BI-MONTHLY SEED SPICES E-Newsletter

ICAR-National Research Centre on Seed Spices

An ISO 9001:2008 Certified Institute

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CONTENTS

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

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Important Events

Celebration of Swachchhta Pakhwada (16-31 May, 2016)

In the context of Swachh Bharat Mission, ICAR-National Research Centre on Seed Spices, Tabiji, Ajmer (Rajasthan) has been celebrated 16 days long Swachhta Pakhwada at the centre under the leadership of Dr. Gopal Lal, Director (A) during 16-31 May, 2016.

The programme was inaugurated on 16.05.2016 at 11.00 AM in the Dr. R. S. Paroda Auditorium of the Centre. In the programme, Dr. N. K. Meena, Nodal Officer, welcomed all the staff and briefed the activities, for Swachchhta Pakhwada. Swachchhta Pledge was taken, in the programme, various activities like cleanliness drive at laboratories cum institute's building, a seminar on cleanliness and environment with guest lecture of Dr. C. B. Gena, Eminent Environmentalist & Ex-Vice Chancellor, MGS University, Bikaner. The scientists from, KVK, ARS, ATC, RSSC, Ajmer also participated in the seminar.

The other programme i.e., many cleanliness drives at inside as well as outside campus at main Beawar road, two cleanliness awareness programme at nearby villages at Dang and Saradhana, where nearly 65 and 50 farm women, children, farmers and people from line department were also participated in both the villages, respectively. Constructed scientifically designed pit at institute's farm, competition for kids of NRCSS staff and awarded prize to winners in various competitive events, face lifting &

Important Events

beautification of campus, advertising through pamphlets and other devices were also conducted on different dates and time during Swachchhta Pakhwada.

Valedictory function of 16 days long Swachhta Pakhwada was organized on 31.05.2016, at Committee Hall of the centre under the chairmanship of Dr. Gopal Lal, Director (Act.) with the participation of all employees. Nodal Officer, Swachhta Abhiyan welcomed and presented the proceeding of 16 days long programme through power point presentation. Dr. Lal appreciated the efforts made by team of Swachh Bharat Mission and each and every person to make this programme very much successful. He congratulate entire NRCSS family for successful celebration of Swachhta Pakhwada and declared Swachhta Pakhwada closed.





XVI (I) Institute Research Council (IRC)

The XVI (I) Institute Research Council (IRC) meeting of ICAR-NRCSS was held under the chairmanship of Dr. Gopal Lal, Director (Acting), 2nd June, 2016 to discuss and review action points as per the recommendation made by V-RAC (2nd meeting) held on 9-10 March, 2016. All Scientists and Technical Officers of the Centre attended the meeting. Dr Y. K. Sharma, I/C PME Cell presented the recommendations made by V-RAC (2nd meeting) and detailed discussions were held in the house for incorporating all the suggestions/recommendations made by RAC in the research programmes. The meeting ended with vote of thanks to the chair and members of IRC.

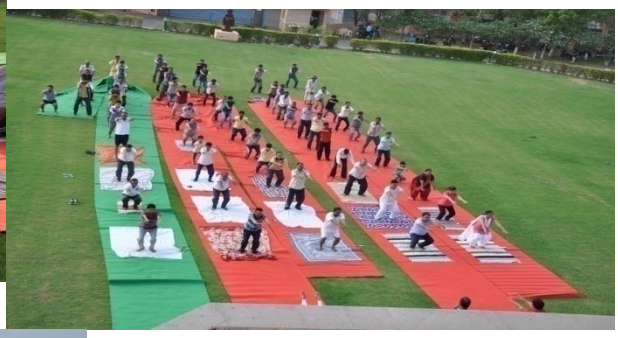
Important Events

NRCSS Celebrated International Yoga day

The function of International Yoga Day was celebrated on June 21, 2016 at the NRC Seed Spices wherein the Director (A) Dr. Gopal Lal led the show and the entire staff, researchers, workers and family members participated with full enthusiasm. The key program of the yoga day were:-

One day Training session (June 20, 2016) for rehearsing Common Yoga Protocol Mass Yoga in NRCSS Campus starting from 7.00 AM – 8.30 AM under the guidance of Yoga instructor and demonstrators form Vivekanand Kendra Kanyakumari Branch Ajmer. Celebrations took place for Mass Yoga (June 21, 2016) performance of Common Yoga Protocol by all NRCSS Staff members at 7.00 AM to 8.00 AM with their interested family members, researchers, students and institute workers in NRCSS Campus.

An on spot deliberation by Dr. Swantantra Kumar Sharma, an eminent scholar and Yoga Expert on the topic "Yoga for Harmony and Peace" immediately after Common Yoga Protocol Mass Yoga Performance. Few of the staff members and participants were having previous knowledge or regular practice of Yoga postures that had a synchronized impact on various Yoga formations.



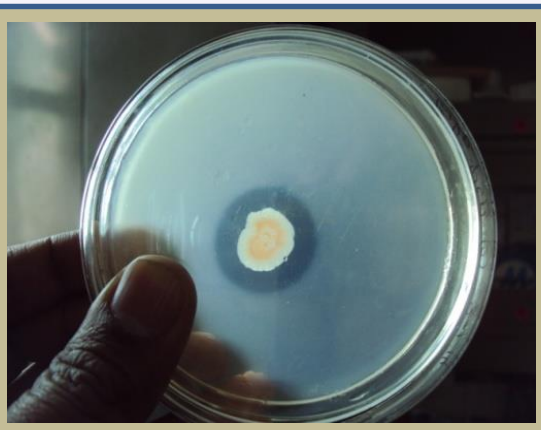
Research Highlights

Bacillus subtilis strain NRCSS-II : An Efficient Phosphate solubilizing native rhizobacteria isolated from Fennel rhizosphere

(Brijesh Kumar Mishra)

Microorganisms are an integral component of the soil Phosphorus (P) cycle and are important for the transfer of P between different pools of soil P. Phosphate Solubilzing Bacteria (PSB) through various mechanisms of solubilization and mineralization are able to convert inorganic and organic soil P respectively into the bio available form facilitating uptake by plant roots. These organisms are ubiquitous but vary in density and mineral phosphate solubilizing ability from soil to soil or from one production system to another. In soil, PSB constitute 1-50% and fungi 0.1-0.5% of the total respective population. They are generally isolated from rhizosphere and non-rhizosphere soils, rhizoplane, phyllosphere, and rock P deposit area soil and even from stressed soils using serial plate dilution method or by enrichment culture technique. When applied to seed or soil, bio-fertilizers increase the availability of nutrients and improve the yields by 10 to 25% without adversely affecting the soil and environment.

PSB were isolated from the saline soil of fennel (*Foeniculum vulgare* Mill.) cultivation fields under semi- arid climate of Rajasthan, India. These native PSB isolates were applied to study their influence on fennel seed yield and essential oil content. Significant effect of different PSB isolates on seed yield of fennel crop was recorded. The highest seed yield was recorded with PSB-36 (2148.66 kg ha^{-1}) which was at par with PSB-1 isolate. Though application of all the PSB isolates resulted into increased essential oil yield as compared to control, but PSB-36 resulted into enhanced seed yield and essential oil both. Based on similarity between their 16S rDNA gene sequence the identity of PSB-36 could be confirmed, and the closest species of the strain identified was *Bacillus subtilis*,. Thus, the isolates were named as *Bacillus subtilis* PSB-1/ NRCSS-I and *Bacillus subtilis* PSB-36/ NRCSS-II. The 16S ribosomal RNA gene sequences of PSB-1 and PSB-36 have been submitted to GenBank (NCBI) under the Accession numbers KU508624 and KU508626 respectively. These PSB strains confirm the efficiency requirement for strains used as the PSB strain as they have phosphate solubilizing capacity in the range of minimum 30%, when tested spectrophotometrically. In terms of zone formation, minimum 5mm solubilization zone in NBRIP media was observed after 3 days of incubation. Phosphate solubilization index of *Bacillus subtilis* strain NRCSS-II/PSB-36 was found to be 1.78±0.15.



MTCC

MICROBIAL TYPE CULTURE COLLECTION & GENE BANK

CSIR-INSTITUTE OF MICROBIAL TECHNOLOGY

Dr. P. Anil Kumar
SCIENTIST

Date: 07-01-2016

To,
Dr. B.K. Mishra
Senior Scientist (Microbiology)
ICAR- NATIONAL RESEARCH CENTRE ON SEED SPICES
Tabiji, Ajmer-305 206, Rajasthan (India)

Please find enclosed here with the 16S rRNA gene sequence identification report of the strain designated as NRCSS/Fen-PSB-36.

Strain Designation	Identity	Percentage similarity
NRCSS/Fen-PSB-36	*Bacillus subtilis*	100.0 %

A detailed list of result is annexed for your kind information.

Thank you for your interest in MTCC.

Scientist,
Microbial Type Culture Collection and Gene Bank,
Institute of Microbial Technology,
Chandigarh-160036, India.

Research Highlights

Application of botanical for sustainable management of aphids in Seed spice crops.

(N K Meena, G. Lal, K. Kant, S. N. Saxena, Sharda Choudhary and M. A. Khan)

Seed spice crops are facing severe problem of indiscriminate use of chemical pesticides which in-turn affects the consumable quality and high residue level in the produce and also cause harmful effects on natural enemies and predominant pollinators of the crops i.e., honeybees. Hence, the application of botanical extracts are highly advisable for the management of aphids sustainably. Some of locally available wild botanicals having pesticidal properties have been identified and used against aphids on coriander. The details of the findings are as under

a. Methodology developed for preparation of botanical extracts : Locally available two wild plants *viz*., *Kareel* (*Capparis decidua*) and thumba (*Citrullus colocynthis*), having insecticidal properties have been used as plant extract formulation in foliar sprays.

***Kareel* (*Capparis decidua*) plant extracts:**

Fresh *Kareel* (*Capparis decidua*) plant material (10 kg) was collected from the nearby farmer's field at Dang, Ajmer (Rajasthan). The samples were brought to the laboratory within 2 hrs. Plants were chopped into small pieces and then washed thoroughly with running water in order to get rid of dirt, insects and planktons. After that, took 1 kg *Kareel* pieces and added 200 ml distilled water and ground in an electric mixture to obtained plant extract. Then the extract was filtered through muslin cloth to obtained aqueous extract assuming 100% and preserved under 20 ^{0}C temperature in well cleaned laboratory glass bottles. The stocked *Kareel* extract @10ml/lit. was used for the management of aphid on coriander. under field conditions.

Thumba (*Citrullus colocynthis*) fruit extract:

Fresh Thumba (*Citrullus colocynthis*) fruits (10 kg) were collected from the farmer's field at Dhawa, Jaisalmer (Rajasthan). The fruit samples were brought to the institute's laboratory. Fruits were washed thoroughly with running water in order to get rid of dirt, insects and planktons. After that, pulp with seed was extracted with help of stainless steel knife and kept in a glass jar. Then after took 100 g thumba fruit pulp and added 30 ml distilled water and ground in an electric mixture to obtained fruit extract. Then the extract was filtered through muslin cloth to obtained aqueous extract assuming 100% and preserved under 20 ^{0}C temperature in well cleaned laboratory glass bottles. The stocked Thumba fruit extract @10ml/lit. was used for the management of aphid on coriander under field conditions.

b. Management Technique for Aphid on Coriander through Botanicals:

Developed pest management technique for aphid's (*Hyadaphis coriandri*, *Myzus persicae* and *Aphis craccivora*) mixed population on coriander (*Coriandrum sativum* L.) using plant extracts. The two years eperimental results showed that, three foliar sprays of *Kareel* (*Capparis decidua*) plant extract @10ml/lit., and thumba (*Citrullus colocynthis*) fruit extract @ 10 ml/lit., at 10 days intervals were given good management of aphids (67 and 62% reduction) on coriander under field conditions and also increased yield significantly over control. Both plant extracts under given doses were non-phytotoxic to the crop plants and non-toxic to honeybees and natural enemies. This pest management technique was also given to the farmers of tribal region of Dungarpur, Banswara and Pratapgarh districts of Rajasthan through trainings, demonstrations and field days.

Research Highlights

Impact of front line demonstrations (FLDs) on yield enhancement of coriander: A case study in TSP area of Pratapgarh

(G. Lal, R. S. Mehta, R. S. Meena, N. K. Meena and M.L. Choudhary*)

Coriander (*Coriandrum sativum* L.) is a major seed spices crop, grown all over the country. In India it is cultivated in 5.47 Lakh hectare area, produces 5.27 lakh tonnes coriander seeds. India alone exports 37100 tonnes of coriander of Rs.210.7 crores annually. Rajasthan is the leading state of country, both in area and production of coriander. In tribal areas of Rajasthan particularly Pratapgarh, clay soil with high carbon contents, good quality water and other weather parameters are congenial for higher coriander production. However, the farmers of this region are still growing local cultivars/varieties and using broadcasting method of sowing and other practices. Conventional method of coriander production in tribal area of Pratapgarh district of Rajasthan is responsible for poor yield and low return which compelled them to adopt cereal and pulses dominated cropping pattern.

In order to enhance yield and productivity of coriander in tribal area, ICAR-National Research Centre on Seed Spices, Tabiji, Ajmer initiated various extension programme in the year 2013 for dissemination of improved production of seed spices to diversify existing cropping pattern. Therefore, 35 front line demonstrations (FLD) of coriander were laid on farmer's field in three different village of Arnod block in Pratapgarh during *Rabi* season of the year 2013-14, 2014-15 and 2015-16. The area under each demonstration was 0.25 ha. Inputs like seeds of coriander, variety ACr-1, fertilizers, pesticides etc., were given for raising successful crop of coriander. The crop was raised with the adoption of recommended package of practices. The follow-up programmes were organised during crop growing period and other farmers were advised to see the performance of the improved technologies in their vicinity. All the demonstrations were monitored by the scientists of NRCSS, Ajmer and KVK, Pratapgarh for enhancing coriander production.

The yield and economics of FLDs and local check is presented in table 1, which reveals that the yield of coriander under FLDs was found higher over local checks during all the years (2013-14 to 2015-16). The coriander yield in demonstrations was recorded 19.26, 20.11 and 14.10 q/ha in the year 2013-14, 2014-15 and 2015-16, which was19.92, 20.64 and 38.23 per cent higher, respectively over local check. Mean yield of all the FLDs during three year was recorded 17.82 q/ha which was 26.26 per cent higher over farmer practices (local check). In front line demonstrations on coriander mean net return (Rs. 60950/- per ha) and benefit cost ratio of (2.87) was recorded which was 35.00 percent higher over local check. The yield enhancement of crop was due to improved technological interventions applied in FLDs. The cumulative effect of technological intervention for increasing yield over three year is on account of adoption of line sowing technique, optimum nutrient management, weeding before critical stage and plant protection measures for insect-pests and disease management. The year to year variations in cost of cultivation and yield were occurred due to the fluctuations in prevailing social, economical and other ecological conditions of that particular region.

Thus, based on three year study, it is inferred that adoption of improved production technology of coriander in FLD's is highly beneficial for realising higher yield, net return and BCR (2.87) which is very helpful for diversification of existing cropping system of tribal area of Pratapgarh resulting enhancement in economic standard of tribal farmers.

*** SMS (Horticulture), KVK, Pratapgarh (Rajasthan)**

Continue…

Research Highlights

Continue….

Table 1. Yield and economics of front line demonstrations of coriander variety ACr-1 at tribal area of Pratapgarh (Rajasthan).

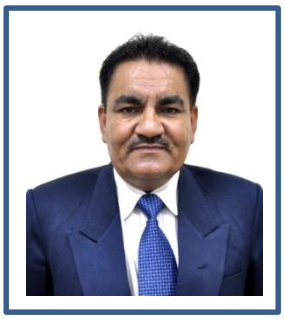
Year	No. of FLDs	Area in each FLD	Yield (q/ha)		Percent increase over local practices	Gross expenditure		Gross return		Net return		B:C ratio	
			LC	FLD		LC	FLD	LC	FLD	LC	FLD	LC	FLD
2013-14	05	0.25	16.06	19.26	19.92	29673	31483	72270	86670	43897	55187	2.43	2.75
2014-15	10	0.25	16.67	20.11	20.64	32190	34524	88351	106583	56161	70059	2.74	3.09
2015-16	20	0.25	10.20	14.10	38.23	32945	35596	71400	98700	34904	57604	2.16	2.77
Average			**14.31**	**17.82**	**26.26**	**31603**	**33868**	**77340**	**97318**	**44987**	**60950**	**2.44**	**2.87**

Human Resource Development

Winter School/Symposia/seminars/conferences/workshop attended

1. Dr. G. Lal, Director(A) delivered a lecture on "Usable technologies of seed spices for Rajasthan and Gujarat" and participated in Annual Zonal Workshop of ATARI, Zone VI, Jodhpur at AAU, Anand, Gujarat on 1st May, 2016.
2. Dr. G. Lal, Director(A) attended workshop on "Take it to Breeders and Researchers-The Plant Breeders & Researchers Rights through Awareness and Streamlining of Farmer's Varieties" at PPVFRA, New Delhi on 29th June, 2016.

From the Director's Desk



The aroma of Zeera, *Dhania, Sowa and Saunf* is strongly felt in the month of May & June when seed spice crops are under processing. Such fragrance of seed spices indicate the activities and research carrying out at the centre. All these activities are mechanized at the centre in order to ensure clean production of spices.

In order to provide effective and efficient management of the centre, regular meetings of the Institute Monitoring and Coordination Committee (IMCC) are held every month's end. Timely assessments of staff are important to uphold the moral of the people.

Along with conducting basic, strategic and applied research, Swachhta Pakhwada was celebrated on May 16-31, 2016 and many events i.e. cleanliness drives, at inside as well as outside campus at main Beawar road, two cleanliness awareness programme at nearby villages at Dang and Saradhana, children, farmers and people from line department were also participated in both the villages, respectively. Prepared and constructed scientifically designed compost pit at institute's farm.

The XVI (I) Institute Research Council (IRC) meeting of ICAR-NRCSS was held to discuss and recommend action points as per the recommendation made by V-RAC (2nd meeting). The function of International Yoga Day Celebrated on June 21, 2016 at the main campus. The research highlights were also given by the scientists of the centre after rigorous work in their respective projects that will be fruitful for the farmers and researchers.

I hope that the contents of this news letter would be informative and useful to all stakeholders of seed spices. Any suggestions for improving the content of the Bi-monthly E-newsletter will be highly appreciated.

(Gopal Lal)