



Indo-Tunisia mini-symposium proceedings

4th Indo-Tunisia Mini Symposium on Microbial Solutions for Sustainable Agriculture

**May 19th, 2022 Amity Food and Agriculture Foundation
Amity University Uttar Pradesh, Noida**

Dr. Nutan Kaushik & Dr. Naceur DJEBALI



Indo-Tunisia mini-symposium proceedings

4th Indo-Tunisia Mini Symposium on Microbial Solutions for Sustainable Agriculture

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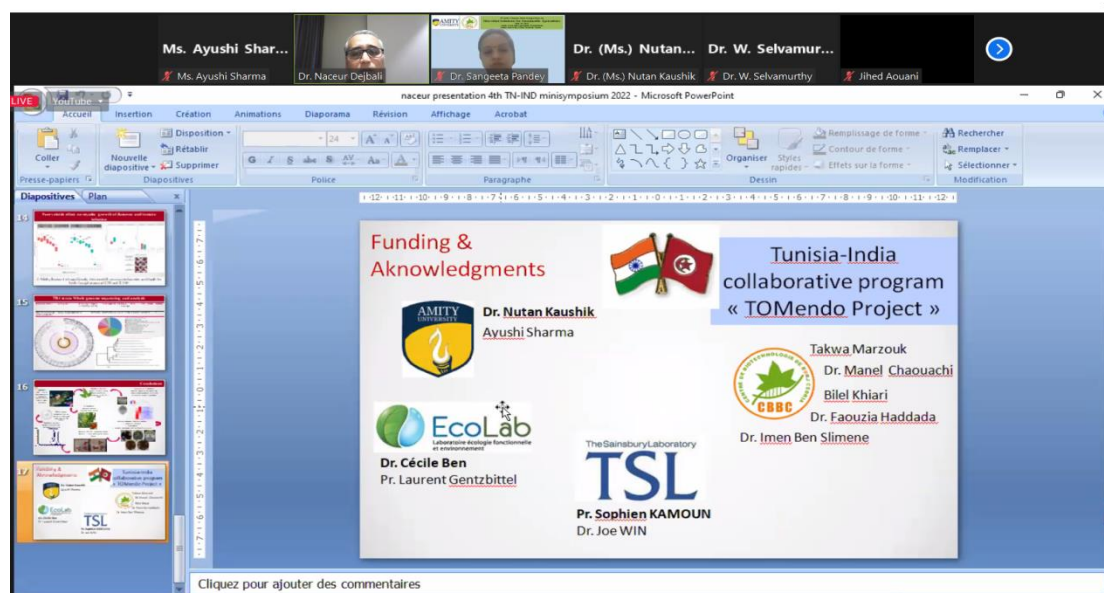
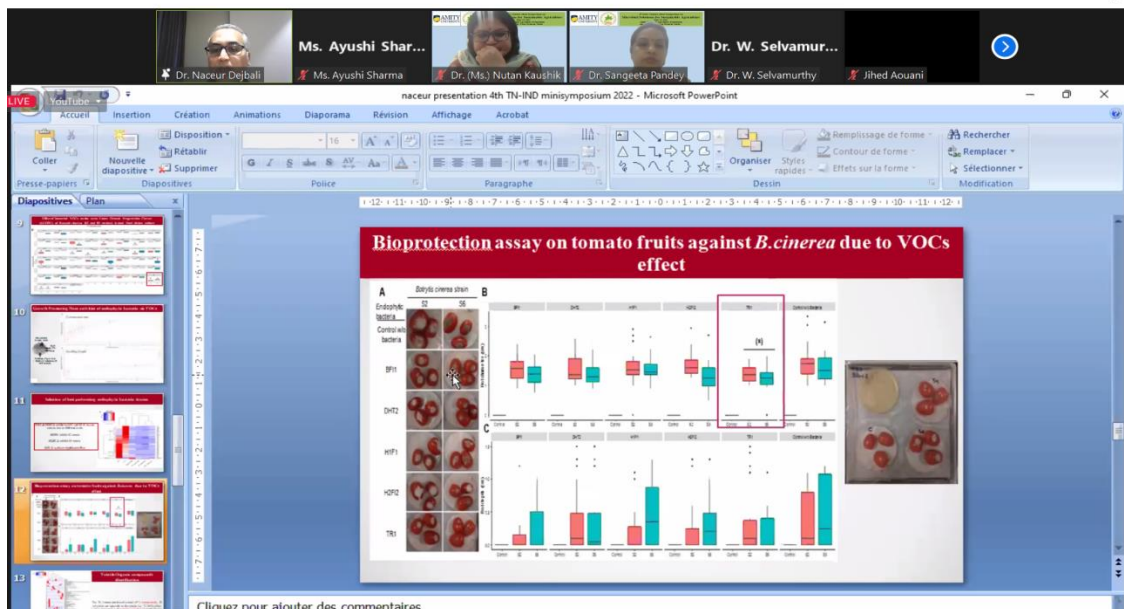
1. Opening remarks given by Dr. Sangeeta Pandey.
2. Dr. Nutan Kaushik welcomed all the panellists and attendees. She gave a brief presentation about the achievement of Indo-Tunisia projects. She talked about all the activities and objectives of this international collaboration project “TOMendo” between India and Tunisia on **Diversity of Tomato Seed-Borne Endophytes and Their Application for the Promotion of Plant Growth and Defenses against Pathogen**. This is the 4th Mini-symposium under this project. Earlier, 2 mini-symposiums were organized in Tunisia and 1 in India at AUUP.
3. Dr. W. Selvamurthy welcomed everyone and the Tunisian guest (Dr. Naceur DJEBALI). He congratulated the team for the success of the project. Dr. W. Selvamurthy also mentioned the Atma Nirbhar Bharat and he praised the team for the outcome of the project in the field of agriculture. He talked about the Founder sir’s mission “Connect and Synergy” and mentioned the benefits of microbial technology.



Oral presentations:

1. Presentation by Dr. Naceur Djebali,

- He highlighted the importance of endophytes in the field of agriculture for enhancing the plant health and growth.
- He gave the highlights about the volatile organic compounds as promising bioactive substances for plant disease management.
- He showed the experimental work performed for the bio-protection assay on tomato fruits against the phytopathogens *Botrytis cinerea*.
- He talked about the benefits of endophytes in controlling post-harvest diseases.





2. Presentation by **Dr. K Annapurna, Professor Emeritus, IARI, New Delhi** on Microbial solution for managing agri-residue-PUSA DECOMPOSER.



- She talked about the rice cultivation in India and the monitoring of the paddy residue burning by satellites.
- She mentioned about the “Pusa decomposer” which is an *in-situ* and *ex-situ* management of agri-residue to convert the crop residue to compost in 25 days.
- She also highlighted the SOPs of the application of Pusa decomposer also its impact on soil health, such as, it can improve the soil Dehydrogenase activity and soil organic carbon and nitrogen.
- She talked about the paddy straw residues management through *in-situ* microbial decomposition with mechanical interventions.



Zoom Webinar

Ms. Ayushi Shar...
Ms. Ayushi Sharma | Dr. (Ms.) Nutan Kaushik | Dr. K. Annapurna | Dr. Nareur Dejjali | Dr. Sangeta Pandey | Dr. KRK Reddy





Recording LIVE YouTube

 **SOPs** 

❖ Can be applied *in-situ* to 1.0 ha of combine fitted with SMS harvested rice field having 5-6 tonnes of paddy straw

❖ Accelerates process of paddy straw decomposition and field ready for potato, peas and wheat sowing in 20-25 days following conventional tilling (CT) practices

❖ Solution for management of paddy straw in conjunction with CT, Happy Seeder and Super Seeder options.

 →  →  → 

Spraying Rotavator Irrigation Sowing of wheat

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3. Presentation by **Dr. Ajit Varma**, Group Dy. Vice Chancellor, AUUP on Nano-Mycorrhiza.

Zoom Webinar

Ms. Ayushi Shar...
Ms. Ayushi Sharma | Dr. (Ms.) Nutan Kaushik | Dr. K. Annapurna | Dr. Sangeta Pandey | Dr. KRK Reddy | Dr. Ajit Varma

Recording LIVE YouTube

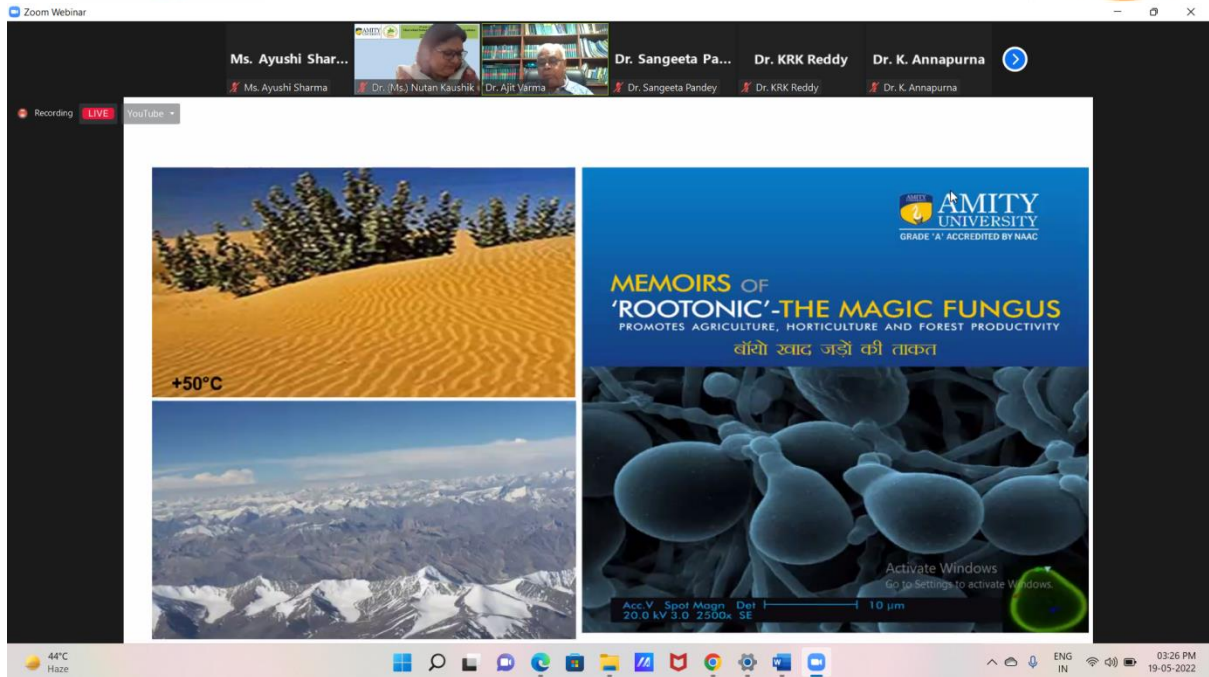
**Nano-Mycorrhiza:
Second Generation of Research**

Prof. Dr. Ajit Varma
Group Dy. Vice Chancellor
Distinguished Scientist & Professor of Eminence
Amity Institute of Microbial Technology
Vice President
Amity Science, Technology & Innovation Foundation
Amity University Uttar Pradesh
E-mail: ajitvarma@amity.edu

Activate Windows
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44°C Haze ENG IN 03:25 PM 19-05-2022

- He highlighted about the Rootonic-The magic fungus and the experiment conducted with it at DRDO, Leh-Ladakh.

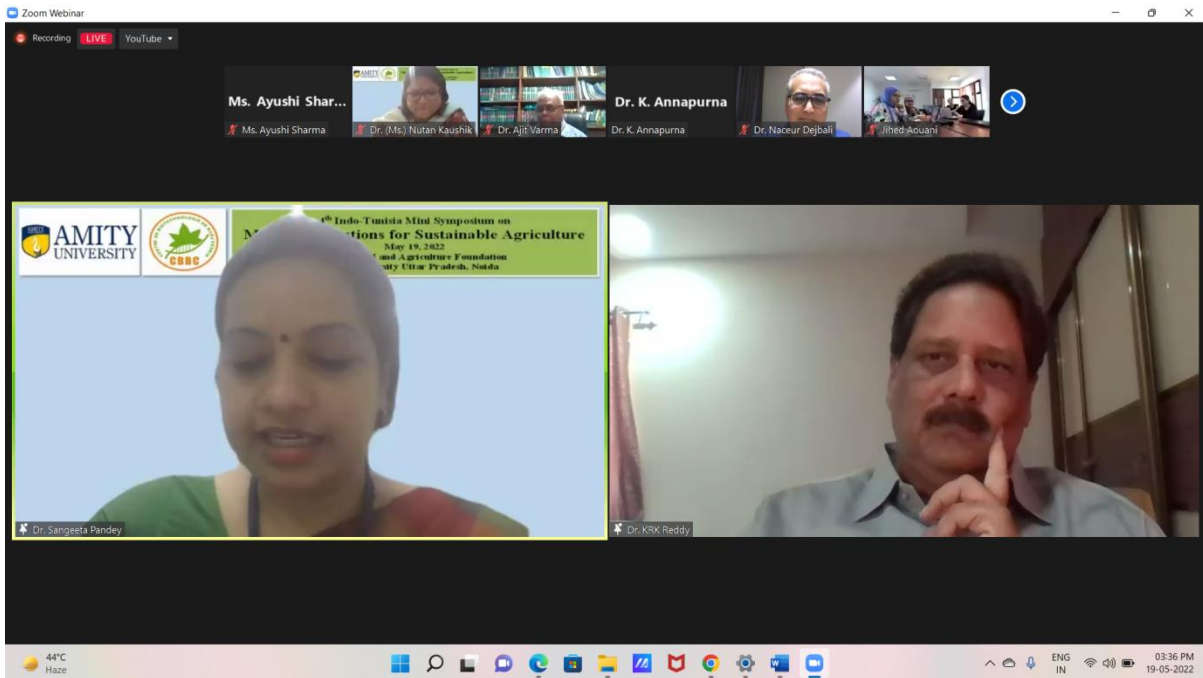


He gave the “carry home message” about the use of *Piriformospora indica*, that its colonies and biological activities get enlarged in the presence of ZnO which further enhance the growth of plants.





4. Presentation by **Dr. KRK Reddy**, Managing Director, Sri BioAesthetics Pvt.Ltd on Microbiome: The future of food and agriculture.





- He highlighted some major environmental problems associated with agriculture, such as, soil erosion, sediment transport and deposition downstream which create a negative impact on food quality and human health.
- He also talked about soil-plant-human microbiome interactions.
- He mentioned, the harnessing microbial technologies can be a paradigm shift in sustainable agriculture.
- He highlighted the benefits of engineering microbes to improve their positive interaction with plants.

The screenshot shows a Zoom webinar interface with a presentation slide titled "MICROBIOME ACTIONS AND INTERACTIONS". The slide is divided into three columns: Direct actions, Indirect actions, and Interactions. The Direct actions column includes Nitrogen fixation, P/K solubilization mineralization, phytohormones, Siderophore Production, and ACC Deaminase Production. The Indirect actions column includes Antibiotic production, Hydrolytic enzymes, Anti Fungal Compounds, ISR (JA, SA, Ethylene Production), and Biocontrol Activity Competitive Inhibition. The Interactions column includes Antagonism, Mineral Nutrition, Stress Tolerance Compounds, Phytohormones, and Stress Tolerant Gene Expressions. The presentation is recorded and live, with a YouTube icon visible. The SRIBIO logo is in the bottom right corner of the slide. The Zoom interface shows several participants in the top bar and a Windows taskbar at the bottom.

Direct actions	Indirect actions	Interactions
Nitrogen fixation	Antibiotic production	Antagonism
P/K solubilization mineralization	Hydrolytic enzymes	Mineral Nutrition
phytohormones	Anti Fungal Compounds	Stress Tolerance Compounds
Siderophore Production	ISR (JA, SA, Ethylene Production)	Phytohormones
ACC Deaminase Production	Biocontrol Activity Competitive Inhibition	Stress Tolerant Gene Expressions

5. Presentation by **Dr. Charu Gupta**, Associate Professor, AIHRS, AUUP on Microbial solutions for sustainable health.



Zoom Webinar

Recording LIVE YouTube

Dr. Charu Gupta Ms. Ayushi Sharma Ms. Khusboo Dr. Sangeeta Pa... Dr. KRK Reddy Dr. (Ms.) Nutan...

AMITY UNIVERSITY

Microbial Solutions for Sustainable Health

Dr. Charu Gupta,
Professor
Amity Institute of Herbal Research & Studies,
Amity University UP, Noida, INDIA

43°C Haze ENG IN 04:03 PM 19-05-2022

- She mentioned about the advantages of the sustainable microbial and herbal products for preventing food or medicine for health care, to treat or manage specific nutritional deficiency disease.
- She talked about some of the examples of functional components, such as, fatty acid (milk and meat).
- She talked about single cell protein and its benefits as food supplement.

Zoom Webinar

Recording LIVE YouTube

Ms. Ayushi Shar... Dr. Charu Gupta Ms. Khusboo Dr. (Ms.) Nutan Kaushik Dr. Sangeeta Pandey Dr. Nazeer Dejbali

Microbes as Protein source (SCP)

BACTERIA :

- ✓ *Brevibacterium*,
- ✓ *Methylophilus methylitropous*,
- ✓ *Acromobacter delvaeate*,
- ✓ *Acinetobacter calcoaenticus*,
- ✓ *Aeromonas hydrophilla*,
- ✓ *Bacillus megaterium*,
- ✓ *Bacillus subtilis*,

FUNGI:

- ✓ *Chaetomium celluloliticum*,
- ✓ *Fusarium graminearum*,
- ✓ *Aspergillus fumigatus*,
- ✓ *A. niger*,
- ✓ *A. oryzae*,
- ✓ *Cephalosporium cichhorniae*,
- ✓ *Penicillium cyclopium*,
- ✓ *Rhizopus chinensis*,
- ✓ *Scytalidium aciduphium*,
- ✓ *Trichoderma viridae*,
- ✓ *T. alba*,
- ✓ *Paecilomyces varioti*

ALGAE:

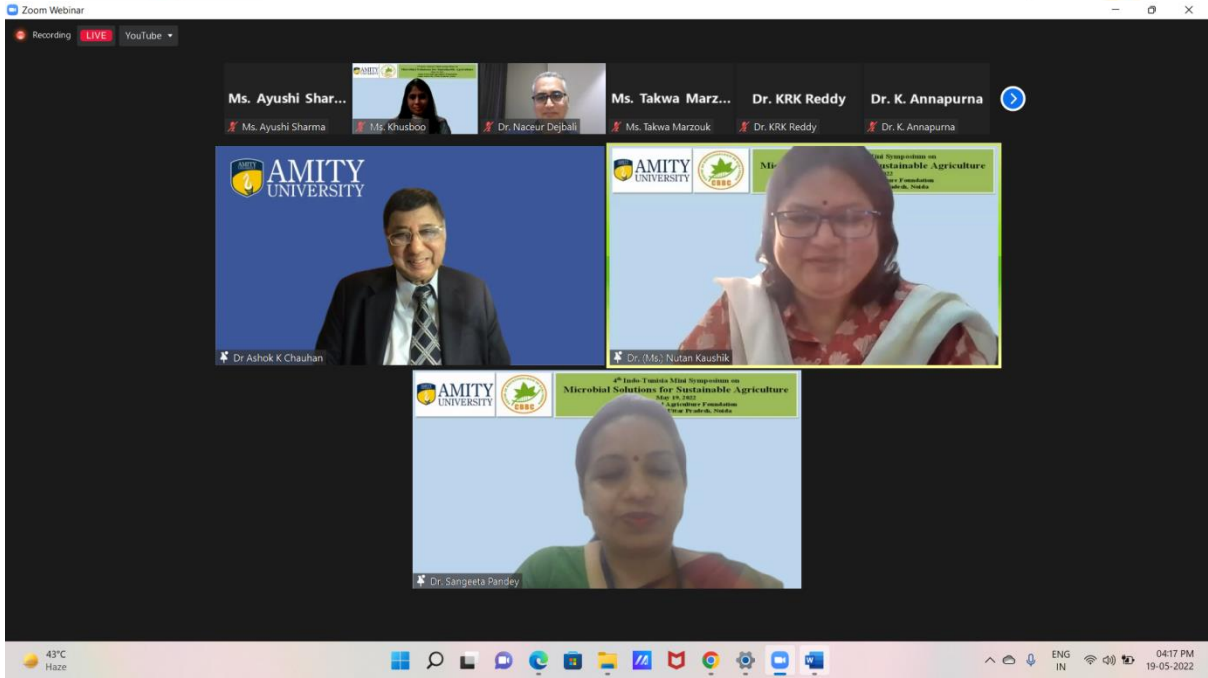
- ✓ *Spirulina maxima*
- ✓ *Chlorella pyrenoidosa*,
- ✓ *C. sorokiana*,
- ✓ *Chondrus crispus*,
- ✓ *Scenedesmus acutus*,
- ✓ *Porphyrium sp.* and others

YEAST:

- ✓ *Candida utilis* (Torula yeast),
- ✓ *C. lipolytica*,
- ✓ *C. tropicalis*,
- ✓ *C. novellas*,
- ✓ *C. intermedia* and
- ✓ *Saccharomyces cerevisiae*

43°C Haze ENG IN 04:12 PM 19-05-2022

- She mentioned that, microbes can be a potential tool for production of variety of nutraceuticals.





6. Way Ahead by Honorable Founder President, **Dr. Ashok K. Chauhan**

- He talked about his mission connect of bringing brilliant brain together.
- He also congratulated the project team for its success.
- He offered a Honorary Professor to Dr. Naceur.

7. Presentation by **Dr. Nutan Kaushik**, DG, Amity Food and Agriculture Foundation, AUUP



- She talked about the research conducted by her on endophytes and its outcomes.
- The isolation of potential bacterial endophyte and its benefits on tomato plants.
- She talked about the formulation technology developed using the most active bacterial endophyte and its biocontrol activity against *R. solani*.

Zoom Webinar

Ms. Ayushi Shar...

Recording LIVE

5 Fungi Selected for Mass Multiplication and Further Investigation

	Cultures	Activity targeted by
1	<i>Fusarium sp.</i> (Endo 1)	<i>Rhizoctonia solani</i> and <i>Sclerotinia sclerotiorum</i>
2	<i>Trichoderma sp.</i> (Endo 2)	Aphid Activity (<i>Myzus</i> and <i>R padi</i>)
3	<i>Penicillium sp.</i> (Endo 3)	<i>B. cinerea</i>
4	<i>Fusarium solani</i> (Endo 4)	<i>F. oxysporum</i>
5	<i>Aspergillus sp.</i> Endo 5)	<i>Spodoptera litura</i>

4°C Haze

Zoom Webinar

Ms. Ayushi Shar...

Recording LIVE

Novelty or USP: Not only a bio-fungicide but also a bio-stimulant

Treatments	Measure of physical parameters per plant				
	Plant height (cm)	No. of buds	No. of flowers	No. of fruits (70 DAP)	Fruit yield (g)
T1: Surface-sterilized seeds only (control)	20.09 ± 2.74d	4.60 ± 1.22d-c	11.35 ± 1.57b-c	5.56 ± 3.43b-c	500.62 ± 71.25b-c
T2: Surface-sterilized seeds + fungal pathogen	20.93 ± 3.43d	1.06 ± 0.34d	8.19 ± 1.65c	4.78 ± 3.43c	430.31 ± 90.55c
T3: Bio-primed seeds only (for growth promoting activity)	46.94 ± 1.99a,b	3.38 ± 0.49b-d	15.81 ± 2.25b	7.90 ± 3.43b	771.56 ± 107.39b
T4: Bio-primed seeds + fungal pathogen	51.00 ± 1.90a	7.09 ± 0.96a	23.44 ± 2.73a	11.72 ± 3.43a	1054.69 ± 123.03a
T5: Bio-primed seeds + fungal pathogen + soil treatment of the bacterial strain (N075)	42.28 ± 1.54d	4.63 ± 1.03d-c	16.03 ± 1.86b	8.48 ± 3.43b	762.19 ± 93.73b
T6: Chemical treated seeds (Bavistin)	23.75 ± 3.41c	5.50 ± 1.09a,b	9.06 ± 1.45d	4.53 ± 3.43c	407.81 ± 85.40c
T7: Chemical-treated + fungal pathogen (chemical control)	18.99	4.26	6.87	7.42	7.42

Values are mean of 10 replications ± SE. Means followed by a common letter are not significantly different at 5% level by DMRT. Whereas, "a" signifies highest value followed by "b" > "c" > "d" DAP: Days after planting.

Plant growth increased by 58%
flowers increased by 62%
Yield doubled

4°C Haze

Zoom Webinar

Ms. Ayushi Shar...

Recording LIVE

4°C Haze



Poster session:

S.No.	Name	Organisation	Country	Title	Mail
1	Ms. Ayushi Sharma	AFAF	India	Development of Oil-in-Water Based Liquid Formulation of <i>Bacillus siamensis</i> NKIT9 for Bio-control of Damping-Off on Tomato	asharma31@amity.edu
2	Mr. Bilel Khiari	CBBC	Tunisia	Antifungal activity of potato endophytic bacteria.	kiaribilel@yahoo.com
3	Dr. Imen Ben Slimene	CBBC	Tunisia	<i>In vitro</i> and <i>in vivo</i> study of the antifungal efficacy of individual and consortium <i>Bacillus</i> strains in the treatment of black scurf of potatoes, and possible development of spore-based fungicides	ibenslimen@yahoo.fr
4	Ms. Marwa Batnini	CBBC	Tunisia	Leguminous-associated Plant Growth-Promoting Bacteria inoculation alleviates the effect of <i>Verticillium dahliae</i> on potato crop under drought stress	batnini_marwa157@outlook.com
5	Jihed Aouani	CBBC	Tunisia	Screening of antifungal activity of essential oil of some Tunisian aromatic and medicinal plants.	jihedaouini30@gmail.com
6	Faouzia Haddada	CBBC	Tunisia	Broad spectrum antagonistic activity of <i>Bacillus</i> sp.Tg-11 strain against <i>Erwinia amylovora</i> and <i>Botrytis cinerea</i> pathogens	Faouzia.HADDADA@cbbc.rnrt.tn haddadafaouzia@yahoo.fr
7	Ms Takwa Marzouk	CBBC	Tunisia	Biocontrol of <i>Rhizoctonia solani</i> using lipopeptides of <i>Bacillus velezensis</i> <i>SMLR1</i> .	ingtakwa@gmail.com
8	Ms Shikha Gupta	AIOA	India	Bioprospecting of endophytes in <i>Moringa oleifera</i> for plant growth promotion and biological control against <i>Xanthomonas</i> leaf spot in tomato	gshikha04@gmail.com shikha.gupta7@s.amity.edu
9	Ms Kotra Vashista	AIOA	India	Coactive role of Bio-char, ZSB and Cellulose degrading PGPR's in differentially regulating ZnO-NPs and Ag-NP induced toxicity for mitigation in plants.	kotra.vashista@s.amity.edu