of scampi (*Macrobrachium rosenbergii*)
- Value addition of mushroom
- Demonstration of micro nutrient foliar application in paddy using drones
- Demonstration of onion cultivation at homestead

Publications

1. Pradeep B, P Ratha Krishnan. 2003. Pacu – Some facts and apprehensions, Aquaculture spectrum magazine – Vol.6, Issue: 2 February 2023, pages 13-18.
2. Ratha Krishnan P., Manoj P S., Prakash K.M., Pradeep B., Aiswariya K K, and Deepthi A. 2023. Kozhikode (Calicut). In: Chandra Gowda M.J., Srinivasa Reddy D.V., Rayudu. B.T., Thimmappa.K., Koleker.D.V., Mallikarjun B. Hanji, Harshitha.D and Deelsha Raj. N. Enhancing Farmers Income in Kerala. Impart of Technologies promoted in KVKs. ICAR ATARI, Bengaluru – PP 93.

News from Library

Six issues of the electronic version of 'AGRItitbits' was published. Dspice was enriched with more institute publications. 88 new books were procured and 25 research articles were verified by using anti-plagiarism software.

Hindi Anubhag

हिंदी अनुभाग

राजभाषा कार्यान्वयन समिति की बैठक

जनवरी-जून 2023 की अवधि में राजभाषा कार्यान्वयन समिति की दो बैठकें आयोजित की गयी। बैठकें दिनांक 09 फरवरी 2023 तथा 01 मई 2023 को निदेशक डॉ. आर. दिनेश की अध्यक्षता में संपन्न हुई। समिति ने राजभाषा कार्यान्वयन की गतिविधियों की समीक्षा करके सुधारने के लिए सुझाव दिया।

हिंदी कार्यशाला

जनवरी-जून 2023 की अवधि में भाकृअनुप-भारतीय मसाला फसल अनुसंधान संस्थान के अधिकारियों तथा कर्मचारियों के लिए दो कार्यशालाएं आयोजित की गयीं। इन कार्यशालाओं में, श्री. के. राजेश, वरिष्ठ प्रबंधक, यूनिजन बैंक ऑफ इंडिया, कोषिकोड तथा श्रीमती एन. प्रसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी, आईसीएआर-आईआईएसआर ने क्रमशः दिनांक 21.02.2023 और 17.05.2023 को "राजभाषा कार्यान्वयन को कैसे आसान बनायें" तथा "राजभाषा नियम" आदि विषयों पर व्याख्यान दिया।



Hindi Anubhag

हिंदी प्रशिक्षण

डॉ. एन. के. लीला, प्रधान वैज्ञानिक एवं हिंदी अधिकारी तथा श्रीमती षजिना ओ., तकनीशियन ने केंद्रीय हिंदी प्रशिक्षण संस्थान द्वारा आयोजित पारंगत परीक्षा उत्तीर्ण की।

श्री. जयप्रकाश पी. टी., उच्च श्रेणी लिपिक तथा श्रीमती एन. प्रसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी ने केंद्रीय हिंदी प्रशिक्षण संस्थान द्वारा आयोजित हिंदी शब्द संसाधन परीक्षा उत्तीर्ण की।

श्रीमती एन. प्रसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी ने विश्व हिंदी दिवस के अवसर पर 10 जनवरी 2023 को आईसीएआर-आईआईएसडब्ल्यूसी, देरादून, उत्तर प्रदेश द्वारा आयोजित ऑनलाइन अंतर्राष्ट्रीय वेब संगोष्ठी में भाग ली।

श्रीमती एन. प्रसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी ने 27 जनवरी 2023 को राजभाषा विभाग द्वारा टैगोर थियेटर, वधुतक्काड, तिरुवनंतपुरम में आयोजित क्षेत्रीय राजभाषा सम्मेलन एवं पुरस्कार वितरण समारोह में भाग लिया।

हिंदी प्रकाशन

- मसाला समाचार जनवरी-जून 2022
- एआईसीआरपीएस वार्षिक प्रतिवेदन का कार्यकारी सारांश 2022
- आईसीएआर-आईआईएसआर के वार्षिक प्रतिवेदन का कार्यकारी सारांश 2022

- प्रमुख मसाला फसलों की खेती से संबंधित मृदा की समस्याएं एवं समाधान
- उत्तर-पूर्वी क्षेत्रों में प्रमुख मसाला फसलों का जैविक उत्पादन (काली मिर्च, अदरक, हल्दी एवं बड़ी इलायची)

राजभाषा रिपोर्ट

संस्थान के राजभाषा कार्यान्वयन की तिमाही एवं वार्षिक रिपोर्ट तैयार करके भारतीय कृषि अनुसंधान परिषद, नई दिल्ली को भेज दिया। तिमाही रिपोर्ट एवं वार्षिक रिपोर्ट राजभाषा विभाग, नई दिल्ली को ऑनलाइन भेज दिया। राजभाषा कार्यान्वयन का अर्धवार्षिक रिपोर्ट तैयार करके नगर राजभाषा कार्यान्वयन समिति को प्रस्तुत किया।

इन्टर्नेशिप प्रशिक्षण

प्रस्तुत अवधि में हिंदी अनुभाग द्वारा केरल केंद्रीय विश्वविद्यालय, कासरकोड के एक स्नातकोत्तर छात्र श्री. अश्विन कृष्णा बी. को राजभाषा कार्यान्वयन पर 15 दिवस का इन्टर्नेशिप प्रशिक्षण दिया गया।



Major Institute Events

International Year of Millets

- KVK, Kozhikode conducted Millet Awareness programme and virtual trip to 'A small millet processing & sales facility of Kudumbasree (Prakrathi Foods), Kayanna to a group of ten women farmers from Vengeri on 15.02.2023.
- KVK, Kozhikode conducted millet awareness program and distributed three millet seeds to 50 farmers and one school batch of Balussery Panchayat on 05.03.2023.
- On the occasion of the International Women's Day celebration (08.3.2023), Dr. Beena Philip, Mayor, Kozhikode corporation launched the 'Millet Meal' program that aimed to provide millet-based food preparations to the staff of ICAR-IISR, Kozhikode. Ragi laddu and 'mixed millet porridge' were distributed to the staff in this launching event.
- A virtual talk on 'Millet types and varieties' was delivered by Mr. Faizy Mohammed, Managing Director, KPA spices, Farmer-Producer company, Pathanamthitta. The program was organized by the B.P.D. unit of the institute under the leadership of Dr. T.E. Sheeja, Chairperson of the committee for entrepreneurship/start-up/collective development. Dr. K. Kandiannan, Chairman of the IYM coordination committee gave his introductory remarks. Mr. Faizy Muhammed explained the different types of millet and recipes for millet preparations. Around 25 participants attended the program both online and offline including institute staff and FPO members.
- Dr. V. Venkatasubramanian, Director, ATARI, Bengaluru inaugurated the exhibition on millets and its value addition on the occasion of the Annual Review (2022-23) and Action Plan (2023-24) meeting of KVKs of Kerala and Lakshadweep at ICAR -IISR, Kozhikode on 26.04.2023. Dr. R. Dinesh, Director, ICAR-IISR, Kozhikode, Dr. B.T. Raydu; Dr. K Thimmappa (ICAR-ATARI, Bengaluru), Dr. Jacob John, Director of Extension, KAU, Thrissur, Dr. P. Rathakrishnan, PC, KVK, Kozhikode were also present in the occasion. Different types of millet, its value-added products, and millet-based preparations made by ICAR-IISR, KVK Peruvannamuzhi, and KVK-supported entrepreneurs were exhibited in the venue.
- An entrepreneurship development programme on 'Value Addition in Millets' was organized at ICAR-Indian Institute of Spices Research, Kozhikode on the 03 – 04 May, 2023. The programme was inaugurated by Dr. R. Dinesh, Director, ICAR-IISR, Kozhikode on 3rd May 2023. Dr. B. Dayakar Rao, Principal Scientist, ICAR-IIMR (Indian Institute of Millet Research), Hyderabad delivered the keynote address on the topic 'Landscape of Millet Nutrition, Production, Processing and its Commercialization'. Ms Bindu Gowri, Coordinator, Agri Business School, KVK, Coimbatore delivered a special address on 'Perspective of Millets in Kerala'. She demonstrated and provided hands-on training on millet-based value-added products like the preparation of ragi soup powder mix, biriyani mix, nutrient health mix, millet mixture and millet-based murukku to the trainees. About 64 participants benefitted by the training and the valedictory programme was held on 4th May 2023
- ICAR- IISR, Kozhikode participated and displayed millet-based products in the exhibition of "Eat Right Millet Mela" organized by FSSAI- Southern Region in Association, Kochi with Food Safety Department of Government of Kerala at St. Joseph's College, Devagiri, Kozhikode on 23.06.2023. Different millet-based products developed by the ICAR- IISR was displayed in the exhibition and sold to visitors.



Major Institute Events

National Science Day- 2023

- ICAR-IISR, Kozhikode celebrated National Science Day- 2023 on 28 February 2023. Dr. Rajanikant G K, Professor & Dean (Student's Welfare), NIT, Calicut was the Chief Guest of the function. Dr. Rajanikant G.K., delivered Science Day Lecture on the topic 'Leveraging Science to improve global well-being'.
- An 'Intercollegiate Science Quiz Competition' was also conducted and eleven teams from different colleges of Kozhikode district participated in the event.



Prof. Dr. Rajanikant G K, Dean Academics, NIT (C) addressing the staff of IISR on National Science Day

International Women's Day

- ICAR- Indian Institute of Spices Research, Kozhikode celebrated International Women's Day on 8th March 2023 on the theme "DigitALL: Innovation and technology for gender equality". In this regard, ICAR Indian Institute of Spices Research, Kozhikode, Kerala organized a gathering representing # Embrace Equity.
- Dr. Beena Philip, Mayor of Kozhikode was the Chief Guest for the Women's Day and delivered a talk on Innovation and technology for gender equality.
- On this occasion a traditional "Curry blends" developed by a women entrepreneur Mrs. Nisha Manimala of Kattippara Coconut Industries Pvt. Ltd was also launched by the chief guest.
- On this special day, in solidarity with the International Year of Millets 2023, a programme named 'Mill e' Meal' was launched by the Mayor at the institute. This

launch commemorates the traditional value of millets and the promotion of a millet-based diet among the staff members to boost energy and excellence.

Experience sharing of successful woman entrepreneurs

- Mrs. Bindu Joseph, Randuplackal Nursery, Kozhikode is a women entrepreneur Winner of Pandit Deen Dayal Upadhyay Antyodaya Krishi Puraskar-2021. Producing and selling more than 10,000 bush pepper, 5000 cocunut seedlings, hybrid bougainvillea, fruit crops.
- Mrs. Geetha Saleesh Entrepreneur from Thrissur, Kerala. She beats her blindness with her courage. Started Geetha's Home to Home in 2020 and availed license for IISR turmeric variety IISR Prathibha in 2022. Cultivated IISR Prathibha in 10 acres including 47



IISR fraternity expressed their unity in their dress code (Yellow) and stood up for the # Embrace Equity



Visit to Kattippara Coconut Industries Pvt. Ltd

Major Institute Events

farmers during 2022-23. Now four people are working under her.

- As a part of International Women's Day, Women cell organized an exposure visit to women entrepreneur unit run by Mrs. Nisha Manimala of Kattipara Coconut Industries Pvt. Ltd, farmers field visit in our adopted village (Kattipara) and Kakkayam bio diversity zone on 01.03.2023. Around 54 members actively participated in this exposure visit.

World Intellectual Property day

- ICAR-Indian Institute of Spices Research, Kozhikode Kerala celebrated World Intellectual Property day 2023 on 26th April 2023 by organizing a virtual interactive session under the theme "Women and IP: Accelerating Innovation and Creativity in collaboration with ICAR-National Research Centre on Seed Spices, Ajmer, Rajasthan and ICAR-Central Plantation Crop Research Institute, Kasaragod, Kerala.
- Ms. Amritha G (Registered Patent Agent, R.K. Dewan and Co. Bengaluru) and Ms. Meenakshi Chotia, Patent Lawyer & Managing Associate at LexOrbis, Bengaluru delivered the lectures on the topics "Sowing the seeds of innovation and IP in agriculture" and "Women & IP: Accelerating Innovation and Creativity" respectively during the occasion.

Environment day

- A "Memorial planting" was carried out in memory of former Directors of ICAR-IISR by the Director and Heads of various Divisions. This was followed by the inauguration of "Kisan Seva Kendra," an outlet for the sale of farm bio-inputs of ICAR Institutes, by Dr. Abdul Hameed E, an Environmentalist and Former Scientist at KSCSTE - CWRDM. A lecture on "Water scenario in Kerala" was organized at ICAR-Indian Institute of Spices Research, Kozhikode, where the Chief Guest, Dr. Abdul Hameed E enlightened us on different aspects of Kerala's water availability, constraints on water resources, and its way forward.

International Yoga day-2023



Brainstorming Meeting on label claim expansion for spices

IISR successfully organized a brainstorming session on Label Claim Expansion for Spices which was held on 18 April 2023 at IISR, Kozhikode. Invitees from various organizations including Spices Board, Directorate of Arecanut and Spices Development (DASD), Central Insecticides Board and Registration Committee (CIBRC), Food Safety and Standards Authority of India (FSSAI), ICAR-National Research Centre on Seed Spices (ICAR-NRCSS), All India Network Project on Pesticide Residues (AINP-PR), All India Coordinated Research Project on Spices (AICRPS) centers, World Spice Organization (WSO), and representatives from pesticide industries participated in the discussion conducted in hybrid mode.

Major Institute Events

7th Dr. Y.R. Sarma Memorial Lecture; 9th June 2023

IISR successfully organized 7th Dr. Y.R. Sarma Memorial Lecture on 9th June 2023 in hybrid mode. Dr. Bir Pal Singh, Former Director, ICAR-Central Potato Research Institute, Shimla delivered the lecture titled "Managing impact of late blight disease on potato production in India". About 70 delegates, comprising scientists, research scholars, former colleagues, and postgraduate students participated in the event and interacted with the speaker.



Awards/ Honours/ Recognitions

- ICAR- Indian Institute of Spices Research won the best stall award among the ICAR Institutes/KVK category in the National Horticulture Fair held during February 22-25th, 2023 at ICAR- IISR, Hesaragatta, Bengaluru.
- Dr. Akshitha HJ was identified as the co-coordinator for the DASD-sponsored farmers training programme on "Scientific and technological approaches for sustainable black pepper production in Malnad region" organized by ICAR-IISR RS, Appangala at TMS hall, Sirsi.
- Pavan Gowda, M, Senior Technical Officer, ICAR-IISR EF, Peruvannamuzhi, was awarded Ph.D. from Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal for his dissertation titled "Bio-formulations and Elicitors mediated response of growth, yield and quality of kalmegh (*Andrographis paniculata* Wall. Ex Nees)"



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Research papers

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- Dinesh, R., Sreena, C. P., Sheeja, T. E., Kumar, I. V., Praveena, R., Charles, S., Srinivasan, V., Jayarajan, K., Sajith, V., Subila, K.P. and Haritha, P. (2023). Soil polluted with nano ZnO reveals unstable bacterial communities and decoupling of taxonomic and functional diversities. *Science of The Total Environment*, 889, 164285. <https://doi.org/10.1016/j.scitotenv.2023.164285>
- Prasath, D., Matthews, A., O'Neill, W. T., Aitken, E. A., & Chen, A. (2023). Fusarium yellows of ginger (*Zingiber officinale* Roscoe) caused by *Fusarium oxysporum* f. sp. *zingiberi* is associated with cultivar-specific expression of defense-responsive genes. *Pathogens*, 12(1), 141. <https://doi.org/10.3390/pathogens12010141>
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- Berliner, J., Alfred-Daniel, J., Rajkumar, Balaaji, Hombegowda, H. C., Manimaran, B., Parvez, Rashid, Khan, M. R., Mhatre, Priyank Hanuman, Govindharaj, Guru-Pirasanna-Pandi (2023). Fauna associated with wheat cultivation in high altitudes of the Nilgiris, India. *Current Science*, 124(4): 426-433. doi: 10.18520/cs/v124/i4/426-433
- Sarathambal, C., R. Sivaranjani, V. Srinivasan, M. Alagupalamuthirsolai, K. P. Subila & B. Anamika. 2023. Effect of arbuscular mycorrhizal inoculation on growth, mineral nutrient uptake, photosynthesis and antioxidant activities of black pepper cuttings, *Journal of Plant Nutrition*, 46(10): 2508-2524
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- Jayashree Ettanil and Thondiath John Zachariah. 2023. Modeling for thin layer drying of black pepper (*Piper nigrum*) in a reverse flow dryer. *Journal of Food Process Engineering*. 46(1): e14202 (1-10). <https://doi.org/10.1111/jfpe.14202>

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- Nirmal Babu, K., R. Dinesh, V. Srinivasan, K. Kandiannan, Ljo Thomas and H.P. Singh. 2023. Precision production technologies in spices and development of value chain. pp. 136. In: Singh, H.P. and Kumar, Dinesh 2023. Book of Abstracts – Global Conference “Precision Horticulture for Improved Livelihood, Nutrition and Environmental Services” May 28-31, 2023 held at JISL, Jalgaon, Maharashtra
- Kandiannan, K., V. Srinivasan Ljo Thomas R. Dinesh. 2023. Technologies for enhancing profitability on spices in coastal India. pp.37-38. In: (Bhunia R N et al. (Eds.)) Book of Abstracts: 13th National Symposium of Indian Society for Coastal Agricultural Research on Fostering Resilient Coastal Agro-Ecosystems 22nd-25th February, 2023 at Regional Agricultural Research Station, Tirupati Acharya N.G. Ranga Agricultural University, Andhra Pradesh, Indian Society for Coastal Agricultural Research, Canning Town, West Bengal.

Popular article

- CK Thankamani. 2023. One day seminar on cultivation of turmeric and control of diseases. March 27, Organized by Directorate of Arecanut and Spices Development, Kozhikode.
- Jayashree E, Anees K. and Alfiya P V. 2022. Kali Mirch- Kala Sona: Iska Vividh Roop, Masaloom ke Mehak, ICAR-Indian Institute of Spices Research, Kozhikode, Kerala, 14-19
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- Nirmal Babu, K., R. Dinesh, V. Srinivasan, K. Kandiannan, Ljo Thomas and H.P. Singh. 2023. Precision Production Technologies in Spices and Development of Value Chain. *Shodh Chintan*. 15: 161-181.
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- Prasath D, Muhammed Nissar V. A. and Arthi S. *Gingerarium a Unique Conservatory of Gingers. Spice India Vol. 36(1) January 2023 P: 22-25 (In four languages)*

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- Prasath D, V.A. Muhammed Nissar & Aarthi S. 2023. Gingerarium: A unique Conservatory og Gingers. Spice India. 36(1):22-25
- Sharon Aravind, Krishnamurthy K S , Rema J, Radha E, & John George 2022 ICAR- Akhil bharathiya samanvith masala anusandhan pariyojana se jari karne ke liye anusasith nai kismem aur poudyogikiyam (Hindi). Masalon ki Mehak 47-50.
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- Alagupalamuthirsolai, M., M. Murugan, C.K Thankamani, C. Sarathambal. 2023. Microclimate modification for abiotic stress management in small cardamom. Kisan world. 50(4):17-20.
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- Shivakumar, M. S., Bindu, C. R., Akshitha, H. J. and Ankegowda, S. J., 2023, Java long pepper. Spice India (English), 36(1): 8-10.

Training Manual

- Manimaran, B., Mukesh Sankar, S., and Alfiya, P. V. (2023). Advanced Techniques in Microbiology, Biochemistry, Biotechnology, and Bioinformatics - A Training Manual, ICAR - Indian Institute of Spices Research, Kerala, India, p.311.

Papers presented in symposia/ seminars/ workshops /conferences

- Greeshma, M., Bhat, A.I. 2023. Complete genome sequencing of a divergent strain of cardamom mosaic virus. Best poster presented at the Indian Phytopathological Society Platinum Jubilee Conference on plant and Soil Health Management: Issues and Innovations. Held at the University of Mysore, Mysore February 2-3, 2023, p140.
- Bhat, A.I., Malavika, P. and Greeshma, M. 2023. Development of recombinase polymerase amplification assay for rapid detection of large cardamom chirke virus. Best Poster presented at the Indian Phytopathological Society Platinum Jubilee Conference on plant and Soil Health Management: Issues and Innovations. Held at the University of Mysore, Mysore February 2-3, 2023, p95.
- Sarathambal, C., A. Jeevalatha, R. Sivaranjani, C.N. Biju, Sona Charles, V. Srinivasan, Priya George, Blessy Peter and R. Radhika. 2023. Arbuscular mycorrhizal colonization alters biochemical, molecular defense responses and root exudate composition in Phytophthora

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- capsici-black pepper host-pathosystem. In: Book of abstracts of International Conference on Current Trends and Future Prospects of Plant Biology. Organized School of Life Sciences University of Hyderabad Telangana during February 23-25, 2023. Pp171 (oral presentation)
- Dr. Anees K Presented a lead paper on "Spices as Nutraceuticals: business potential of Kerala State" during international congress on Kerala Studies as lead speaker on May 20-22nd 2023 at Thrissur.
 - Fathimath Zumaila, A. Jeevalatha, C.N. Biju. 2023. Genetic diversity of Phytophthora spp. infecting black pepper as revealed through RAMS and REP PCR analysis. In IPS platinum jubilee conference on Plant and Soil Health Management: Issues and Innovations held during 2-4th Feb, 2023 at University of Mysore, Mysuru
 - Aiswarya Babu, Santhosh J Eapen, C Sellaperumal, Gautam Chawla, B Manimaran The Root Lesion Nematode (*Pratylenchus* sp.) Infecting Turmeric in Tamil Nadu: Morphological and Molecular Characterization. IPS Platinum Jubilee Conference on 'Plant and Soil Health Management: Issues and Innovations' at University of Mysore, Mysuru, Karnataka
 - Muhammed Nissar V. A., Pradheep K., Joseph John K., Jaisankar I., B.A. Jerard. and Prasath D. A glimpse of diversity in gingers from Andaman and Nicobar Islands of India. In the International seminar on gingers held at KSCSTE- Malabar Botanical Garden and Institute for Plant Sciences, Kozhikode during 1-3 March 2023
 - Raghuv eer Silaru, Dr. Prasath D, Dr K M Yuvaraj, Dr. S Aarthi, Dr. K S Krishna Murthy, and Dr V Srinivasan. 2023. Identification of superior turmeric genotypes for colour characteristics through GGE Biplot analysis. Poster presentation at International Seminar on Gingers conducted by Kerala State Council for Science Technology and Environment, Malabar Botanical Garden and Institute for Plant Sciences from March 1st to 3rd 2023
 - Gobu Delivered a keynote address in International Conference on Innovative Approaches in Crop Improvement for Sustainable Agriculture held at JSA college of Agriculture and Technology on 23.02.2023.
 - Mukesh Sankar, S. and Saji, K.V. (2023). Potential and strategic approaches in developing high-yielding, climate-resilient spices varieties for Kerala. In Book of Abstract on Seminar on Three-day seminar on Agricultural in Kerala, during the event 5th International Kerala study circle congress: May
 - Mukesh Sankar, S., Alfiya, P.V., Azharudeen, T. P., Priya George, Sudhakaran, A., and Thankamani, C.K. (2022). Spices News (July-December, 2022), ICAR-Indian Institute of Spices Research, Kozhikode, Kerala, India, 33 (2): 1-57
 - Aswathi, A.P., Mukesh Sankar. S., Sheeja, T. E. and Prasath, D. (2023). Genome-wide association analysis for important agronomic traits in turmeric (*Curcuma longa* L.) based on ddRAD sequencing. In the International seminar on gingers held at KSCSTE- Malabar Botanical Garden and Institute for Plant Sciences, Kozhikode during 1-3 March 2023

Radio talk

- Dr. SJ Ankegowda, Dr. A Honnappa and Dr. MS Shivakumar participated and interacted with farmers in live phone-in programme on production aspects of spice crops hosted by All India Radio, Madikeri on 02-02-2023.
- Dr. A Honnappa given radio talk on production technology in black pepper and cardamom on 02-02-2023 which was broadcasted by All India Radio, Madikeri

Publications

- Dr. SJ Ankegowda, Dr. A Honnappa and Dr. MS Shivakumar gave a radio programme on field operation of spices on 08-02-2023 spices hosted by All India Radio, Madikeri.

Institute publications

- Praveena, R. Lijo Thomas, Sentilkumar, C. M., Akshitha H. J., Alfiya, P. V (2022). Annual Report 2022. ICAR-Indian Institute of Spices Research, Kozhikode, Kerala. p. 84. ISBN: 978-81-80872-64-2.
- Mukesh Sankar, S., Alfiya, P.V. & George, P. (2022). Spice News (July - December, 2022). 33 (2): p 57.

Students Corner

M Sc. Dissertations 2022

S. No.	Name	Title of the M.Sc. thesis	Guide	University to which submitted	Degree
1.	Ms. Hasna K.M	Process optimization and characterization of spice oleoresins infused ice-cream for enhancing its functional attributes	Dr. E Jayashree	University of Calicut 1 -3-2022 to 31 -5- 2022	M.Sc. Food Science and Technology
2.	Ms. Huda C.N	Process optimization and characterization of spice oleoresins infused finger millet milk fortified ice-cream for enhancing its functional attributes	Dr. E Jayashree	Pondicherry University 1 -3-2022 to 31 -5- 2022	Food Science and Nutrition
3.	Ms. Mehna Riswi K.T.	Physicochemical quality evaluation of microwave-assisted hot air drying of turmeric slices: An alternative method for conventional curing of turmeric (<i>Curcuma longa</i>)	Dr. E Jayashree	ICAR-IISR	Post M.Sc. Training

Personalia

New Appointment

Name	Post.	Date of Joining
Dr. D Prasath	Project Coordinators (AICRP on Spices)	02.05.2023

Promotion: Nil

Transfer

Name	Post	Date of Joining
Sri. Krishnakumar P C	Lower Division Clerk	13.02.2023 (at IISR, Kozhikode)

Retirement

Name	Post	Date
Dr. K V Saji	Head & Principal Scientist (Crop Improvement & Biotechnology), ICAR-IISR	31.05.2023
Mr. John George	Chief Technical Officer, AICRP Cell, ICAR-IISR	30.06.2023

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