

# Spices News

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## In this issue

In Focus	1
Research Updates	2
News and Events	6
Transfer of technologies	19
Extension activities	24
Hindi anubhag	27
News from KVK, Kozhikode	32
Other activities	34
Publications	51

### In Focus: Institute bagged

#### "Sardar Patel Outstanding ICAR Institution Award" for the third time

ICAR-Indian Institute of Spices Research, Kozhikode, Kerala has been awarded "Sardar Patel Outstanding ICAR Institution Award, 2021" for the best ICAR institute. The institute got this prestigious recognition for its persistent pursuit of research excellence, which played a decisive and fundamental role in shaping the spice economy of the country and in making India a global leader in the spice sector. The award committee recognized that the institute's focus on socially and geographically disadvantaged stakeholder groups has resulted in a slew of effective intervention programmes aimed at improving the quality of life for vulnerable communities, as well as harnessing the commercial potential offered by spice value chains through handholding commercial ventures and start-up entrepreneurs. Director of the institute, received the award from honorable union agriculture minister, Shri. Narendra Singh Tomar at the 94th ICAR foundations day ceremony at New Delhi. This award comprises a cash award of Rs. 10 lakhs, a citation and a plaque. This is the third time the institute has received the prestigious award.



Dr. C K Thankamani receiving prestigious Sardar Patel Outstanding ICAR Institution Award from Shri. Narendra Singh Tomar, Hon'ble Union Minister of Agriculture and Farmers Welfare on the occasion of ICAR foundation day, 2022.

## Research updates

### ***IISR- Manushree (Appangala-3), new moisture stress tolerant small cardamom variety identified in 33rd AGM, AICRPS***

IISR developed a new Cardamom variety namely IISR- Manushree [Appangala 3], which was recommended for release during the 33rd Annual Group Meeting of AICRPS held during 13-15th October 2022. The variety belongs to malabar type and was selected from germplasm collection, IC 349537 at ICAR-IISR Regional station, Appangala, Kadaga, Karnataka. This variety is moisture stress tolerant, with a stable yielding capacity of 550 kg dry capsules/ha under irrigated conditions and 360 kg dry capsules/ha under moisture stress conditions. This variety contains 8.74% essential oil (irrigated conditions) and 8.84% essential oil (moisture stress conditions), with 50% of the capsules having > 8 mm size. Essential oil components such as  $\alpha$ -terpinyl acetate and 1,8-cineole did not show significant variation between control and moisture stress conditions. The variety has been recommended for small cardamom growing tracts of Karnataka and Kerala.



IISR- Manushree, a new moisture stress tolerant cardamom variety developed by ICAR-IISR (RS), Appangala

### ***Weighted parameter index for identifying promising genotype in black pepper***

Weighted parameters for yield contributing traits for identifying promising genotypes in black pepper is proposed where maximum weightage was given to yield followed by bulk density, spike length and number of berries. Other traits which are given weightage are spikes per lateral branch, spike setting, berry size, pericarp thickness, dry recovery and early maturity type. Additional parameters which were given weightage are Phytophthora resistance, nematode resistance, drought tolerance, anthracnose resistance, high piperine and high oleoresin.

### ***Screening promising lines for drought tolerance in black pepper***

Forty drought tolerant black pepper germplasm accessions were field evaluated for seven morphological traits and wide

### ***IISR got patent for the cardamom micronutrient formulation***

The institute has been awarded with a patent (Patent No. 413017) for the cardamom micronutrient formulation on 30<sup>th</sup> November, 2022. The technology was developed by the team consisting of Dr. V Srinivasan, Dr. R Dinesh and Dr. S Hamza, ICAR-IISR, Kozhikode.



Photograph of patent certificate for micronutrient formulation for cardamom received by ICAR – IISR, Kozhikode

## Research updates

range of variability was observed for all the traits under study. The genotypes were grouped into five clusters based on UPGMA clustering analysis. Cluster 2 had the highest number of genotypes (12) followed by cluster 3 with 10 genotypes and cluster 5 with single genotype.

### **Characterization, genetic diversity analysis and correlation studies conducted using selected set of black pepper accession maintained at NAGS, IISR-Kozhikode**

In this study, 696 black pepper accessions conserved in NAGS of black pepper were characterized as per IPGRI descriptors for 27 qualitative and 21 quantitative traits in augmented RCBD to explore the extent of diversity, association among the traits and to form a core collection. Spike length ranged from 3.00 to 15.80 cm with a mean of 7.36 cm. Fresh berry yield per vine ranged from 200 g to 6850 g with a mean yield of 1277.53 g/vine. The piperine content ranged from 1.01 to 7.76 per cent with a mean of 3 percent. The traits, leaf length and leaf width exhibited positive correlation with spike length, but showed significant negative correlation with fruit setting percent and quality parameters. The accessions IC 316500, IC 316510, IC 316538, IC 316550, IC 316611, IC 316639, IC 316788 and IC 596345 were found to be promising for fresh berry yield per plant. A subset of 70 diverse accessions were formed using Core Hunter-3 based on average entry to nearest entry distance method, which will serve as a mini-core for association studies. Many promising genotypes were observed which can be favourably exploited in breeding programmes.



Genetic variability for spike characters in black pepper

### **Genome wide association analysis (GWAS) for important agronomic traits in turmeric based on ddRAD sequencing**

GWAS was carried out to obtain SNPs linked to valuable agronomic characters like curcumin content, rhizome girth, and rhizome length in turmeric using 51 turmeric genotypes with diverse agro-morphological constitution. The phenotypic observations for these traits were recorded based on field evaluation for two years. The high quality 30,438 SNPs filtered based on < 10% of missing data and > 5% of minor allele frequency obtained from ddRAD based genome sequencing of turmeric were utilized for association analysis. The results obtained here are the first of its kind and this will help in understanding genetic base of traits like rhizome characters and quality traits like curcumin content in turmeric.

### **CVT on hybrids of small cardamom**

In the CVT trial consisting of nine hybrids and a national check variety highest fresh as well as dry yield per plant was recorded in the hybrid PH 13 (6.30 kg/plant and 1.18 kg/plant respectively) which is on par with PH-14 and Bold × IC 547219 where the dry yield per plant was 0.94 and 0.82 kg/plant, respectively. The hybrid PH-13 which recorded high yield was having highest percentage of I grade – 8 mm and above (65.81 %) capsules which was followed by PH-14 (62.85 %) and Bold × IC 547219 (52.98 %).

## Research updates



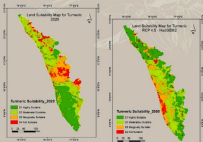
Clump, fresh and dry capsules of high yielding hybrid PH-13

### Land suitability analysis for turmeric in Kerala using geospatial techniques

Land suitability for turmeric in Kerala was analysed using geospatial techniques. Climatic parameters (rainfall, temperature), land characteristics (soil drainage, soil depth, soil pH) and erosion hazard (slope) were considered for suitability analysis. Present suitability was compared with future suitability at 2050 (for RCP 4.5 scenario). The analysis showed that southern districts of Kerala are highly suitable while northern districts are moderately suitable and Thrissur and Palakkad are marginally suitable for turmeric cultivation at present.

### Soil test-based fertilizer recommendation for targeted yield of spices (IISR-eSOFT) – DSS launched

This software is for getting fertilizer recommendations for the targeted yield based on the factors like initial soil fertility, nutrient required per unit yield (NR), contribution of nutrient from soil (CS) and contribution from fertilizer (CF) that were standardized, validated and recommended for major spice crops viz., black pepper, ginger, turmeric



Maps showing the land suitability for turmeric at present (2020) as well as for future (2050)

imbalance of nutrients in soil, improve fertilizer use-efficiency and increase yield as compared to the blanket recommendation. A decision support system IISR eSOFT was launched for getting the fertilizer recommendations during the RAC meeting held in July 2022.

### Volatile analysis of *Illicium sp*

A local *Illicium sp* collected from Pasighat region of Arunachal Pradesh were analyzed for its volatile composition. The GC-MS profile of the essential oil showed that myristicin (30%) is the major constituent of this species as compared to trans-anethole present in *Illicium verum* (star anise). The other major volatile constituents identified in the essential oil are linalool (13.4%), caryophyllene (3.7%), D-germacrene (3.3%), beta-cadinene (2.9%) and alpha-cadinol (2.8%).



## Research updates



Illicium sp collected from Pasighat region of Arunachal Pradesh

contained 0.02 mg/mL of glucose equivalent and it also contained phenolics and flavonoids in the concentration of 62 mg GAE/mL and 22 mg QE/mL respectively. The composition of sugars in the polysaccharide was analyzed using HPLC and it was found that galactose is the major sugar followed by xylose and glucose.

### Green house evaluation of promising phosphate solubilizing bacteria (PSB) for soil P solubilization and growth promotion

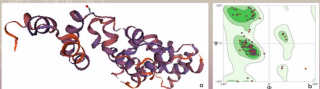
Application of PSB significantly promoted turmeric growth as evidenced from the enhanced number of tillers, shoot length, number of leaves, dry weight of shoot and root when compared to untreated plants at 60 DAP. Among the PSB treatments, available P was found to be significantly higher in the treatments with *B. safensis* + *B. cereus* + 75 % P, *B. safensis* + *B. maritima* + 75 % P and *B. safensis* + 75 % P.

### Field evaluation of PSB for soil P solubilization and growth promotion

Among the treatments, the one with 75% P + *B. safensis* registered significantly higher rhizome yield and the increase was greater by 46.5% and 58.0 % compared to control (100% P) and absolute control. With regard to soil available P, the levels were significantly higher in all the treatments involving combined application of *B. safensis* with 50% or 75% or 100% P. Higher microbial activity in *B. safensis* treatment was confirmed with the observation on dehydrogenase, which registered greater levels in *B. safensis* + 75% P and corresponding increase in acid phosphatase activity was 26.5% higher compared to 100% P.

### Analysis of effector gene from *Phytophthora tropicalis*

The RxLR 29 gene was cloned from *Phytophthora tropicalis* isolate 98-93 and sequenced. The gene was about 827 bp long, coding for 275 amino acid protein. Blast analysis of the RxLR effector protein (RxLR29) showed 31.96% similarity with RxLR effector protein PSK2 of *Phytophthora sojae*. Three-dimensional (3D) protein structure was constructed using SWISS MODEL workspace (Fig. a). A protein from Protein data bank (ID: 5GNC) with sequence similarity of 30.08% was used as template to build the model of RxLR29 protein. The modelled structure was validated using the Ramachandran plot from the MolProbity program. All amino acid residues of the modeled protein fit within the Ramachandran plot allowed regions (Fig. b). The RxLR protein showed 1.45% Molprobity score, 94.44% residues were in the favored residues and 0.85% in the outlier's regions.



Predicted structure of the RxLR 29 protein (a) and Ramachandran plot of modelled RxLR29 protein (b)

## News and events

**News from Human Resource Development Cell**

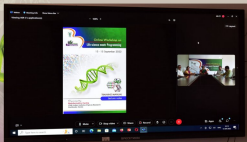
Three-days training on Functional Skill Training programme for Technicians and Skilled Support Staff of ICAR-IISR, was conducted during 10 - 12 August 2022. The training was coordinated by Mr. Jayarajan. Seven technical staff and three skilled support staff from IISR- main campus, IISR -Experimental farm, Peruvannamuzhi and IISR-Regional Station, Appangola attended the training programme.



Functional Skill Training programme for Technicians and Skilled Support Staff of ICAR-IISR held during 10 - 12 August 2022

**Workshop on "Life Science meets Programming"**

A three days online workshop on "Life Science meets Programming" was organised by the Bioinformatics Centre, ICAR- Indian Institute of Spices Research, Kozhikode from 13-15th September 2022 for Research Scholars, Scientists and Assistant Professors. The inaugural talk was delivered by Dr. Santhosh J Eapen, former Director, ICAR-IISR. The sessions were handled by Ms. Sona Charles, Mr. Mukesh Sankar S and Mr. Jayarajan from ICAR-IISR, Dr. Prashanth N Suravajhala from Amrita Vishwa Vidyapeetham, Mr. Subeesh A from ICAR - Central Institute of Agricultural Engineering, Bhopal and Dr. Merlin Lopez from MS Swaminathan Research Foundation. The workshop included theory as well as hands-on sessions on basic bioinformatics, introduction to R, Python, Linux and Galaxy. 15 participants were selected from over 200 applicants for the workshop from various ICAR Institutes, Universities and colleges. The questions from the participants were answered during the discussion.



## News and events



Online workshop on Life Science meets Programming held during 13-15 September 2022

### News from AICRPS

The XXXIII Annual Group Meeting (AGM) of ICAR-All India Coordinated Research Project on Spices (AICRPS) was conducted first time offline after COVID-19 pandemic during 13-15th October 2022 at Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, Uttar Pradesh. Dr. N.K. Krishna Kumar, Former DDO (HS), ICAR, New Delhi, inaugurated the group meeting. In his inaugural address, he highlighted on strengthening the market potential and also creating market intelligence for spice trade in India. Dr. C. K. Thankamani, Director & Project Co-ordinator (Spices), ICAR-IISR, Kozhikode welcomed the gathering and presented the achievements of AICRP on Spices during 2021-22. Dr. Bijendra Singh, Vice-Chancellor, ANDUAT, Kumarganj presided over the function and in his presidential address, he emphasized upon the importance of growing spices as intercrops for uplifting the farmers income. Dr. V. A. Parthasarathy, Former Director & PC (Spices), ICAR-IISR, Kozhikode was the guest of honour during the occasion. During the inaugural session the "Best AICRPS Centre Award 2021-22" was presented to AICRPS centre at Sardarkrushinagar Dantiwada Agricultural University, Jagudan. Dr. J. Rama, Former Director & PC (Spices), ICAR-IISR, Kozhikode, Dr. Hamey Cheriyan, Director DARD, Kozhikode, Dr. Sanjay Pathak, Dean, College of Horticulture, ANDUAT, Kumarganj, Dr. S.N. Saxena, Acting Director, ICAR-NRCSS, Ajmer, Rajasthan, Dr. A. B. Remashree, Director (Research), Spices Board, Kochi offered felicitations. Dr. K. S. Krishnamurthy, Principal Scientist, ICAR- IISR, Kozhikode proposed the vote of thanks.

The workshop was organized in six technical sessions viz., genetic resources and crop improvement, crop management, crop protection, variety release, technology transfer and plenary session. during the workshop, one small cardamom variety namely Appangala-3, developed by ICAR-IISR Regional Station, Appangala, Kodagu, Karnataka has been recommended for release by ICAR-AICRPS.

Three technologies were also recommended for adoption in XXXIII AGM of AICRPS. viz., 1. Application of half the recommended doses of zinc, iron, manganese, and boron as soil treatment along with their foliar spray

## News and events

could boost curcumin productivity to 684.6 kg/ha with a high benefit-cost ratio of 3.96.

2. Standardization of drip irrigation interval and method of micronutrient fertigation in fenugreek
3. Management of aphid and blight in curcumin using three foliar sprays of kresoxym methyl 44.3 SC @ 0.044%.



GImpose of AICRP workshop held at ANDUAT, Kuvempore on 13-15 October 2022

### Small Cardamom Field Day at ICAR- IISR RS, Appangala

In commemoration of 75<sup>th</sup> Anniversary of India's Independence ICAR-Indian Institute of Spices Research Regional Station, Appangala conducted "Small Cardamom Field Day" on 22.08.2022. Programme was inaugurated by watering cardamom plant. Sh. K. G. Ramachandra, progressive planter and Krishi Pandith Awardee, Kalale, Sakaleshpura in his inaugural address shared his experience in agriculture and cardamom cultivation in particular. Dr. K. S. Ananda, Former Head, CPCRI RS, Vittal in his address highlighted the importance of mixed cropping and selection of improved varieties. Mr. Sudeep, Progressive planter shared his experience in cardamom cultivation. Dr. S. J. Ankegowda, Principal Scientist & Head, ICAR-IISR RS, Appangala in his presidential address emphasized the importance of sustainable production to reap higher market price. And also highlighted the importance of judicious use of fertilizers and plant protection chemicals, pesticides to enhance the quality of exported produce. Dr. Akshitha H J, Scientist, ICAR-IISR RS gave detailed presentation on advances in production technology of small cardamom. Dr. Shivakumar, M. S., Scientist, ICAR-IISR RS proposed vote of thanks. Participants were taken to the cardamom experimental and multiplication blocks. Explained various ongoing research activities and also demonstrated cardamom planting and harvesting. Exhibition showcasing varieties of cardamom, black pepper and other technologies was also displayed. About 41 farmers from Kodagu, Chikkamagalur, Mysore, Dakshina Kannada and Hassan districts participated in the field day.



Small cardamom field day conducted at Appangala on 22.08.2022

## Major events

**1. ICAR-IISR Foundation day celebration on 01 July 2022**

The Indian Institute of Spices Research (IISR) celebrated its Foundation Day on 01<sup>st</sup> July 2022. Dr. A.K. Singh, Deputy Director General (Horticultural Sciences), ICAR, New Delhi, inaugurated the celebrations. Dr. S Jayasree, Chairperson, Standing Committee (Health), Kozhikode Corporation, and former Principal, Govt arts and science college, Kozhikode was the guest of honour of the day. The meeting was presided by Dr. Vikramadithya Pandey, Assistant Director General (Horticultural Science II), ICAR. Dr. Manoj P. Samuel, Executive Director, Centre for Water Resources Development and Management (CWRDM), delivered the Foundation Day lecture on 'Water: quantity and quality management strategies in view of changing climate scenario'. In a new initiative aimed at supporting women entrepreneurs, the institute launched a traditional recipe product, Mallikappi, a brew of coriander and spices developed by its off-campus incubatee, Sunan Research and Rehabilitation Centre, Palazhi, Kozhikode. As part of the Foundation Day, the institute conferred spice excellence awards for significant contribution on Jomy Mathew from Shivamogga district, Karnataka, Colonel Prakash Chand Rana from Himachal Pradesh, and M.M. Joseph from Kozhikode. M/s Narsai Organic Spices and Agricultural Products Producer Co. Ltd. and M/s Attappady Cooperative Farming Society won the spice Awards in the institutional category for their exemplary interventions in the spices sector. The institute also executed two varietal licensing agreements with M/s. Kesav Plants and Landscapes (Nutmeg varieties, IISR Visvaaree and IISR Keralaaree) and M/s Olevia Agrofarming Pvt.Ltd.(Black pepper variety, IISR Thevan). The institute released two extension folders on turmeric and cardamom cultivation.



Major events



Glimpse of foundation day events

## Major events

**2. Webinar on ICAR Service Rules**

ICAR-Indian Institute of Spices Research in Kozhikode organized a webinar on ICAR service rules to commemorate India's 75<sup>th</sup> anniversary of independence on August 12, 2022. Dr. C. K. Thankamoni, Acting Director, gave introductory remarks and Mr. T. E. Janardhanan presented on the ICAR service rules for scientific, technical, and administrative categories.

**3. IISR celebrates the Independence Day-2022**

The 75<sup>th</sup> Independence Day was celebrated at all the campuses of the Institute. At the headquarters the national flag was unfurled by Dr. CK Thankamoni, Director (Acting). Staffs and labours are joined for the event and participated in Mass tree planting ceremony (75 nos) each at IISR, Kozhikode and IISR Experimental Farm, Peruvannamuzhi.



## Major events

**4. ICAR-IISR signed MoU with M/s. Bayer Crop Science Limited**

The ICAR-Indian Institute of Spices Research (IISR) in Kozhikode signed an agreement with Bayer Crop Science Limited for developing capacity building, plant protection, and nematode management program on 25th August 2022. The two organizations will collaborate to share research knowledge, expertise, and capabilities. The partnership also aims to provide technical expertise for conducting capacity building programs with a special emphasis on developing a module for nematode management in spices, particularly in black pepper and ginger. The agreement was signed by various representatives from Bayer, including Dr. Sangeeta Mendiratta and Mr. Yogesh Mohite, while Dr. C. K. Thankamani, Director (Acting) presided over the meeting. Mr. Yogesh Mohite and Dr. V. Srinivasan briefly presented the mandates and missions of Bayer Crop Science Limited and ICAR-IISR, respectively. Dr. A. Ishwara Bhat, Head (Acting), Division of Crop Protection, briefed about the agreement and narrated the activities proposed to be undertaken under various components of the MoU. The collaboration aims to develop best practices for safe spice production towards achieving the aim and mission of the MoU for the benefit of the farming community of India at large.



MoU signing between ICAR-IISR and M/s. Bayer Crop Science Limited

**5. Launch of FIT India Freedom Run 3.0**

The Indian Institute of Spices Research (IISR) is actively participating in the Fit India Mission 3.0 by launching innovative fitness campaigns. The IISR inaugurated the FIT India Freedom Run 3.0 at all three centres: ICAR-IISR Kozhikode, ICAR-IISR Regional Station, Appangala, and ICAR-IISR Experimental Farm, Peruvannamuzhi on 02.10.2022. At ICAR-IISR Kozhikode, the run was inaugurated by Director of the Institute. The campaign encourages citizens to include 30 minutes of physical activity in any form and celebrate an active lifestyle while committing to fitness on India's 75<sup>th</sup> Independence anniversary.

**6. Cyber Jaagrookta Divas 2022**

As a part of Cyber Jaagrookta Divas Annual Day Celebration at IISR, a talk on cyber security "Stay Safe: Be Cyber Smart" by Dr. Geetha Radhakrishnan, Asst. Professor, Computer Science, KAU was organised on 6<sup>th</sup> October 2022.

**7. Rashtriya Ekta Diwas**

The Rashtriya Ekta Diwas was observed in IISR on 31.10.2022 to uphold our country's unity, integrity, and security in the face of real and potential challenges. IISR, celebrated the occasion by conducting a pledge-taking ceremony. The Director led the ceremony, and the staff members followed the pledge to reaffirm our commitment to the strength and resilience of our nation.



## Major events

**8. Vigilance Awareness Week, 2022**

ICAR-Indian Institute of Spices Research (IISR), Kozhikode, observed Vigilance Awareness Week from October 31 to November 6, 2022. On 31<sup>st</sup> October, 2022, 11.00 am, Dr. D. Prasath (Pr. Scientist & Vigilance Officer) addressed the staff and briefed about the VAW 2022. Dr. C.K. Thankamani, Director, administered integrity pledge to the staff members. The event included various activities, such as an integrity pledge, slogan writing and pencil drawing competitions, an elocution competition, a vigilance quiz, and a vigilance awareness rally with around 100 participants. The valedictory function was held on 4<sup>th</sup> November, with Dr. D. Prasath (Pr. Scientist & Vigilance officer) presenting the VAW 2022 report and Smt. Nirmala Devi, Post Master General, Kozhikode, as the chief guest who distributed prizes to the winners shared her thoughts about Vigilance Awareness among public. The event concluded with a vote of thanks from Mr. R. Bharathan (ACTO).

**9. Swachhta Pakhwada 2022**

Swachhta Pakhwada was formally inaugurated on 16<sup>th</sup> December by Dr. R. Dinesh, Director, ICAR-IISR. The Swachhta pledge was administered by the Director, in which the staff as well as students participated. Ceremonial planting was done by Director, ICAR-IISR, followed by cleanliness drive in which all the staffs actively participated. Various cleanliness programmes were undertaken by Division of Social Science, Crop Production Administration and Library. Different cleanliness programmes in connection with Swachhta Pakhwada were also conducted at ICAR-IISR Regional Station, Appangala and at ICAR-IISR Experimental Farm, Peruvannamuzhi.



Swachhta pakhwada activities conducted at IISR, Kozhikode

## Major events

On 28.12.2022 as a part of Swachhita Pakhwada programme, essay writing and drawing competitions were conducted for 1st to 7th standard students of Government Primary School, Bettageri village. In connection with the Swachhita fortnight, a contingent of volunteers representing ICAR-Indian Institute of Spices Research, Kozhikode visited Kattippara, the village adopted by the Institute under Mera Gaan Mera Gaurav programme on 28.12.2022. A scientist-farmer interface was organized at Nirmala UP School, Chamal which was inaugurated by Shri. Muhammed Moyath, President, Kattippara Grama Panchayat.



Mera Gaan Mera Gaurav programme organized as part of Swachhita fortnight at Kattippara village on 28.12.2022

## Major events

An awareness program was conducted on cleanliness and the importance of Swachhita in day to day life for the graduate trainees from Horticulture department, Lalbagh, Bengaluru by the staffs of ICAR-IISR Regional Station, Appangala.

The valedictory programme of Swachhita Pakhwada 2022 was held on 30<sup>th</sup> December 2022 at ICAR-Indian Institute of Spices Research (Headquarters), Kozhikode. The Director presided over the function and distributed prizes to the winners of various competitions held as a part of cleanliness fortnight. All the programmes were conducted on the theme "Swachhita and clean India".



Swachhita 2.0, Students painting competition Winners

Swachhita 2.0, a special campaign for disposal of pending matters was conducted from 02-31<sup>st</sup> October, 2022 at ICAR-IISR, Chelavoor, Regional Station, Appangala, Experimental Farm at Peruvannamuzhi and KVK, Peruvannamuzhi. For efficient management of space, the store rooms of ICAR-IISR, Kozhikode, Experimental farm, Peruvannamuzhi and Regional Station Appangala were cleaned and sorted out the junks.

To promote the interest of farming in children, vegetable seeds were distributed to students of St. Joseph High School, Chembanada and vegetable garden was established at KVK, Peruvannamuzhi by involving the students. As a part of Swachhita cleanliness drive, drawing competition was conducted among contractual staffs on the topic "Clean India, Green India" at Regional Station, Appangala.

## News from Project Monitoring and Evaluation Cell

**The meeting of 3<sup>rd</sup> research advisory committee held on 27-28 July, 2022 at ICAR – IISR, Kozhikode**

The third meeting of the IX RAC of ICAR- IISR was held during 27-28 July, 2022 on hybrid mode. Dr. N. K. Krishnakumar, Former DDG (Horticulture) ICAR, Chairman of IX RAC and members, Dr. Jitendra Kumar, Director,

Institute of Pesticide Formulation Technology (IPFT), Gurugram, Delhi; Dr. Hemendra C. Bhattacharyya, Former DEE, AAU, Jorhat and Dean, Daffodil College of Horticulture, Guwahati (Metro), Assam; Shri. Jayachandran Master, T. P. (JMC member) and Dr. C. K. Thankamani, Director ICAR-IISR, Kozhikode and Member Secretary RAC attended the meeting in person while other members, Dr. Umesh Srivastava, Former ADG (Hort.), ICAR; Dr. VC. Mathur, Former Professor, Division of Agricultural Economics, ICAR-IARI, New Delhi; Shri. Nanjundan Bhojan (JMC member); Dr. Vikramaditya Pandey, ADG (HS-I) ICAR, New Delhi attended the meeting online via Cisco Webex platform while the member, Dr. V. G. Molathi, Former Principal Scientist (Plant Pathology), ICAR-Indian Agricultural Research Institute, New Delhi did not attend the meeting owing to ill health.

On 27<sup>th</sup> July 2022 Dr. N. K. Krishnakumar, Chairman, RAC inaugurated the Essential Oil Extraction Unit at the institute in the presence of other members of the RAC, the Director and staff of the institute. This was followed by ceremonial planting by the chairman and members of the RAC at the institute's premises. Later, the chairman and committee members visited various laboratories, and facilities including nurseries and the garden of ginger.

The formal meeting of RAC started at 11.30 am on 27<sup>th</sup> July 2022 with the ICAR song. The Director welcomed the members followed by opening remarks by the Chair, and members of RAC. Newly joined scientists of the Institute were introduced to the house. Dr. V. Srinivasan, Principal Scientist and PME in charge of the institute presented the Action Taken Report (ATR) of the second meeting of IX RAC recommendations. Following launches and releases of publications were done:

1. Launch of IISR-eSOFT (soil test-based fertilizer recommendation for targeted yield in spices); Released by Dr. N. K. Krishna Kumar.
2. Launch of food products developed at ICAR-IISR, Kozhikode (three types of spice flavoured finger millet cookies and six types of ice-creams flavoured with spices); Released by Dr. Jitendra Kumar.
3. Extension folder on Turmeric varieties for organic farming by Shri T. P. Jayachandran Master
4. Compilation of spices varieties at ICAR-IISR by Dr. Hemendra C. Bhattacharyya.
5. Spice Awards: Profiles in Excellence (E-publication) by Dr. Vikramaditya Pandey.

The project leaders of megaprojects presented the progress during 2021-22. The Chair and members of the RAC critically reviewed the progress under seven megaprojects and discussed the results in detail. The meeting ended with comments by the Chairman and members of the RAC followed by the vote of thanks by Dr. C. K. Thankamani.

On 28<sup>th</sup> July 2022, the Chairman and members of the RAC visited the ICAR-IISR Experimental Farm and KVK at Peruvannamuzhi and accorded suggestions for fine-tuning the experiments.

News from Project Monitoring and Evaluation Cell



Glimpses of RAC meeting and associated visits

News from Project Monitoring and Evaluation Cell



Gilgrases of RAC meeting and associated visits

## Transfer of technologies

### News from Business planning and development unit

Bindu Joseph, a young women farmer from Kozhikode, won the Pandit Deen Dayal Upadhyay Antyodaya Krishi Puraskar-2021 for her contributions to marginal, small, and landless farmers. She received the award, comprising a cash prize of one lakh rupees, a citation, and a memento, from Union Minister of Agriculture and Farmers Welfare Narendra Singh Tomar on July 16, 2022, in New Delhi. Bindu was nominated for the award by the ICAR-KVK at Peruvannamuzhi, under the Indian Institute of Spices Research, Kozhikode. She was recognized for her work on sustainable and integrated farming systems, soil health and water conservation, farm waste management, and diversification of farm activities. The KVK officials credited her efforts for the horizontal spread of technology among fellow farmers.

### Training for Agripreneurs

ISR facilitated an online Collaborative Refresher Training Programme (RTP) in partnership with MANAGE, Hyderabad, to support business development and cultivation of spices from 13-15th September 2022. This training program drew the participation of 55 accomplished Agripreneurs from all over India. During the course of the training, several incubatees from the ABI unit shared their triumphs and experiences, including Mr. Gavaskar from M/s H17 Agri Biosolutions Ltd, Ms. Pooja Rao from SRT Agro Science Pvt Ltd, and Mr. Aloak Meran from M/s Spizaor Pvt Ltd in Kozhikode, Kerala. The program's coordination was handled by Dr. Shreeja, in line with ISR's commitment to supporting businesses in the cultivation and sale of spices.

### Launch of "Mallikappi": IISR's role in branding and marketing incubates product

ISR has extended its support to one of such startups in branding and marketing of spice-based value products sourced directly from farmers. Mallikappi, a traditional immunity booster composed of spices, widely used by the local people of Kerala was officially launched on the Foundation day of the Institute on 1st July on behalf of incubatee "Suman Research and Rehabilitation Centre", an NGO working for rehabilitation of mentally challenged Women of Kozhikode District.

### Entrepreneur from Kerala develops 'Curcu-meal' after years of research with incubation from ICAR-IISR

Mrs. Geetha Saleesh, an entrepreneur from Thrissur, Kerala, developed 'Curcu-meal' after two years of hard and consistent research with incubation from ICAR-IISR. 'Curcu-meal' is a blend of turmeric, dates, almonds, coconut milk, and jaggery. For the preparation of curcu-meal, the Prathiba cultivar of turmeric with high curcumin content is most suitable. On the ICAR-IISR foundation day, she received the license for cultivating IISR Prathiba turmeric exclusively from IISR.



Mrs. Geetha Saleesh, receiving the exclusive license for cultivating IISR Prathiba turmeric from Director, ICAR-IISR.

## Transfer of technologies

### IISR empowered innovative Start-ups shines at hon'ble Prime Minister inaugurated Agri-conclave

IISR facilitated the participation of three startup licensees/firms, namely SRT Agro Science Pvt Ltd from Chhattisgarh, Codagu Agritech and HI7 Agri Bio solutions from Karnataka, in the Agri Start-up Conclave & Kisan Sammelan-2022. This event was graced by the presence of the Hon'ble Prime Minister and took place on October 17, 2022, at IARI Mela Ground, Pusa, New Delhi. The startups were able to showcase their innovative ideas and technologies related to agriculture, thanks to the support provided by IISR.

#### Transfer of Technology

- During the period July-December 2022 four license agreements were executed with various farmers/firms across the country, three for commercial multiplication and marketing of black pepper and nutmeg varieties and one for the technology 'a novel method of storing and delivering PGPR/ Microbes through biocapsules'.
- Patent granted for the technology, 'A micronutrient composition for cardamom and a process for its preparation' (Indian Patent No. 413017, dt. 31.03.2015).
- Approval of National Biodiversity Authority was obtained for the invention, 'Granular Lime Formulation and A Process for its Preparation' Indian Patent Application No.- 202241010858

#### Consultancy Processing Cell

- IISR entered into MoA with M/s Bayer Crop Science Pvt Ltd, Maharashtra for collaborative research on developing best practices for cultivation, production and protection measures in spices.
- ITMU & ABI facilitated 3 consultancy visits to black pepper plantations of various firms in Kerala & Karnataka
- Dr. Biju as consultant, visited two divisions (Mayfield and Avondale) of Mayfield Estate, Harrison's Malayalam Limited, Gudalur, Nilgiri (District), Tamil Nadu for assessing black pepper yield on 15-16 Nov. 2022.

## News from Agricultural Technology Information Centre

### Support for Attappady Cooperative Farming Society

ICAR-IISR extended support for tribal beneficiaries associated with Attappady Cooperative Farming Society, an institution established for the welfare of tribal population, through handholding services for improving their spice production programmes. As part of the initiative, the institute supplied 300 Nutmeg Grafts (IISR Kerala-ree) 300 Cinnamon Seedlings, 300 Clove Seedlings and 500 Cardamom Suckers (250 IISR Avinash and 250 Appangala 1) to ACPS.

### Cardamom Field Day organized

A cardamom field day and seminar were organized at IISR Regional Station Madikeri on 20 August 2022. More than 50 cardamom farmers from Kodagu, Chikkamagalur, Mysore, Dakshina Kannada and Hassan districts benefitted from the programme. The farmers visited the cardamom fields of the stations and the scientific personnel interacted with them about the merits of various varieties of small cardamom released by the institute. They were also trained on latest crop management practices.

### Training on scientific cultivation of ginger

ICAR-IISR organized a three-day training programme on scientific cultivation of ginger for high yield and



## News from Agricultural Technology Information Centre

quality for 21 FPO representatives from Sangareddy district of Telangana during 23-25 August 2022. The training programme was conducted with financial assistance from NABARD, Sangareddy. The training programme included classroom sessions and field visits for enhancing the effectiveness of training.

### Workshop on spices conducted in Tripura

A two-day workshop on "Advances in Production and Processing Technologies of Spices" in collaboration with Department of Horticulture, Government of Tripura was organized during 27-28 September, 2022 at Agartala. Resource persons from the institute interacted with officials, farmer representatives and other stakeholders to chart out strategies for improving spice production in the region.

### Training and input supply programmes under tribal empowerment programme

The institute organized a series of tribal support programmes during September in collaboration with various partner institutions. The training programme on spices cultivation at Thavinjal in Wayanad (22 Sept 2022), Training on Mushroom cultivation for women at Pochuthana, Wayanad (22 Sept 2022) and training on black pepper cultivation at Meenangadi (24 Sept 2022) were some of the important training programmes. Various technology input requirements of the trainee beneficiaries were also distributed during these training programmes.



Tribal women beneficiaries of training programme on mushroom cultivation at Pochuthana, Wayanad

### Popularizing backyard poultry rearing among marginalized communities

The institute undertook a focused intervention to promote backyard poultry rearing among Scheduled Caste and Scheduled Tribe households. A total of 50 households each were identified from among SC and ST hamlets. Ten-layer chicks of improved variety, Gramasree was supplied to each beneficiary unit in collaboration with Krishi Vigyan Kendra, Kozhikode. The intervention is expected to increase the nutritional security of the households and popularize layer chicken rearing as a viable source of supplementary income among these target communities. The training on layer chicken management and distribution of layer chicks were undertaken on 24 September 2022 at Kodencherry for ST beneficiaries and on 01 October 2022 at Kottipara for SC beneficiaries.

## News from Agricultural Technology Information Centre



Distribution of layer chicks to tribal women beneficiaries at Kodencherry

**Workshop on Spice Processing and Entrepreneurship Development**

A two-day Workshop on Spice Processing and Entrepreneurship Development was organized at ICAR-IISR during 30 Nov to 01 Dec, 2022 for the benefit of representatives and officials from cooperative sector of the state. The workshop discussed various technological advances in spice processing and opportunities for cooperative institutions in spice entrepreneurship. The workshop was sponsored by the AIF (Agricultural Infrastructure Fund) Scheme, Department of Cooperatives, Government of Kerala. The programme was coordinated by Dr. Rajeev P, Principal Scientist, ICAR-IISR and about 39 participants from various districts of Kerala participated in the training programme. Technical sessions on post-harvest handling of various spices including quality control and Entrepreneurship opportunities were handled by Dr. E. Jayashree, Dr. Anees, Dr. Lijo Thomas and Ms. Alfiya.

**Training Programme on "Value Addition and EDP in Spices"**

A training programme sponsored by ICAR-Agricultural Technology Application Research Institute (ATARI), Bengaluru on 'Value Addition and Entrepreneurship Development in Spices' was held at ICAR - IISR, Kozhikode during 13 - 15 December 2022. About 20 participants mainly entrepreneurs identified by various KVK's from Karnataka and Kerala were present for the training programme. The programme included theory and practical sessions followed by field visit to ICAR-IISR, Experimental farm at Peruvannamuzhi. During the training programme, Dr. C.K. Thankamani, Dr. P. Rajeev, Dr. E. Jayashree, Dr. K. Anees, Dr. Lijo Thomas, Dr. P. Ratha Krishnan, Ms. Alfiya P.V and Ms. A. Deepthi handled various sessions on post-harvest processing, quality aspects and entrepreneurship development.

## News from Agricultural Technology Information Centre

**Farmer seminar on “Sustainable Practices for Scientific Management of Black pepper Plantations”**

Dr. K. Kondiannan, Dr. V. Srinivasan, Dr. C N Biju and Dr. Lijo Thomas participated as resource person in one day farmers seminar on “Sustainable Practices for Scientific Management of Black pepper Plantations” sponsored by Directorate of Arecanut and Spices Development, Calicut was organized at Parish Hall, St. Thomas Church, Palakkuzhy, Palakkad District, Kerala, on 15<sup>th</sup> December 2022 by ICAR - Indian Institute of Spices Research, Kozhikode. Black pepper varieties and nursery practices, Crop production & protection technologies and post-harvest practices and value addition were the topics presented and interactive session with farmers were held and discussed. Around 100 farmers participated in the seminar. At the end of seminar inputs like black pepper rooted cuttings and pepper special micro-nutrient mixture distributed to all the participants and field visits also made.



Farmer seminar on “Sustainable Practices for Scientific Management of Black pepper Plantations” on 15<sup>th</sup> December 2022 by ICAR - Indian Institute of Spices Research, Kozhikode

## Extension Activities:

Date	Programme	Venue	Resource Persons
23-12-2022	Organized black pepper field day at alternative germplasm site on occasion of Kisan diwas	IISR, RS, Appangala	Dr. M. S. Shivakumar
05-12-2022	Attended and exhibited IISR technologies and varieties on occasion of Krishi mahotsava -world soil day	Forestry college, Ponnampet	Dr. M. S. Shivakumar
22-09-2022	Participated in distribution of black pepper cuttings, micro nutrients and bio capsules to ST beneficiaries and seminar on 'Scientific production technology of spice crops' (Malayalam) under TSP programme	Wayanad Service Society (WSS), Boys Town, Kerala. (60 tribal farmers participated)	Dr. Maneesha S.R & Dr. Sharon Aravind
24-09-2022	Participated in training programme on improved black pepper cultivation for 50 tribal beneficiaries under TSP programme.	Meenangadi Grama Panchayat, Wayanad, Kerala	Dr. Praveena. R & Mr. Mukesh Sankar. S
15-11-2022	Imparted training on "Modern trends in nutmeg cultivation" by YR. Sarma Memorial Trust, Koderchery, Kozhikode	YR. Sarma Memorial Trust, Koderchery, Kozhikode	Dr. Muhammed Nisar V. A.
15-11-2022	Delivered a lecture on "Value addition of nutmeg" For the participants of training programme on 'jathri krishiyile noothana sadhyathakal'	YR Sharma Memorial Trust at Koderchery	Ms. Alfiya P V
5.09.2022	Demonstration on micro rhizome based single bud pro trays ginger production. One thousand micro rhizome based single bud portrays of ginger were distributed for undertaking demonstration.	Kavuthara, Naduvannur, Kozhikode, Kerala	Dr. Sharon Aravind
23.08.2022	Delivered talk on "Plant protection strategies for ginger" during NABARD sponsored training on "Scientific cultivation of ginger for high yield and quality"	For the farmers from Sangaraedy (District), Telangana on 23.08.2022 at ICAR-IISR, Kozhikode.	Dr. Biju C. N

## Extension Activities:

29.08.2022	Delivered talk on "Plant protection strategies for spice crops of Tamil Nadu" during Department of Horticulture and Plantation Crops, Government of Tamil Nadu sponsored training on "Improved technologies for high yield and quality in spice crops"	For the farmers of Tamil Nadu at ICAR-IISR, Kozhikode.	Dr. Biju C. N
14.09.2022	Delivered talk on "Plant health management in black pepper, ginger and turmeric" during collaborative Refresher Training Programme (RTP) on "Promoting spices crop cultivation and business opportunities for established agripreneurs under AC & ABC scheme" on	Advances in production processing and technology commercialization in spices 13-15 September 2022 (online mode) at ICAR-Indian Institute of Spices Research (ICAR-IISR), Kozhikode	Dr. Biju C. N
15.12.2022	Delivered lecture on "Integrated plant protection strategies for black pepper" during district seminar on "Sustainable practices for scientific management of black pepper plantations"	Directorate of Arecanut and Spices development under Mission for Integrated Development of Horticulture at Palakkuzhy, Vadakkanderry, Palakkad	Dr. Biju C. N
20.12.2022	Delivered lecture on "Integrated disease management strategies for spice crops"	Block level training for extension functionaries of Kodalvally Block, Kozhikode under ATMA at ICAR-Indian Institute of Spices Research (ICAR-IISR), Kozhikode	Dr. Biju C. N
01-08-2022	Delivered a lecture on "Spices- Pest & Diseases Management" for Farmers at ICAR-IISR	ICAR-IISR, Kozhikode	Dr. Praveena R.
01-11-2022	Delivered a lecture on "Black Pepper- Nursery, Pest & Diseases Management"	For Farmers at MSSRF, Wayanad	Dr. Praveena R.

## Extension Activities:

04-11-2022	Delivered a lecture on "Bioinoculants for management of disease in spices"	For Farmers at Kodendery Krishi Bhavan	Dr. Proveena R.
4-8-2022	Delivered a lecture on 'Post-harvest handling and drying of nutmeg'	Training class for nutmeg farmers from Pollachi at IISR	Dr. E. Jayashree
29-8-2022	Delivered lecture on 'Turmeric processing and value addition'	For farmers from Coimbatore sponsored by MIDH training Scheme for farmers at IISR	Dr. E. Jayashree
21.12.2022	Research farmer Extension Interface – Vengeri Agri	Vengeri-fest 2022 sponsored by the Department of Agriculture, Kerala.	Dr. Rajeev P
25.11.2022 – 29.11.2022	Expert member	Krishi Darshan Technology, by Department of Agriculture, Government of Kerala	Dr. Rajeev P
23.12.2022	Worked as Expert in Scientist Agricultural officers-Farmers meet Vengeri-fest 2022	Vengeri-fest 2022 sponsored by the Department of Agriculture, Kerala.	Dr. C. K Thankamani
05.07.2022	Soil fertility management for crop productivity,	ICAR-IISR, KVK	Dr. V Srinivasan
15.12.2022	One day farmers seminar on "Sustainable Practices for Scientific Management of Black pepper Plantations"	Palakkuzhy, Vadakkandery under MIDH	Dr. V Srinivasan

**Radio talk**

- Dr. Akshita H J: Scientific cultivation of ginger, AIR-Madikeri, 11.07.2022 @ 6.50 pm.
- Dr. Akshita H J: Scientific cultivation of turmeric, AIR-Madikeri, 10.08.2022 @ 6.50 pm.

## Hindi anubhag

## हिंदी अनुभाग

राजभाषा कार्यन्वयन समिति की बैठक

जुलाई-दिसंबर 2022 की अवधि में राजभाषा कार्यन्वयन समिति की दो बैठकें आयोजित कीं। पहली बैठक 23 सितंबर 2022 को डा. सी. के. तंजमणी, निदेशक, आईसीएआर-आईआईएसआर एवं अध्यक्ष, राजभाषा कार्यन्वयन समिति की अध्यक्षता में संपन्न हुई। दूसरी बैठक 26 दिसंबर 2022 को डॉ. आर. दिनेश, निदेशक, आईसीएआर-आईआईएसआर एवं अध्यक्ष, राजभाषा कार्यन्वयन समिति की अध्यक्षता में संपन्न हुई। बैठक में निदेशक ने संस्थान की राजभाषा कार्यन्वयन की समीक्षा की और नये दिशा-निर्देश भी हिंदी कार्यशाला

- राजभाषा को लोकप्रिय बनाने के लिए आईसीएआर-आईआईएसआर, स्पेसिफिकोड में दो हिंदी कार्यशालाएं आयोजित की गयीं। पहली कार्यशाला दिनांक 27 सितंबर 2022 को आयोजित की। श्री. एम. अरविदास, वरिष्ठ अनुवाद अधिकारी, कर्मचारी भविष्य लिपि संगठन, कोचिकोड ने राजभाषा कार्यन्वयन के लिए उपयोगी आधुनिक तकनीकियां पर व्याख्यान दिया।
- दूसरी कार्यशाला दिनांक 12 दिसंबर 2022 को आयोजित की। इसमें संस्थान के सुश्री. एन. प्रसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी ने 'ई-ओफीस में हिंदी में टिप्पणी' के बारे में परिचित कराया।



हिंदी अनुभाग में एक

## Hindi anubhag

## हिंदी पखवाहा 2022

- भास्कुलुप-भारतीय मसाला फसल अनुसंधान संस्थान, कोच्चिकोड में दिनांक 14.09.2022 से 29.09.2022 की अवधि में हिंदी पखवाहा मनाया गया। राजभाषा विभाग, नई दिल्ली के अनुरोध के अनुसार दिनांक 14 सितंबर 2022 को हिंदी दिवस एवं हिंदी पखवाहे का उद्घाटन समारोह पंडित दीनदयाल उपाध्याय इंडोर स्टेडियम, मूरत, गुजरात में संपन्न हुआ। हमारे माननीय गृह मंत्री श्री अमित शाह ने समारोह का उद्घाटन किया। प्रस्तुत समारोह में संस्थान का प्रतिनिधित्व करते हुए डा. एन. के. लीला, हिंदी अधिकारी ने भाग ली। हिंदी दिवस के अवसर पर माननीय महानिदेशक डॉ. हिमांशु पाठक का अपील एवं माननीय गृह मंत्री श्री अमित शाह का संदेश संस्थान की टीवी में प्रदर्शित की और साथ ही इसे संस्थान के स्टाफ सदस्यों की ई-मेल और वाट्सएप ग्रुप में अपलोड किया गया। इसके अलावा हिंदी दिवस की बधाईयाँ का स्लाइड वाट्सएप में प्रदर्शित किया।
- हिंदी पखवाहा के अवसर पर अनुशीर्षक लेखन, चित्र कहानी लेखन, टिप्पणी एवं मसौदा लेखन, भाषण, वीडियो क्लिप, गीत, कविता पाठ, प्रश्नोत्तरी आदि प्रतियोगिताएं हिंदी में आयोजित की गईं। प्रत्येक प्रतियोगिताओं के प्रथम और द्वितीय स्थान पर अजेताओं को पुरस्कार दिया गया।
- इन प्रतियोगिताओं के अलावा दिनांक 27.09.2022 को हिंदी कार्यशाला आयोजित की। इसमें श्री एम. अरविदाशन, वरिष्ठ अनुवाद अधिकारी, कर्मचारी भविष्य निधि संगठन ने राजभाषा कार्यान्वयन के लिए उपयोगी आधुनिक तकनीकियाँ पर व्याख्यान के साथ प्रदर्शन भी दिया था।
- हिंदी पखवाहा का समापन समारोह 29 सितंबर 2022 को डा. सी. के. तंकरणी, निदेशक की अध्यक्षता में संपन्न हुआ। डा. एन. के. लीला, प्रधान वैज्ञानिक एवं हिंदी अधिकारी ने सबका स्वागत किया। श्री. सुभाष कुमार, प्रबंधक, सेन्ट्रल बैंक ऑफ इंडिया, चेन्नई इस समारोह में मुख्य अतिथि थे। उन्होंने हिंदी भाषा के महत्त्व एवं विकास यात्रा पर प्रकाश डाला। मुख्य अतिथि के द्वारा पुरस्कार विजेताओं को नकद पुरस्कार प्रदान किया। हिंदी को लोकप्रिय करने के लिए प्रतियोगिताओं के प्रतिभागियों को समाधान पुरस्कार के रूप में हिंदी पढ़ें, लिखें और आगे बढ़ें मुद्रित कप दिया गया। सुश्री एन. प्रसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी ने हिंदी पखवाहे की रिपोर्ट प्रस्तुत की।





Hindi anubhag

**अनुशीर्षक लेखन प्रतियोगिताएं**  
Caption Writing Competition  
15th IASRI Day

आपके आसपास की हर वस्तु का अपना अर्थ है। हमें इन वस्तुओं को देखकर सोचना और उन्हें शब्दों में बताना है। इस प्रतियोगिता में आप अपने विचारों को लिखें और उन्हें चित्रों के साथ साझा करें।

आपके आसपास की हर वस्तु का अपना अर्थ है। हमें इन वस्तुओं को देखकर सोचना और उन्हें शब्दों में बताना है। इस प्रतियोगिता में आप अपने विचारों को लिखें और उन्हें चित्रों के साथ साझा करें।

आयु: 10-15 वर्ष (10-15 वर्ष के बच्चे)

प्रतियोगिता का विषय: **आसपास की हर वस्तु का अपना अर्थ है।**



विजेता प्रदर्शनी में भाग



विजेता प्रदर्शनी में भाग

## Hindi anubhag

आईसीएआर-आईआईएसआर क्षेत्रीय स्टेशन, अप्पंगला आईसीएआर-आईआईएसआर क्षेत्रीय स्टेशन, अप्पंगला में विभिन्न कार्बेकजों के साथ हिंदी सप्ताह मनाया गया। स्टाफ सदस्यों एवं सविद्या कर्मियों के लिए हिंदी स्मरण परीक्षा, चित्र रचना एवं उसके लिए हिंदी में अनुशीर्षक लेखन, हिंदी कविता पाठ आदि प्रतियोगिताएं आयोजित कीं। प्रत्येक प्रतियोगिताओं के पहले, दूसरे और तीसरे स्थान पर आने वालों को पुरस्कार दिया गया। दिनांक 28 सितंबर 2022 को समापन समारोह आयोजित किया। इसमें अध्यक्षता प्रभारी कार्यालय प्रधान डॉ. अशिता एच. जे., वैज्ञानिक ने की। डॉ. मुहम्मद फैसल पीराज, वैज्ञानिक ने सभा को संबोधित किया और विभिन्न प्रतियोगिताओं के विजेताओं को पुरस्कार प्रदान किया। प्रतिभागियों को समाधास पुरस्कार भी दिया गया।



आईसीएआर-आईआईएसआर क्षेत्रीय स्टेशन, अप्पंगला में आयोजित हिंदी परबर्ष का सप्ताह

## हिंदी प्रशिक्षण

डॉ. एन. के. लीला, प्रधान वैज्ञानिक एवं हिंदी अधिकारी तथा सुश्री. बजिता ओ., तकनीशियन ने हिंदी शिक्षण योजना द्वारा आयोजित पारंगत परीक्षा उत्तीर्ण की।

## तराकास गतिविधियां

सुश्री एन. प्रसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी ने दिनांक 28 अक्टूबर 2022 को आयोजित नगर राजभाषा कार्यालयन समिति की 70वीं अर्धवार्षिक बैठक में भाग ली।

## हिंदी कार्यशाळा /संवाद/संमिन्तार में प्रतिभागिता

- सुश्री एन. रबीला, उच्च श्रेणी लिपिक और सुश्री एन. कार्तिका, बरिष्ठ तकनीशियन ने केंद्रीय हिंदी प्रशिक्षण संस्थान, नई दिल्ली द्वारा 18-22 जून 2022 की अवधि में आयोजित पांच अर्ध दिवसीय अंतःस्थापित हिंदी कार्यशाळा में भाग ली।
- डॉ. एन. के लीला, प्रधान वैज्ञानिक एवं हिंदी अधिकारी ने राजभाषा विभाग, नई दिल्ली द्वारा 14-15 सितंबर 2022 को पंडित दीनदयाल उपाध्याय इंडोर स्टेडियम, सुरत, गुजरात में आयोजित हिंदी दिवस समारोह-2022 एवं द्वितीय अखिल भारतीय राजभाषा सम्मेलन में भाग लिया।
- सुश्री एन. प्रसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी ने भारतीय कृषि अनुसंधान परिषद के राजभाषा अधिकारियों के लिए भाकूअनुप-केंद्रीय पटसन एवं समवनीय रेशा अनुसंधान संस्थान,

## Hindi anubhag

बैरकपुर, कोलकाता में 24-25 अगस्त 2022 को 'स्वातंत्रता के 75 वर्ष प्रशासनिक व्यवस्था और राजभाषा हिंदी का विकास' पर आयोजित दो दिवसीय भाषा उत्सव एवं हिंदी संगोष्ठी में भाग लिया।

- सुश्री. एन. प्रसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी ने दिनांक 15 नवंबर 2022 को भाकूअनुप-केंद्रीय तटीय कृषि अनुसंधान संस्थान, गोवा में 'कार्यालय संचालन में राजभाषा का उपयोग' पर आयोजित ऑनलाइन कार्यशाला में भाग ली।
- डॉ. एन. के. लीला, प्रधान वैज्ञानिक एवं हिंदी अधिष्ठात्री तथा सुश्री. एन. प्रसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी ने दिनांक 22 दिसंबर 2022 को भाकूअनुप-भारतीय मृदा एवं जल संरक्षण संस्थान, देहरादून द्वारा 'तकनीकी विषय में हिंदी में कार्य करना' पर आयोजित ऑनलाइन तकनीकी कार्यशाला में भाग ली।
- सुश्री. एन. प्रसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी ने दिनांक 23 दिसंबर 2022 को भाकूअनुप-राष्ट्रीय कृषि उपयोगी सूक्ष्मजीव ब्यूरो, मऊ, उत्तर प्रदेश द्वारा 'कार्यालय प्रणाली में हिंदी के प्रयोग में स्मार्ट टूल्स' पर आयोजित एक दिवसीय राष्ट्रीय ऑनलाइन हिंदी कार्यशाला में भाग ली।

## प्रकाशन

- संस्थान के रिसर्च हाईलाईट्स 2020-21 का हिंदी रूपान्तर तैयार करके वेब साइट में अपलोड किया।
- संस्थान की राजभाषा पत्रिका मसालों की महक 2022.
- मसाला समाचार जनवरी-जून 2021
- मसाला समाचार जुलाई-दिसंबर 2021

## राजभाषा पत्रिका का विमोचन

भाकूअनुप-भारतीय मसाला फसल अनुसंधान संस्थान की राजभाषा पत्रिका मसालों की महक 2022 का विमोचन दिनांक 26 दिसंबर 2022 को संपन्न हुई राजभाषा कार्यान्वयन समिति की बैठक में संस्थान के निदेशक एवं राजभाषा कार्यान्वयन समिति के अध्यक्ष डॉ. आर. दिनेश के द्वारा किया गया।



मसालों की महक 2022 का विमोचन

## News from KVK, Kozhikode

**Celebration of important Days****National Fish Farmer's Day**

The National Fish Farmers' Day was celebrated by paying tribute to Dr. K. H. Alkuntli and Dr Hiralal Chaudhury, who successfully demonstrated induced breeding in Indian major carps on 10th July, 1957. The event was organized on 11th July, 2022 along with the training programme on "Aquarium setting and aquatic plants culture".

**World coconut Day**

An awareness program sponsored by CDB was organized at KVK, covering classes on scientific cultivation practices and plant protection aspects. The program was inaugurated by Shri N P Babu, Panchayat President, Perambra, and attended by about a hundred farmers.

**World Fisheries Day**

Celebrated by organizing training on integrated fish farming on 21<sup>st</sup> November, 2022, which was attended by 21 farmers.

**Children's Day celebration**

An exposure visits of students and parents of BRC, Thodannur, which benefited 52 participants.

**World Soil Day**

Two awareness classes on recent trends in plant protection, soil health, and its importance were conducted at Naduvannur GVHSS. Distribution of soil health cards to farmers based on soil test reports was organized at Maruthankara as a part of World Soil Day celebration.

**Mass Awareness Programmes****National Campaign of Poshan Abhiyan and Tree Planting Programme**

National Campaign of Poshan Abhiyan and Tree Planting program were inaugurated by Shri K. Suresh, President, Chakkittapara Grama Panchayat at KVK on 17<sup>th</sup> September, 2022. The farm women were distributed with seed kits arranged by IFFCO, and neem saplings were planted at KVK campus. In continuation, training on nutri-garden and tree planting was held with expert classes on Nutri-garden establishment, balanced diets and Poshan Abhiyan, Pest and disease management during vegetables cultivation and tree-plantation opportunities and scope by KVK experts.

**Live casting of PM Kisan Samman Sammelan**

Live casting of PM Kisan Samman Sammelan was inaugurated by Shri N P Babu, President, Perambra block panchayat, and presided over by Dr. P Ratha Krishnan, Program Coordinator, KVK. Dr. C K Thankamani, the then Director, ICAR IISR delivered a special address. Dr. K K Alswariya, SMS, KVK, and Dr. P Rajeev, Principal Scientist talked to the gathering. Mr. James Edachery and Sh Raghunathan from Chakkittapara Service Cooperative Bank participated in the program along with KVK staff and 150 farmers from all parts of Kozhikode. Training classes on beekeeping by Mr. G S Rajeev, Expert, HORTICORP and Bush pepper production by Dr. P S Manoj, SMS were also held as part of the program.

**Training programmes/capacity development programmes**

A total of 22 on campus trainings and 9 off campus trainings were conducted benefitting 585 and 185 participants, respectively on agriculture and agri-allied topics.

## News from KVK, Kozhikode

**Seminar/ Workshops/ Training attended:**

- Dr. K K Alswariya and Ms. A Deepthi attended workshop on Statistical and socio – economic methods and impact assessment for refinement of technologies in agriculture at CPCRI, Kasaragode, 11-12 Aug. 2022.
- Dr. K K Alswariya attended Virtual meeting on recent plant protection methods in major crops esp. sugar cane, maize and mustard, organised by ATARI, Bengaluru 13.08.22.
- Dr. K M Prakash attended National workshop on organic farming at Gwallor, 3.12.22.
- Dr. K M Prakash attended Orientation programme cum training for SMSs of KVK & ATARI (i/c) on natural farming at Kurukshetra, 5-6 Dec. 2022
- Mr. Soora, SRF under NICRA project attended International Conference on reimagining rainfed agro eco systems – Challenges and opportunities at CRIDA, Hyderabad, 22-24 Dec. 2022

**Exhibitions**

- Exhibition in connection with Mega Kisan Mela and Agri Expo, CPCRI, Kildu, 19-23 Nov. 2022
- Exhibition in connection with Agrifest organised by Dept. of Agriculture and Farmer's Welfare at Vengeri, 23-31 Dec. 2022

**Awards:**

- Pandit Deen Dayal Upadhyay Antyodaya Krishi Puraskar awarded to Smt. Bindu Joseph, Randuplackal (H) during ICAR Foundation Day at New Delhi.
- IISR Kozhikode Best Technical Officer Award presented to Ms. Deepthi A, Subject Matter Specialist (Home Science), KVK.
- Best Coconut Farmer (Large – South West Zone) sponsored by CDB Cochin awarded to Shri. K T Francis, Kaitakkulath (H)

**Field Days (Completed FLDs)**

- Field day in connection with Demonstration of fodder grass at Naduvannur
- Field day on Demonstration of Hybrid Napier Sustira in coconut-based homesteads with extended irrigation at Naduvannur on 27.12.22.

**Radio talk: 1**

Dr. B Pradeep, Aquaponics - Modern farming techniques, Farm and Home of AIR, 09.09.22.

**Publications**

- Manoj, P. S., Prakash, K. M., & Ratha Krishnan, P. (2022). Phala Vrikshangali Ninnu Deerikha Kala Vilavu (Malayalam). Methods for perennial yield from fruit crops. Ente Harithamuttam, 5(D: 70-71)
- Prakash, K. M., Manoj, P. S., Ratha Krishnan, P., Alswariya, K. K. & Deepthi, A. (2022). Jaiwa Cheera Krishi Thudangam Anogyavum Adayavum Urappikkam (Malayalam) "Let us start amaranth cultivation to ensure health and income". Krishi Anganam 5(1): 39-40
- Pradeep, B. & Ratha Krishnan, P. (2022). Poor alkalinity – A hidden threat in aquaculture. MPEDA Newsletter, Vol X, No.9 : 30-31.

## Other Activities

### On Deputation

- Dr. Muhammed Nissar V. A. and Dr. Sharon Aravind were deputed for field inspection and assessment of feasibility for nutmeg cultivation in Khammam and Bhadradi Kathaguden districts of Telangana as requested by the Director Horticulture Telangana during 22- 24 August 2022.
- Dr. Muhammed Nissar V. A and Dr. Shivakumar M. S. Participated in the exhibition on "Plant Genetic Resources in India" in connection with the 9<sup>th</sup> Session of the GB of ITPGRFA held at hotel Pullman, Aero city, New Delhi from 19-23 September 2022.
- Dr. D. Prasiath, Dr. Muhammed Nissar V.A. and Dr. Lijo Thomas conducted a germplasm exploration in Kankam region of Maharashtra from 04-07-2022 to 09-07-2022 in collaboration with (AICRPS centre, Dapoli). Various locations in Kolhapur, Sindudurg and Mahabaleswar districts were surveyed during the exploration.
- Dr. K. Kandliannan served as an expert member for Dr.YSRHU academic presentation by newly recruited assistant professors during August 2022.
- Dr. K. Kandliannan served as an expert member for spice nursery accreditation organized by DASD, Coallat on 09, December 2022.
- Dr. C.K.Thankamani participated as panelist in "National spice congress" at Hotel Inn Bombay from 6-7 October 2022.
- Dr. E Jayashree and Dr. Anees K nominated as member of Indian Delegation to attend the 6<sup>th</sup> session of the Codex Committee on Spices and Culinary Herbs (CCSCH6) from September 26-30 September, 2022.
- Dr. Anees K served as a panel member to finalize the road map to address the issue of low MRIs set by EU for chilly and Ginger during the First session of National Committee on Spices Quality & Safety (NCSQS) [Virtual] on 20<sup>th</sup> July, 2022.
- Dr. E Jayashree participated as member in the 14<sup>th</sup> Committee meeting to appraise the proposals received from States/UTs for Common Incubation Centre establishment under PMFME through video conferencing organized by National Institute of Food Technology Entrepreneurship and Management (NIFTEM) – Thanjavur on 04-08-2022 (Online).
- Dr. E Jayashree participated as in formulating the guidelines for functioning of Incubation facility under PM FME at Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka on 1-8-2022 (Online).
- Dr. E Jayashree participated as the 15<sup>th</sup> Committee meeting to appraise the proposals received from States/UTs for Common Incubation Centre establishment under PMFME through video conferencing organized by National Institute of Food Technology Entrepreneurship and Management (NIFTEM) – Thanjavur on 02-09-2022 (Online).

## Other Activities

- Dr. Rajeev P. participated in review meeting of the Block Level Agricultural Knowledge Centers (BLAKC) at Kozhikode, Department of Agriculture, Kerala 11<sup>th</sup> December 2022.
- Dr. Rajeev P. participated in meeting for the Action Plan Preparation for promotion of Technologies and scientific farming of spices in Tripura State, -Horticulture Research Station, Nagcherra, Tripura 29<sup>th</sup> September 2022.
- Dr. Biju C. N. and Dr. R. Gabu visited district agricultural farm, Koothali, Kozhikode on 05.07.2022 to ascertain the health status of black pepper in nurseries and to provide technical advice.
- Dr. C.K. Thankamani chaired a session on Climate change Adaptation and mitigation strategies in the National Conference "Natural Farming Systems and Biodiversity Conservation under Changing Climate Scenario" On 5-7 December 2022 Organized by: NAAS Regional Chapter-Barapani, Meghalaya, International Union of Organic Agriculture, Shillong and College of Agriculture, Central Agricultural University (Imphal), Kyrdenkulai, Meghalaya.
- Dr. C.K. Thankamani chaired a session on Crop management-AICRPs group meeting at Kuzarganj 14<sup>th</sup> Feb 2022.
- Dr. C.K. Thankamani chaired a session on Climate Change-Adaptation and mitigation strategies, National conference on Natural farming systems and Biodiversity conservation under changing climate scenario. 5-7 December 2022, organised by NAAS regional chapter Barapani, Meghalaya and IJOA, Shillong, Meghalaya.
- Dr. C.K. Thankamani chaired a session on production management technologies-improving profitability and livelihood security in the National conference on Enhancing competitiveness of horticulture through technology innovations, 17-18 November 2022, ICAR-CPCRI, Kasaragod.
- Dr. A.J Bhat chaired a session on Plant Protection at the XXXIX Zonal Research and Extension Advisory Council (North Zone) meeting of Kerala Agricultural University at the Regional Agricultural Research Station (N.Z.), Piliode (14-7-2022).
- Dr. A.J Bhat attended Third meeting of IX Research Advisory Committee: 27-28 July, 2022.

## Training Undergone

Participant	Training on	Period	Organizers
<b>Scientific Staff</b>			
Dr. M. S. Shivakumar	Training Workshop on Analysis of Multi-Environment Trials (Online Mode)	03-08 November 2022	ICAR-NAARM, Hyderabad.
Dr. N.K. Leela & Dr. Anees K	Training on advances in pesticide residue analysis (using both GC-MS/MS and LSC-MS/MS)	31-10-2022 to 4-11-20-22.	Quality evaluation laboratory, Spices board, Kochi

## Other Activities

Dr. R. Gobu	Online Workshop on Life Science meet Programming	13 -15 September 2022	ICAR- IISR, Kozhikode
Ms. P.V. Alfiya	Workshop on response Surface Methodology (online)	18 – 20 August 2022	ICAR-NAARM, Hyderabad
Dr. E Jayashree & Ms. P.V. Alfiya	Training programme on 'Entrepreneurship Development in Food Processing'	20-22 July 2022.	National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Thanjavur
Dr. M. Alagupalamuthirajal	Irrigation system and advancement	19 – 21 July 2022	NIPHM, Hyderabad
Dr. C.K. Thankamani, Dr. R. Dinesh, Dr. A. Ishwara Bhat, Dr. K. Kandianan, Dr. N.K. Leela, Dr. K. Krishnamurthy, Dr. P. Rajeev, Dr. T E Sheeja, Dr. E. Jayashree, Dr. D. Prasath, Dr. C. M. Senthikumar, Dr. V. Srinivasan, Dr. C. Sarathambal, Dr. C. N. Biju, Dr. P. S. Divya, Dr. Lijo Thomas, Dr. K. Anees, Dr. R. Praveena, Dr. A. Jeevalatha, Dr. C. Sellaperumal, Dr. Sharon Aravind, Mr. V. A. Muhammed Nissar, Ms. R Sivarajani, Mr. Mukesh Sankar Ms. Sana Charles, Ms. P.V. Alfiya, Dr. Alagupalamuthirajal, Dr. Hannappa Asangi, Dr. M. S. Shivakumar, Dr. S. Aarthi, Dr. R. Gobu & Dr. H. J. Akshitha.	Training Programme on ICAR-Service Rules	12- August 2022	ICAR- IISR, Kozhikode



## Other Activities

Dr. C.K. Thankamani, Dr. R. Dinesh, Dr. A. Ishwara Bhat, Dr. K. Kandianan, Dr. N. K. Leela, Dr. K. Krishnamurthy, Dr. P. Rajeev, Dr. S. J. Ankegowda, Dr. T. E. Sheeja, Dr. E. Jayashree, Dr. D. Prasath, Dr. C. M. Senthikumar, Dr. V. Srinivasan, Dr. C. Sarathambal, Dr. C.N. Biju, Dr. P. S. Divya, Dr. Ujo Thomas, Dr. K. Anees, Dr. R. Praveena, Dr. A. Jeeralatha, Dr. C. Selloperumal, Dr. Sharon Aravind, Mr. V. A. Muhammed Nisar, Dr. Balaji Rajkumar, Dr. Muhammed Faisal Peeran, Ms. R. Sivaranjani, Ms. Sona Charles, Ms. P.V. Alfiya, Dr. M. Alagupalamuthinsolai, Dr. Hannappa Asangi, Dr. M. S. Shivakumar, Dr. S.R. Maneesha, Dr. S. Aarthi, Dr. R. Gobu & Dr. H. J. Akshitha.	Contract labour Minimum wages act	20 <sup>th</sup> October 2022	ICAR-IISR, Kozhikode
<b>Technical Staff</b>			
Mrs. O. Shajina, Mr. B. Vishnu, Mr. C.M. Nikhil & Mr. P.B. Ranjith.	Functional Skill Training Programme for Technicians and Skilled Support Staff	10 – 12 August 2022	ICAR- IISR, Kozhikode
Mr. John George Mr. R. Bharathan Mr. K. Jayarajan Mrs. Prasankumari Mr. E. S. Sujesh	Training Programme on ICAR-Service Rules	12- August 2022	ICAR- IISR, Kozhikode

## Other Activities

Mr. A. Sudhakaran Mr. K. Krishnadas Ms. Chandravally Dr. Priya George Mr. L. P. Vijesh Kumar Ms. N. Karthika Mr. O. G. Sivadas Mr. V. S. Binoy Ms. Rejina P. Govind Mr. B. T. Hareesh Mr. A. R. Rasmish Mr. B. Vishu Ms. O. Shajina Mr. C. M. Nikhil Mrs. P. N. Kausalya & Mr. P.B. Rarjith.			
Mr. Vijesh Kumar	Online Workshop on Life Science meet Programming	13 – 15 September 2022	ICAR- ISR, Kozhikode
Mr. H.C. Rathish	Competency Enhancement training programme on Motivation, Positive thinking and Communication skill for the technical officers (T-5 and above) of ICAR Institute	13 – 16 September 2022	ICAR-NAARM, Hyderabad
Mr. John George Mr. R. Bharathan Mr. K. Jayarajan Mrs. Prasanakumari Mr. E.S. Sujeesh Mr. A. Sudhakaran Mr. K. Krishnadas Ms. Chandravally Dr. Priya George Mr. L. P. Vijesh Kumar Ms. N. Karthika Mr. O. G. Sivadas Mr. V. S. Binoy Ms. Rejina P Govind Mr. B. T. Hareesh Mr. A. R. Rasmish Mr. B. Vishu	Contract labour Minimum wages act	20 <sup>th</sup> October 2022	ICAR-ISR, Kozhikode

## Other Activities

Ms. O. Shajna, Mr. C. M. Nithil, Mrs. P. N. Kausalya & Mr. P.B Ranjith.			
Ms. N. Karthika	Pesticide Residue Analysis using both GC-MS/MS and LSC-MS/MS	31 <sup>st</sup> October – 4 <sup>th</sup> November 2022	Quality Evaluation Laboratory, Spices Board, Kochi
Mr. B. Vishnu	Training programme on "Selection, Adjustment, Operation, and Maintenance of Agricultural Implements for field and Horticultural Crops"	29 December 2022 – 7 January 2023	ICAR- CIAE Bhopal
<b>Administrative Staff</b>			
Mr. T. E. Janardhanan, Ms. C. K. Beena, Mr. P. Sundaran, Mr. V. C. Sunil, Mr. V. V. Sayed Mohammed Ms. M. Seema, Ms. N. Rebeena Mr. P. K. Rahul Mr. P. T. Jayaprakash & Mr. K. Faisal.	Training Programme on ICAR-Service Rules	12 <sup>th</sup> August 2022	ICAR- IISR, Kozhikode
Mr. T. E. Janardhanan, Ms. C. K. Beena, Mr. P. Sundaran, Mr. V. C. Sunil, Mr. V. V. Sayed Mohammed, Ms. M. Seema, Ms. N. Rebeena, Mr. P. K. Rahul, Mr. P. T. Jayaprakash & Mr. K. Faisal.	Contract labour minimum wages act	20 <sup>th</sup> October 2022	ICAR-IISR, Kozhikode
<b>Skilled Support Staff</b>			
Mr. K.P. Abhi Balagopal, Mr. K.P. Sachin & Mr. V. Vijesh.	Functional Skill Training Programme for Technicians and Skilled Support Staff	10 -12 August 2022	ICAR- IISR, Kozhikode
Mr. K.P. Abhi Balagopal, Mr. K.P. Sachin & Mr. V. Vijesh.	Contract labour minimum wages act	20 <sup>th</sup> October 2022	ICAR-IISR, Kozhikode

## Other Activities

## Programmes organized

Staff Involved	Programme organized
Dr. M. S. Shivakumar & Dr. H. J. Akshitha	Served as coordinator in conducting Small cardamom field day at ICAR-IISR, RS, Appangala on 20-08-2022
Dr. M. S. Shivakumar	Organized black pepper field day at alternative germplasm site on occasion of Kisan diwas on 23-12-2022.
Dr. Sharon Aravind	Served as coordinator for three-day training on Improved technologies for high yield and quality in spice crops (sponsored by Dept. of Horticulture & Plantation crops, Govt. of Tamil Nadu) at ICAR-IISR on 29-31 August 2022
Dr. Sona Charles (Workshop Convenor) Mr. Magesh Sanakar. S (Course associate) Mr. Jayarajan (Course associate)	Three-day online workshop on "Life Science meets Programming" organized by the Bioinformatics Centre, ICAR- Indian Institute of Spices Research, Kozhikode from 13-15 <sup>th</sup> September 2022. (15 participants from over 200 applications received).
Dr. T E Sheeja, (Course Director) Dr. M. Alagupalamuthirisalai, (Coordinator)	A collaborative Refresher Training Programme (RTP) on Promoting Spices Crop cultivation and Business opportunities for established Agripreneurs under AC & ABC Scheme
Dr. E Jayashree	Offered hands on training 'On value addition of turmeric' for farmers from Coimbatore on 31-8-2022 (22 persons) sponsored by MIDH.
Dr. C.K Thankamani, Dr. E Jayashree, Dr. Rajeev P and Ms. Alfiya P V	Coordinated two days training programme on "Spice processing and entrepreneurship development" on 30 <sup>th</sup> November- 01 <sup>st</sup> December 2022 sponsored by Registrar of Cooperatives, Govt. of Kerala. (39 participants attended the training programme).
Dr. E Jayashree, Dr. Rajeev P, Dr. Anees K and Ms. Alfiya P V	Coordinated the ICAR-Agricultural Technology Application Research Institute (ATARI), Bengaluru sponsored training programme on "Value Addition and Entrepreneurship Development in Spices" held at ICAR – IISR, Kozhikode during 13-15 December 2022. (20 participants attended the training programme).
Dr. C.K Thankamani	Organised national awareness campaign on organic farming in collaboration with IFSR Modipuram on 4 <sup>th</sup> August 2022.

## Other Activities

## Participation in Symposia/ Seminars/ Workshops/ Conferences/ Meetings

Participant (s)	Symposia/ Seminars/ Workshops/ Conferences/ Meetings	Period	Organized by
<b>Symposium Attended</b>			
Dr. D. Prasath	Rejuvenation of Cochin ginger and Alleppey finger turmeric	18 Oct 2022	DASD, Kozhikode, Kerala
Dr. K. Kandiannan Dr. D. Prasath, Dr. Maneesha S.R, Dr. M. S. Shivakumar & Dr. H. J. Akshitha	National Symposium on Horticultural Crops of Humid Tropics for Nutritional and Livelihood Security	02-03 Dec 2022	ICAR-IHR, Chetali, Madikeri, Karnataka
Dr. Sharon Aravind	National Conference on Natural farming and biodiversity conservation under changing climate scenario"	5-7 Dec 2022	College of Agriculture, Kyrdemkulai, Meghalaya.
Dr. Gobu. R	Tending Mendel's Garden for a Perpetual and Bountiful Harvest (Symposium)	19-21 July 2022	ICAR-IARI, New Delhi
Mr. Mukesh Sankar. S	Tending Mendel's Garden for a Perpetual and Bountiful Harvest (Symposium)- Online Platform	19-21 July 2022	ICAR-IARI, New Delhi
Dr. E Jayashree & Alliya P Y	56 <sup>th</sup> Annual Convention of Indian Society of Agricultural Engineers on Agricultural Engineering innovation for Global Food Security and International Symposium on "India @2047: Agricultural Engineering Perspective".	09-11 Nov 2022	Tamil Nadu Agricultural University, Coimbatore
Dr. C. Selloperumal	International conference on Advances in agriculture and food system towards sustainable development goals.	22-24 August 2022	UAS, Bangalore, Karnataka.
Dr. E Jayashree	National Conference on 'Tribal Horticulture' organized by from	17-18 Oct 2022	Dr. YSR Horticultural University, Andhra Pradesh
Dr. V Srinivasan	National Conference on Enhancing Competitiveness of Horticulture through Technology Innovations	17-18 Nov 2022	CPCRI
Dr. V Srinivasan	The spice conference on Value Creation in Spices - Global Market, jointly organized by Spices Board and CII	27 Sept 2022	Hotel Le Meridian, Kochi

## Other Activities

Dr. V Srinivasan	One day farmers seminar on "Sustainable Practices for Scientific Management of Black pepper Plantations" under MIDH	15 Dec 2022	Palakkadzy, Vadakkanchery
<b>Workshops</b>			
Dr. D. Prasath	ICAR-APAARI Workshop on Knowledge Management	23rd July, 2022	ICAR-Directorate of Knowledge Management in Agriculture, New Delhi
Dr. C.K. Thankamani	Advanced production and processing technologies in spices	26-29 Sept, 2022	State level workshop organized by Horticultural station Nagichera, Agartala.
Dr. C.K. Thankamani	Annual group meeting of ICAR Network program on Organic Farming	28-30 Dec, 2022	RKMVERI, Narendrapur Campus
Dr. C.K. Thankamani, Dr. V Srinivasan, Dr. AJ Bhat, Dr. D. Prasath, Dr. Sharon Aravind, Dr. M. S. Shivakumar & Dr. H. J. Akshitha	XXXIII Workshop of All India Coordinated Research Project on Spices	Oct 13- 15, 2022	ANDUAT, Kumarganj, Ayodhya, UP
<b>Meeting Attended</b>			
Dr. Praveena R.	Attended Interface meeting with Agriculture Officers at Vengeri.	22 <sup>nd</sup> December, 2022	Kozhikode, Kerala
Dr. V Srinivasan	16th Annual review meeting of MIDH programme,	13-14 July 2022,	DASD & Horticultural College and Research Institute, Periyakulam, TN.
<b>Exhibitions</b>			
Dr. T E Sheeja & Dr. Gobu. R	Cane Fest 2022	23-24 September, 2022	ICAR-Sugar Cane Breeding Institute & Society for Sugarcane Research and Development
Dr. T E Sheeja	Agri Start-up Conclave & Kisan Sammelan-2022 conducted on October 17, 2022, at IARI Mela Ground, Pusa, New Delhi	October 17, 2022	RKVY-RAFTAAR Innovation & Agri Entrepreneurship Cell, DA & FW, Ministry of Agriculture & Farmers' Welfare

## Other Activities

## Participation in Symposia/ Seminars/ Workshops/ Conferences/ Meetings

Dr. T E Sheeja	Kishi Danhan programme	25-29 October 2022	Department of Agriculture, Kerala
Dr. T E Sheeja	Horticulture Value chain	1-2 November 2022	Department of Agriculture and Farmers Welfare
Dr. T E Sheeja	Kisan Mela, Farmers Meet cum Agri- Expo	19-23 November 2022	ICAR-central Plantation Research Institute, Kasaragod
Dr. T E Sheeja	Vengeri fest 2022	22-31 December 2022	Department of Agriculture, Kerala

## Lectures delivered

Resource Person	Lecture Topic	Date	Organizers
Dr. C. K. Thankamoni	Achievements of ICAR-IISR, Kozhikode	11 Nov. 2022	Presented in a meeting organized by ICAR-IJHR, Hesaraghatta in collaboration with Western Sydney University Australia and TNAU, Coimbatore at Bangalore
Dr. C. K. Thankamoni	Climate resilient strategies for sustainable spices production' in the	05-07 Dec. 2022	National Conference on "Natural Farming Systems and Biodiversity Conservation under Changing Climate Scenario" at Kyrdemkulai, Meghalaya
Dr. C. K. Thankamoni	Production technologies for organic spices - Improving profitability and livelihood security in the	17-18 Nov. 2022	National conference on Enhancing competitiveness of Horticulture through technology innovations, ICAR-CPCRI, Kasaragod, Kerala.
Dr. C. K. Thankamoni	Ginger and turmeric production management with emphasis on GAP	26-29 Sept. 2022	Horticultural station Nagdihera, Agartala
Dr. C. K. Thankamoni	Cropping systems with spices for better use of space and income generation.	02-03 Dec. 2022	National Symposium on Horticultural Crops of Humid Tropics for Nutritional and Livelihood Security (NSHCHT), Chettali
Dr. C. K. Thankamoni	Cropping Systems with Spices for Better Use of Space and Income Generation	02 Dec. 2022	Invited talk during National Symposium on Horticultural Crops of Humid Tropics for Nutritional and Livelihood Security (NSHCHT)-2022 organized by ICAR-IJHR Central Horticultural Experiment Station, Chettali, Karnataka

## Other Activities

Dr. K Kandiannan	Agronomic practices and fertilizer management in ginger	23-25 Aug. 2022	Training on Scientific cultivation of ginger for high yield and quality at ICAR-IISR, Kozhikode
Dr. K Kandiannan	Critical agronomic practices in major spices.	29-31 Aug. 2022	Training on Improved technologies for high yield and quality in spice crops, ICAR-IISR, Kozhikode
Dr. K Kandiannan	Varietal advances and agronomic practices in black pepper"	15 Dec. 2022	One day farmers seminar on "Sustainable Practices for Scientific Management of Black pepper Plantations" was organized by ICAR-IISR at Parish Hall, St. Thomas Church, Palakkuzhy, Palakkod District, Kerala
Dr. D. Prasath	Varietal advances and planting material technology of ginger	23 Aug. 2022	Training on scientific cultivation of ginger for high yield and quality (for farmers from Sangareddy District, Telangana), ICAR-IISR, Kozhikode, Kerala
Dr. V Srinivasan	Black pepper – Production management	13-14 July. 2022	Spice Expo, Horticultural College and Research Institute, Periyakulam, Tamil Nadu Agricultural University,
Dr. V Srinivasan	Soil, nutrient management and agronomic practices for nutmeg,	03-04 Aug. 2022	Training programme on technology adoption for upscaling nutmeg production, ICAR-IISR
Dr. V Srinivasan	16 <sup>th</sup> Annual review meeting of MIDH programme	13-14 July. 2022	DASD & Horticultural College and Research Institute, Periyakulam, TN.
Dr. A. I Bhat	Plant viruses and their detection	16 Sep. 2022	Refresher Course in Biological Science held from 14.09.2022 to 27.09.2022, organized by the UGC- Human Resource Development Centre, Kannur University, Kerala
Dr. T E Sheeja	Virtual Faculty Development Programme- Technology Commercialization and Nurturing Entrepreneurship	12 Oct. 2022	Academic Staff College (ASC) in association with School of Biosciences and Technology, Vellore Institute of Technology
Dr. E Jayasree	'Opportunities in spice processing sector'	17 Aug. 2022	One day Online Training Program on Processing and Value Addition of Spices organized by National Institute of Food Technology, Entrepreneurship and Management (NIFTEM) - Thanjavur along with the Liaison Office, Guwahati, Assam.
Dr. E Jayasree	Processing and value addition in black	13 Sep. 2022	Three days Collaborative Refresher Training Programme (RTP) Promoting Spices Crop



## Other Activities

	pepper		cultivation and Business opportunities for Established Agripreneurs in collaboration with MANAGE, Hyderabad
Dr. E Jayasree	Post-Harvest Processing and value addition opportunities in Spices'	14 Sep. 2022	FFO interface programme on advanced technology in production, value addition and processing of spices at ICAR-IISR.
Dr. E Jayasree	Ginger Processing and Drying Machinery for Spices	11 Oct. 2022	Training programme organized by Kerala Agricultural University
Dr. E Jayasree	Spice processing and value addition	02 Nov. 2022	Training course on "Advances in Food Process Engineering and Preservation" at Engineering Division of ICAR-CIFT, Kochi.
Dr. E Jayasree	Advances in Processing of Nutmeg	15 Nov. 2022	Training programme on "New Opportunities in Nutmeg farming" organized by Indian Institute of Spices Research, Kozhikode at Kodercherry, Kozhikode.
Dr. E Jayasree	Processing of spices	30 Nov. 2022	Training programme on "Spice processing and entrepreneurship development" organized by Indian Institute of Spices Research, in collaboration with Dept. of Cooperatives at Kozhikode
Dr. E Jayasree	Processing of Black pepper and Ginger.	13 Dec. 2022	ICAR-Agricultural Technology Application Research Institute (ATAR), Bengaluru sponsored training programme on 'Value Addition and Entrepreneurship Development in Spices' held at ICAR - ISR, Kozhikode
Dr. E Jayasree	Advances in post-harvest management and processing of spice crops.	20 Dec. 2022	for officials from Agricultural department of Kerala as part of the pre Krihi darshan training programme for Agricultural officers organised at ICAR- IISR
Dr. Rajeev P	Post-harvest Technology and Value Addition in Major Spices-	28 Sep. 2022	State Level Workshop on Advances in Production and Processing Technologies of Spices organized under the NEH states Mission programme at Agartala
Dr. Rajeev P	Value Addition in Spices Status and Prospects.	30 Nov. 2022	EDP on Spices Processing and Value Addition Sponsored by Department of Cooperatives, Government of Kerala
Dr. Anees K	Environment, Healthcare and Security: Emerging threats and mitigation opportunities.	07 July 2022	St.Joseph's College Devagiri, Kozhikode during international symposium on Threat Mitigation 2022.
Dr. Anees K	Primary processing and Value addition in Nutmeg.	03 Aug. 2022	Lecture delivered on technology adoption for upscaling nutmeg production to Anamalai Nutmeg Growers association at IISR
Dr. Anees K	Conducted a practical class on value addition in ginger	23-25 Aug. 2022	during training on scientific cultivation of ginger for high yield and quality
Dr. Anees K	Business Opportunities & chemistry of spice extracts	14 Sep. 2022	Collaborative Refresher Training Programme (RTP) on Promoting Spices Crop cultivation and Business opportunities for Established

## Other Activities

			Agripreneurs under AC&ABC Scheme.
Dr. Anees K	Post-harvest technology and value addition in major spices	27-29 Sept. 2022	Two-day national seminar on Advances in Production and Processing Technologies of Spices, at Agartala, Tripura.
Dr. Anees K	Key issues and management strategies for safe spices: An R&D Perspective	6-7-Oct. 2022	National spice conference organised by World spice organization.
Dr. Anees K	Value Addition in Turmeric and its export possibilities	10-11-2022	For officials from Agricultural Department at Baluserry block.
Dr. Anees K	Quality evaluation of spices	30-Nov. 2022 to 1 Dec. 2022	Workshop on 'Spice Processing and Entrepreneurship Development'
Dr. Anees K	Quality evaluation of spices	13-Dec. 2022 to 15 Dec. 2022	Training on 'Value Addition and Entrepreneurship Development in Spices'
Dr. Anees K	Entrepreneurship Awareness and Development Programme in value added products and various business plans using Spices	15-12-2022	Malabar Chamber of Commerce, Kozhikode as a part of LEAD programme.
Dr. H J Akshitha	Advances in small cardamom production technology	20-08-2022	Small cardamom field day at ICAR-IISR RS, Appangala
Dr. H J Akshitha	Varietal wealth and propagation of nutmeg	16-11-2022	Prospects of Nutmeg cultivation in Karnataka conducted by ICAR-IISR RS, Appangala.
Ms. Sivaranjini R	Application of GC-MS in phytopharmacology	05-12-2022	Training programme on "Identification & characterization of phytochemicals & their possible targets of action", organized by Department of Veterinary Pharmacology and Toxicology, College of Veterinary and Animal Sciences, Mannuthy.
Dr. Sharon Aravind	Lecture on micro rhizome based ginger production	05-08-2022	One day workshop organized by DASD on micro rhizome based ginger production at Kavarthara, Naduvannur
Dr. Sharon Aravind	Lecture on "Scientific cultivation of spices"	22-09-2022	For 60 tribal farmers, at Boy's town, Waynad underTSP programme
Dr. Sharon Aravind	Lecture on monsoon care of spices like black pepper & nutmeg.	17-08-2022	MGMG programme at Kottippara
Dr. Sharon Aravind	Lecture on "Varietal advances in spices"	29-08-2022	Lecture delivered during training on "Improved technologies for high yield and quality in spice crops" (sponsored by Dept. of Horticulture & Plantation crops, Govt. of Tamil Nadu) at ICAR-IISR.

## Other Activities

Dr. Maneesha S.R	Scientific Research Careers in Agriculture.	21-12-2022	Lecture delivered for RAWE students Kerala Agricultural University
Dr. Muhammed Nissar V. A.	"Origin Crop Improvement and cultivation of Nutmeg- An introduction"	03-08-2022	Lecture delivered for a technology adoption for upscaling nutmeg production to Anamalai Nutmeg Growers association at ISR
Mr. Mukesh Sankar, S	Lecture on "Introduction to R"	13-09-2022	Three days online workshop on "Life science meets Programming" conducted at ICAR-IISR, Kozhikode
Ms. Afiya F V	Value addition in important spice crops in Tamil Nadu with special focus on turmeric.	31-8-2022	MIDH sponsored hands-on training on 'Value addition of turmeric' for farmers from Coimbatore. (22 persons)
Ms. Afiya F V	Processing and value addition opportunities in turmeric.	13-9-2022	Three days Collaborative Refresher Training Programme (RTP) promoting spices crop cultivation and business opportunities for established agripreneurs in collaboration with MANAGE, Hyderabad at ICAR – IISR, Kozhikode (online)
Ms. Afiya F V	Novel food processing technologies	24-9-2022	For the participants of Faculty Development Programme in Food Technology organized by DGNES Manipal College
Dr. Sona Charles	Lecture on "Utilities in Bioinformatics"	13-09-2022	Three days online workshop on "Life science meets Programming" conducted at ICAR-IISR, Kozhikode
Dr. Sona Charles	Lecture on "Data Visualization using R"	14-09-2022	Three days online workshop on "Life science meets Programming" conducted at ICAR-IISR, Kozhikode

## Awards/ Honours/ Recognitions

- Dr. E. Jayashree was awarded as the 'Fellow of Indian Society of Agricultural Engineering- 2022' during the 56th Annual Convention of Indian Society of Agricultural Engineers on Agricultural Engineering Innovation for Global Food Security and International Symposium on "India @2047: Agricultural Engineering Perspective" at Tamil Nadu Agricultural University Coimbatore during 09-11 November, 2022.
- Dr. E. Jayashree was awarded as the 'Fellow Society for Promotion of Oil Palm Research and Development- 2022' during the 3rd National Conference on Oil Palm held at Vēyayowada during 23-25 November, 2022.
- Dr. C. Sellaperumal received 'Young Scientist award 2022' conferred by Dr. B Vasantharaj David foundation, Chennai, Tamil Nadu.
- Dr. H. J Akshita secured 'Best Oral presentation Award' for the abstract entitled "Effect of different methods of drying on appearance and quality of black pepper" authored by Akshitha, H. J, Shivakumar, M. S., Sivarajanji, R., Ankegowda, S. J., Mohammed Faisal, P., Hanappa Asangi and Balaji Rajkumar, M. presented in the National Symposium on Horticultural Crops of Humid Tropics for Nutritional and Livelihood Security, December 02-03 December, 2022, CHES, ICAR-IHR, Madikeri, Karnataka.
- Mr. Mukesh Sankar, S secured 'Best Poster presentation Award' for the abstract entitled "Identification and validation of genes conferring foliar blast resistance in pearl millet using genome wide association mapping strategy." In Tending Mendel's Garden for a Perpetual and Bountiful Harvest (Symposium)- Online Platform, ICAR-IARI, New Delhi during 16-18 July, 2022.

## Other Activities

## New Appointments

***Dr. R Dinesh takes over as new Director of ICAR-IISR, Kozhikode***

Dr. R Dinesh, Principal Scientist (soil science) assumed charge as the new director of ICAR-Indian Institute of Spices Research, Kozhikode on December 8, 2022. He has made significant contributions in soil fertility, soil biochemistry and soil microbiology of arable soils, soils under tropical forests and mangrove ecosystems. His contribution in the area of plant-microbe interaction and their influence on nutrient cycling and nutrient use efficiency in soils under perennial horticulture has opened up new areas of research. He is the co-inventor of the novel delivery system for agriculturally important microbes through encapsulation (biocapsules), designer micronutrients and PGPR formulations which have been non-exclusively licensed to many private companies for commercialization. Six of these formulations have been awarded with patents. He is a Fellow of the National Academy of Agricultural Sciences, New Delhi and recipient of many awards and has published over 50 high impact research papers.



## Other Activities

## New Appointments

Name of staff	Position	Date of joining
Dr. C. K. Thankamani	Director (in-charge) & Project coordinator (Acting)	1-5-2022 to 7-12-2022
Mr. Pavan Gowda M	Senior Technical Officer	05-09-2022

## Transfers

Name of staff	Position	Joined as on/ relieved as on	Institute (to/ from)
Dr. Muhammed Azharudheen TP	Scientist (Plant breeding & Genetics)	12-08-2022	From ICAR-NIBB, Cuttack to ICAR-IISR, Kozhikode
Dr. Maneesha S.R.	Scientist (Fruit Science)	31-08-2022	From ICAR-CCARI, Goa to ICAR-IISR, Kozhikode
Dr. Manimaran B	Scientist (Nematology)	05-09-2022	From ICAR-IARI, New Delhi to ICAR-IISR, Kozhikode
Mr. Babu R K	Senior Finance & Accounts Officer	19-10-2022	From ICAR-CIBA, Chennai to ICAR-IISR, Kozhikode
Dr. M Alagupalamuthusolai	Senior Scientist (Plant Physiology)	01-12-2022	From ICAR-IISR, Kozhikode to ICAR-SRI, Coimbatore

## New Project Initiatives

Sl No.	Title of the Project	Duration		Roles and Responsibilities in the Project
		From	To	
1.	Risk assessment of nanotechnology in agriculture: Effects of metal and metal oxide nanoparticles on soil bacteria communities, soil microbial processes and evaluation of phytotoxicity using genomic approaches. (Multi Institutional- National Agricultural Science Fund, India)	2020	2023	Dr. T E Sheeja (PI)
2.	Computational and experimental biology approaches for delineation of selected secondary metabolite pathways in major spices (Multi Institutional- Indian Council of Agricultural Research, India)	2017	2023	Investigators Dr. R Dinesh (PI) Dr. T E Sheeja (Co-PI) Dr. V Srinivasan (Co-PI) Dr. C Sarathambal (Co-PI)
3.	Contract research project funded by Bayer's Crop Science Pvt Ltd on 'Assessment of nematocidal efficacy of fluopyram against major nematodes infecting black pepper.	2022	2024	Dr. C Sellapperumal (PI) Dr. B Manimaran (Co-PI)
4.	Contract research project funded by Bayer's Crop Science Pvt Ltd on 'Assessment of nematocidal efficacy of fluopyram against major nematodes infecting Ginger.	2022	2024	Dr. B Manimaran (PI) Dr. C Sellapperumal (Co-PI)

## Other Activities

## Student Corner

Student	Title of the thesis	University	Guide
<b>PhD awarded</b>			
Dr. Prashina Mol P	Diversity and characterization of curcumin biosynthetic genes and transcription factors from <i>Curcuma</i> Spp.	University of Calicut	Dr. T E Sheeja
Dr. K.P. Sabila	Studies on <i>Pythium</i> species associated with yellowing of black pepper ( <i>Piper nigrum</i> L.)	University of Calicut	Dr. R. Suseela Bhal
<b>PhD registration</b>			
Arya T E	Metabolic engineering of curcumin biosynthesis by overexpression and regulation of pathway genes in <i>Curcuma longa</i> L. (turmeric).	University of Calicut	Dr. T E Sheeja
Fathima Dilkush	Bio-prospection and characterization of metabolites derived from bacterial endophytes of ginger and their bio-efficacy against <i>Pythium</i> spp.	University of Calicut	Dr. C. Sarathambal
Krishnapriya N.P.	Studies on wellness applications of extractives from genus <i>Garcinia</i>	University of Calicut	Dr. K. Anees
<b>M Sc Dissertations</b>			
Name	Title of the M.Sc. thesis	University to which submitted	Degree
Krishna M S	Morphological, biochemical and molecular characterization of elite nutmeg varieties	Bharathidasan University	MSc Botany

## Publications

## Research papers

- Akshitha, H. J., Prasath, D., Umesh, K., Faisal, M. P. & Venkataravanappa, V. (2022). Molecular characterization of ginger genotypes using RAPD and SSR markers. *Journal of Horticultural Sciences*, 17(1), 95-102. DOI: <https://doi.org/10.24154/jhs.v17i1.1052>
- Biju, C. N., Bhat, A. I., Naveen, K. P., & Prasath, D. (2022). Identification of virus-free ginger germplasm accessions through symptomatology and molecular assay. *Indian Phytopathology*, 1143-1149. <https://doi.org/10.1007/s42360-022-00548-y>
- Dinesh, R., Srinivasan, V., Praveena, R., Subila, K. P., Priya George, Akshaya Das, Shajino, O., Anees, K., Leela, N. K. & Haritha, P. (2022) Exploring the potential of P solubilizing rhizobacteria for enhanced yield and quality in turmeric (*Curcuma longa* L.). *Industrial Crops and Products*, 189, 115826. <https://doi.org/10.1016/j.indcrop.2022.115826>
- Eapen, S. J., Thomas, L., Praveena, R. & Senthil Kumar C. M. (2022). Pesticide regulation policy and global food safety for Indian spices. *Journal of Consumer Protection and Food Safety*, 17, 407-410. <https://doi.org/10.1007/s00003-022-01387-9>
- George, J. K., Fayad, M. A., Shelvy, S., Sheeja, T. E., Eapen, S. J., Charles, S., Rai, A. & Kumar, D., (2022). Dataset of De Novo hybrid berry transcriptome profiling and characterization of *Piper* species (*Piper nigrum* and *Piper longum*) using Illumina and Nanopore sequencing. *Data in Brief*, 42. <https://doi.org/10.1016/j.dib.2022.108261>.
- Gowda, M. T., Sellaperumal, C., Reddy, R., & Pandey, K. K. (2022) Antagonistic potential of rhizobacterial liquid formulations against *Meloidogyne incognita* infecting okra under field conditions. *Vegetable Science*, 49(2): 241-247.
- Gowda, M.T., Meena, B. R., Krishnan, N., Manjunath, M., & Sellaperumal, C. (2022). Antimicrobial peptides producing native *Bacillus* spp. for the management of root-knot nematode *Meloidogyne incognita* infecting okra [*Abelmoschus esculentus* L. Moench], *Biological Control*, 171, 104951. <https://doi.org/10.1016/j.biocontrol.2022.104951>
- Jayashree E., & Basheer, N. (2022). Quality variation of turmeric during polishing in a power operated turmeric polisher. *Journal of Spices & Aromatic Crops*, 31 (1): 34-44. <https://doi.org/10.25081/josac.2022.v31.i1.7562>
- Jayashree E., & Joseph, D. (2022). Physicochemical quality evaluation and drying characteristics of nutmeg (*Myristica fragrans*) dried in a solar tunnel dryer with biomass backup. *Journal of Spices and Aromatic Crops*, 31 (2): 166-176. <https://doi.org/10.25081/josac.2022.v31.i2.7801>
- Jeevalatha A., Fathimath Zumaila, Biju, C. N. & Putya, K. C. (2022). Duplex recombinase polymerase amplification assay for simultaneous detection of *Pythium* spp. and *Rhizoctonia pseudosolanacearum* from ginger rhizomes. *Crop Protection*. 161. <https://doi.org/10.1016/j.cropro.2022.106057>.
- Jeevalatha, A., Zumaila, F., Biju, C. N., & Peeran, M. F. (2022). Multiplex PCR assay for simultaneous detection of *Phytophthora*, *Pythium* and *Fusarium* associated with foot rot and yellowing diseases of black pepper. *Journal of Spices & Aromatic Crops*, 31(1): 92-96. <https://doi.org/10.25081/josac.2022.v31.i1.7739>

## Publications

## Research papers

- Jose, D. A., Bhabhina, N. M., Leela, N. K., Vishudha, M., Aarthi, S., & Prasath, D. (2022). Comprehensive assessment of phytochemicals and health benefits of Geographical Indication turmeric in India. *Journal of Spices & Aromatic Crops*, 31 (1): 45-55. <https://doi.org/10.25081/josac.2022.v31.i1.7668>
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