SEED SPICES
E - Newsletter
ICAR-National Research Centre on Seed Spices

An ISO 9001:2008 Certified Institute

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Dr. R. K. Solanki	Editor
Dr. Sharda Choudhary	Editor
Sh. M. A. Khan	Editor

Photography by: M. A. Khan
G. K. Tripathi

Important Events

Efforts Placed for Clean India Mission

Cleanliness is the half trustworthiness of the mankind. NRC seed spices staff engaged themselves time to time in cleanliness programme in and outside campus also. Dr. Balraj Singh, Director of the centre has conducted programme for awareness of clean India Mission on December 19, 2014. He talked to a group of progressive ladies farmer of Jaipur district, Rajasthan. All the staff members also actively participated in the cleanliness programmes of the centre.







Different Activities Under Clean India Mission

RESEARCH HIGHLIGHTS

Modified Atmospheric Packaging for Management of Stored Pest, Microbial Population and other quality parameters

Krishna Kant[1], S.R.Meena[2], B.K.Mishra[2], S.S.Rathore[2] and M.K.Vishal[2]

Stored insect pests are one of the major quality deteriorating agents during storage of seed spices. The cigarette beetle *L. serricorne* Fab. is found world-wide in tropical and sub-tropical areas causing huge economic losses to stored products. Maximum damage to seed spices during storage is caused by larval feeding of cigarette beetle, while adults make damage by making holes to penetrate or escape from packaged commodities. Beside the damage due to feeding, the presence of dead insects, cast skins residues from different larval life stages, pupal cases, and fras become contaminants in seed spices and render them unfit for consumption. Use of synthetic insecticides for control of pests in seed spices has limitation Presence of insecticide residue is one of the non tariff barrier in export of seed spices, besides any product that have masking impact over original aroma of seed spices can not be applied.

Experiment on Modified Atmospheric Packaging (MAP) using different inert gases alone and in combination with seeds of ajwain and cumin seed for management of cigarette beetle and other quality parameters showed that all inert gases causes complete mortality of beetle both at room temperature and controlled environment. Oil content estimated after 120 days of storage showed that in ajwain seed, the maximum total oil content was found in seeds packed with O_2 alone and the maximum essential oil in ajwain seeds in vacuum packaging iunder both environments. Microbial load on ajwain showed the minimum fungal count was observed in seeds packed with O_2 and bacterial count in CO_2 (50%) +N_2 (50%) at room temperature and was at par with vacuum at controlled temperature. In cumin seed, total oil content was observed maximum in seed packed with CO_2, both in room and controlled temperature, where as essential oil estimated maximum in seed packed with N_2 at room temperature and CO_2 (50%) + O_2 (50%) at controlled temperature. Vacuum packaging of cumin seed showed minimum fungal and bacterial count both in the seed kept at room temperature and controlled environment .



Fig.: Ajwain and Cumin seeds with inert gases and vacuum packaging

RESEARCH HIGHLIGHTS

TALC BASED PGPR BIOFORMULATION DEVELOPED FOR CORIANDER CROP

Brijesh Kumar Mishra, Y.K. Sharma, O.P. Aishwath, Krishna Kant and M. K. Vishal

The commercial use of plant growth promoting rhizobacteria requires inoculum that retains high cell viability and easily be transported and applied to seed. The aims of formulating viable cells are to ensure that adequate cell viability is sustained to increase the efficacy of the cells and to facilitate the delivery and handling processes. Under the Ongoing Research Project **"Screening of plant growth promoting rhizobacteria for coriander (*Coriandrum sativum* L.)"** a Talc based bacterial formulation has been developed for enhanced survival and effective application of Plant Growth Promoting Rhizobacteria (PGPR) on coriander seeds as well as soil application in seed spices crop field.

Microbial Formulations are generally composed of the live / active material (bacterial/ fungal biomass) which must be preserved or maintained in viable condition to produce its biological effect. The carrier material may or may not include the incorporation of enrichment materials or additives. Generally, amendments can be grouped as either carriers (fillers, extenders) or amendments that improve the chemical, physical, or nutritional properties of the formulated biomass. The active material is mixed with carrier materials such as water, clay, talc, oil or others to make the formulation safer to handle, easier to apply and better suited for storage. In some formulations, enrichment materials comprising of nutrient-rich medium such as, molasses, trehalose, maltose and sucrose are incorporated to further enhance the viability of active microbial cells/spore/mycelium. Generally, dry formulations are generally preferred over wet formulations because they provide extended shelf life and are easier to store and transport. However liquid biofertilizers are also gaining momentum now a days.

In present investigation efficient plant growth promoting rhizobacterial isolates from coriander crop were selected for optimization of bioformulation production at Microbiology laboratory of NRC on Seed Spices, Tabiji, Ajmer. PGPR isolates were grown on a modified nutrient medium in 250 ml Erlenmeyer flaks on an orbital shaker at 100 rpm at 30 ^{0}C for 5 days. The inert carriers used in the formulations were talc and cellulose. For each carrier type, 1% carboximethyl cellulose (CMC) as binder,15% $CaCO_3$ as buffer and 0.25% of different enrichment materials were incorporated .The enrichment materials incorporated were sucrose, dextrose, yeast extract and peptone. Also, combinations of the enrichment materials were tested with talc-cellulose carriers. The inert carriers, enrichment and additive materials were mixed and sterilized by autoclaving. PGPR broth 20 ml was added into them, mixed well under aseptic conditions, and then the mixtures were air dried in a laminar flow chamber for 48 hours. Powder formulations were then placed in plastic petri plates, sealed with parafilm, stored at refrigerated as well as room temperature, and sampled for estimation of bacterial population at monthly interval. In the viability assessment, population counts of bacteria among various formulations were determined by serial dilutions from formulations and plated in triplicate on nutrient agar, and the CFU per gram of formulation were enumerated at intervals of 1 to 6 months. After 6 months of refrigerated storage highest bacterial population (13.6X10^{7}cfu/g) was recorded for bacterial formulation consisting of Talc-CMC and yeast extract, however, in ambient storage bacterial population was found less than 1.0X10^7 cfu/g after 6 months storage which is generally desired for solid carrier based biofertilizers. Thus pgpr bioformulation using Tale as carrier material is a feasible oprtion instead of peat based.





Transfer of Technology

Farmers' Trainings under TSP and NEH Programme

Sr. No	Name of Training	No of days	Organizing Secretary, Coordinators/ Co-Coordinators
1	Farmers training on "*Vegyanik Vidhi Se Bijya Masala Phasalon ki Kheti*" was organized under Tribal Sub-Plan on 17 Nov., 2014 at KVK, Banswara (Rajasthan)	01	Dr. G. Lal Dr. R.S. Meena Dr. R.S. Mehta Dr. N.K. Meena
2	Farmers Training on "*Unnat Sasya Kriyaen*" at KVK Dungarpur was organized under Tribal Sub-Plan on 18 November, 2014.	01	Dr. G. Lal Dr. R.S. Mehta Dr. N.K. Meena Dr. R.S. Meena
3	Farmers Training under Tribal Sub-Plan on "*Bijya Masala phasalon ki Unnatt Prodhiyogiki*" was organized at Gomteswar, Arnod, Pratapgarh.	01	Dr. G. Lal Dr. R.S. Meena Dr. R.S. Mehta Dr. N.K. Meena
4	Farmers Training on "Improved Production Technology and Post-Harvest Management of Seed Spices" at Shillong under NEH programme was organized from 27-28 November, 2014.	02	Dr. G. Lal Dr. R.S. Mehta
5	Farmers Training on "Production and Promotion of seed spices in Sikkima under NEH Program of NRCSS	02	Dr. G. Lal Dr. R.S. Meena Dr. R.S. Mehta Dr. N.K. Meena





Farmers Training Under NEH at Sikkim





Photographs of Farmers Training Under TSP at Dungarpur

Transfer of Technology

Training

Five days farmers' Training on "*Bijya Masala Phasalo Ki Unnat Prodhogiki*" under ATMA, Government of Maharashtra

Five days training programme for the farmers of Chandarpur district of Maharashtra was conducted during 14-19, November, 2014 at NRCSS, Ajmer. The training was sponsored by Project Director, ATMA, Chandarpur, Maharashtra. On inaugural function Dr. Balraj Singh, Director, advised farmers about the prospects and status of seed spice production in Chandrapur area of Maharashtra. He suggested that in order to increase the export of seed spices, it is necessary to enhance production of seed spices by adopting improved varieties and production technology of seed spices. In this training, 25 farmers from Chandarpur district participated. The Lecture on various aspects of seed spices production were delivered by the scientist of NRCSS, Ajmer. A field visit of these progressive farmers was also organized. Dr.R. S.Mehta, Principal Scientist was Training Coordinator and Dr. P. N. Dubey, Senior Scientist was the Co-Cordinator of the programme. In the valedictory function, farmers expressed their desire to grow seed spices in Chandarpur area of Maharashtra. A bulletin on *Vidharbh Xetra- Zila Chandrapur Me Bijya Masala Phasalonutapdan Hetu Unnat Prodhogiki*" was also prepared and given to farmer participants. At the end, certificates were given to the participants.





Director addressing the farmers releasing bilingual book on seed spice cultivation





Group photographs of participants of the training programme

Taking feedback from participants

Transfer of Technology

Participated in National Sheep & Wool Fair at CSWRI, Avikanagar

Dr. Balraj Singh, Director, NRC on Seed Spices, Sh. M.A. Khan, Assistant Chief Tech. Officer and Sh. G.K. Tripathi, Sr. Tech. Assistant have participated and installed an exhibition in National Sheep & Wool Fair which was organized by CSWRI, Avikanagar on 12.09.2014. Pamphlets on different technologies on different crops of seed spices were distributed to the farmers. About 500 farmers, farm women, researchers and students visited NRCSS stall. Hon'ble Agril. Minister, Sh. Prabhu Lal Saini, Govt. of Rajasthan was the Chief Guest, he has also visited our stall and got a glimpse of the activities taken care by NRCSS for seed spice development R & D.





Exhibition of NRCSS on Seed Spices at National Sheep & Wool Fair at CSWRI, Avikanagar

Soil sample survey for cumin growing areas of Rajasthan

Dr. Sharda Choudhary, Dr. Ravindra Singh and Dr. R.S. Sharma went for soil sample survey at cumin growing areas of Rajasthan (Barmer, Pali, Jaisalmer, Jodhpur, Merta and Nagaur) under the AMAAS project in 12-14 December, 2014. In most of the areas crop was late due to the changing scenario of climatic conditions (late winters). During discussion with cumin growing farmers it was found that most of them are using seeds from previous crops or purchasing from local dealers. Location data were recorded with the help of GPS system. The average EC, PH, OC and nitrogen in the collected soil samples were found to be 0.296, 8.08, 0.432 and 0.179 respectively.







Human Resource Development

Participation in 'Annual convention of Indian Society of Soil Science' held at Hyderabad

Dr O.P. Aishwath, participated and presented a paper in 'Annual convention of Indian Society of Soil Science' and National Seminar on 'Development in Soil Science' held from 24-27 at Hyderabad, The convention was started with the registration in the afternoon on 23.11.2014. After inauguration there were various concurrent sessions from first day and some special sessions on Soil Science Education and Society and precision nutrient management in small holder system of India.

Dr. Aishwath was invited to act as rapporteur in the Soil Chemistry Session-II. In this session he made a oral presentation on "Response of coriander with variable soil pH in TypicHaplustepts and TypicHaplustalfs on 25.11.2014. During the concluding session, Dr Aishwath presented the proceedings of the 'Chemistry Session-II' as a rapporteur.



ICAR short course on "Advances in nutrient dynamics in soil-plant atmosphere system for improving nutrient use efficiency" attended

Dr O.P. Aishwath undergone the above course held at IISS, Bhopal during September 2-11, 2014. There were 38 lectures scheduled during the programme. These lectures were on concept and basics of nutrient use efficiency (NUE) and their dynamics in soil plant under various situations. Soil physical, chemical, biological and agronomic management for improving NUE in module-II. In the module-III, lectures were on plant physiology, genetics and molecular biological basis for improving nutrient uptake and use efficiency. The aspects on climate change and its relation to soil and plant system for improving NUE were covered in Module IV. Besides the lectures, there were some laboratory visits having advanced analytical facilities within IISS and outside the institute. In this course, Dr O.P. Aishwath had been selected as one of the outstanding participants and for him, Director-NRCSS, Ajmer had received a letters of commendation from the organizers.

Human Resource Development

Honours and Awards

ICAR West Zone Sports Meet - 2014

West zone sports meet of ICAR was organized by Central Arid Zone Research Institute, Jodhpur during November 20–24, 2014. In this mega ICAR west zone sports meet, a team of 36 members from National Research Centre on Seed Spices, Ajmer had actively participated in events like Athletics (100 m, 200 m, 400 m, 800 m, 1500 m), shot put, javelin throw, discus throw, long jump, high jump, shuttle badminton, basketball, table tennis, kabaddi, volleyball (smashing & shooting), chess and carom.

Prizes Achieved

Mr. Diwakar, Y., Scientist of NRCSS has bagged the following prizes
First place in High Jump
Second place in Javelin Throw
Third place in 100 Metre Sprint & Long Jump.







Mr. Diwakar, Y., Scientist of NRCSS receiving the prizes

Dr. B.K. Mishra made oral presentation in International Conference at MPUAT, Udaipur

Dr. B.K. Mishra attended an "INTERNATIONAL CONFERENCE: CHANGING SCENARIO OF PEST PROBLEMS IN AGRI-HORTI ECOSYSTEM AND THEIR MANAGEMENT, held at RCA, MPUAT, Udaipur during 27-29 November, 2014. He presented his paper entitled "EFFECT OF GROWTH MEDIA COMPOSITION ON PRODUCTION OF ENTOMOPATHOGENIC FUNGI" authored by Brijesh K. Mishra*, K. Kant, Y.K. Sharma, Prateek Sinha, S.R. Meena and P.N. Dubey. In his power point presentation he descrided the process optimization studies conducted at Biocontrol lab of NRCSS for mass production of Entomopathogenic fungi viz; *Beauveria bassiana, Metarhizium anisopile* and *Verticillium lecanni* through change in carbon and nitrogen sources.

Dr. Krishna Kant & co-authors received first prize in poster presentation in International Conference

Dr. Krishna Kant attended an "INTERNATIONAL CONFERENCE: CHANGING SCENARIO OF PEST PROBLEMS IN AGRI-HORTI ECOSYSTEM AND THEIR MANAGEMENT, held at RCA, MPUAT, Udaipur during 27-29 November, 2014. During the conference he presented his research work entitled "Seed wasp, *Systole albipennis* walker (Eurytomidae: Hymenoptera) management in fennel" authored by Krishna Kant*, S.R. Meena R.S. Mehta and B.K. Mishra. This poster presentation was awarded with **first prize** by the Evaluation committee in the International Conference: Changing Scenario of Pest Problems in Agri-Horti Ecosystem and their Management, at RCA, MPUAT, Udaipur (Rajasthan).

Human Resource Development

Publications

➢R.K. Yadav, R.L. Meena and O.P. Aishwath (2013). Salinity tolerance of coriander, fennel and fenugreek seed spices under semi-arid conditions of northern India. Journal of Soil Salinity and Water Quality 5 (2):114-118

Symposia/seminars attended

▪Dr. Arvind Kumar Verma, Scientist attended 6th Indian Horticulture Congress from November, 6-9, 2014 at Coimbatore, Tamil Nadu. Presented paper on "Effect of different doses of gamma irradiation on seed germination, survivability and growth of cumin cv. Gujarat Cumin 4".

▪Dr. Ravindra Singh participated in International Conference held at Rajasthan College of Agriculture (RCA), Maharana Pratap University of Agriculture and Technology (MPUAT), Udaipur from 27th to 29th November, 2014 and presented a research paper in oral session.

Appointment/Superannuation

Name	Post	Date
Sh. Mukesh Kandari	Lower Division Clerk	28 Nov., 2014 (Newly Joined)
Sh. L.K. Sharma	Asstt. Admn. Officer	31 Dec., 2014 (Superannuation)

From the Director's Desk



Climate change has shown high impact on seed spice crops, more specifically on the two main seed spice crops *i.e.,* cumin and coriander. Area under cumin has decreased in the state of Gujarat in the present year because of high rainfall during the kharif season.

Coriander, is becoming a challenging crop day by day, the epidemic of stem gall in the previous year has resulted in a development of huge pathogenic population in the soil which may be volcanic if the climate become congenial during the flowering stages. The temperature fluctuation creating a difference in the day and night temperature is the most critical problem for the plant to establish properly in the very initial phase.

The coming year 2015 has been declared as Year of Soil. Soil health should be given due importance, a balanced nutrient availability is of utmost importance both for soil and plant. A systematic approach should be designed for the farmers to follow the recommended nutrient package for sustaining the soil health in totality. Soil borne problems are very much correlated with the nutrient availability and micro climate beneath the surface; hence a understanding of the subject in correlation with all biotic and abiotic factors should be simulated to understand the basis of plant growth in relation to soil health. Seed spices are highly sensitive crops with low initial vigour where soil atmosphere is very much important.

NRC on seed spices is heading with high pace for the betterment of seed spice growers. The team of the centre is dedicatedly working to develop new and robust technologies to make seed spices sustainable against the changing climatic scenario.

Mr. Kandari has joined as LDC in administration at our NRCSS family I congratulate him and SH. L.K. Sharma has retired from his duties in this centre so best of luck for his future life.

I wish that the contents of this document would be informative and usefuk to allconcerned persons of the farming community and researchers. Any suggestion for improvement of the content of E0newsletter would be highly appreciated.





Balraj Singh