

Report
on
Biotech Innovation Ignition School (BIIS-4)
SRISTI- BIRAC Initiative
at
Ahmedabad
on
November 13-December 3, 2019

Biotech Innovation Ignition School (BIIS)-4
Ahmedabad, November 13- December 3, 2019

Inauguration Schedule

The inaugural session was held on November 13 at Grambharti, Gandhinagar. Kindly find below the schedule for Inaugural day and a couple of following days.

SITARE BIIS (Biotech Innovation Ignition School) <i>November 13th - December 3rd, 2019</i> <i>Venue- Grambharti</i>	
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November 13, 2019	
9:30-10:00	Breakfast
10:00-10:15	Overview about SITARE BIIS, goal and purpose for BIIS workshop and SRISTI lab by Dr. Megha Barot .
10:15-10:50	Introduction session by Mr. Ramesh Patel , Secretary, SRISTI
10:50-11:05	Dr. Vipin Kumar , Director, National Innovation Foundation, Grambharti
11:05-11:25	Dr. A. N. Bhadalkar , Joint Director (BD) ,GSBTM, DST, Govt. of Gujarat
11:25-11:45	Dr. Mamta Shah , LM College of Pharmacy, Ahmedabad, India

11:45- 12:00	Mr. Arjun Goyal , CEO, SRISTI Innovations
12:00-12.05	Vote of thanks by Dr. Shyam Sunder Reddy
12.05-1.00	Lunch
1.00-2:00	Introduction of the BIIS participants
2:00-3:00	Overview about Honey Bee Network, Journey of SRISTI and Grassroots Innovations by Mr. Chetan Patel, SRISTI
3:00-3:30	Dr. Ravi Kumar , NIF
3:30-4:30	Practices discussion with students by Dr. Nirmal S Sahay , Advisor-SRISTI, Bilodara, Mansa, Gandhinagar
4:30-4:50	Tea break
4:50-5:25	Open discussion with students by Mr. Ramesh Patel , Secretary, SRISTI Interaction with SRISTI Lab Team
5:25-5:30	Vote of thanks by Dr. Shahila Parween

November 14, 2019	
9:30-10:00	Breakfast
10:00-10:30	Dr. Arvind Pathak , Ex. Vice Chancellor, Agriculture University, Navsari and Junagadh, Gujarat
10:30-11:00	Dr. Minoo Parabia , Botanist, Retired Professor

11:00-11:30	Dr. Sameer Patel , Veterinary Doctor, Sabar Dairy, Himatnagar
11:30-12:00	Question- Answer
12:00-1:00	Lunch
1:00-1:30	Students Interaction with Dr. Minoo Parabia , Botanist, Retired Professor
1:30- 2:00	Lab visit
2.00-4.00	Instruments demonstration (HPTLC and HPLC)
4:00-4:20	Tea break
4:20-6:00	Instruments demonstration (ELISA, Centrifuge, Gel Electrophoresis, AAS)
6:00-7:00	Instruments demonstration (AAS, Soxhlet Unit, Vacuum Evaporators)

Work schedule and lectures

The students had pursued their experimental work at SRISTI Sanshodhan Natural products lab. The names and the title of projects assigned:

NO.	NAME	TITLE
1	FATIMAH JAN	USE OF JATROPA ROOT, BUTEA MONOSPERMA, TEA LEAF (ECHINOCHLOA FRUMENTACEA) TO CURE DIARRHEA IN CATTLE
2	BHAKTI SHETH	MIXTURE OF BAJRA FLOUR , SOUR BUTTERMILK AND DETERGENT AS A BIOPESTICIDE AGAINST CATERPILLAR
3	MOHAMMAD ASIF SHEIKH	EVALUATION OF INSECTICIDAL EFFECT OF SEEDS OF AZADIRCHATA INDICA, PONGAMIA PINNATA AND ZIZYPHUS OENOPHLEBA AGAINST ECTOPARASITIC INFESTATION
4	ADITYA PATHAK	CALOTROPIS PROCERA AS THE ANTI- YELLOWING OF LEAVES AGENT

5	ISHANI MAHAJAN	AQUEOUS BOILED EXTRACT OF ADHATODA VASICA, DATURA STRAMONIUM, PONGAMIA PINNATA, NEEM AS BIOPESTICIDE FOR BLACK APHIDS.
6	SAUMYA KUMARI	EFFECT OF BOILED EXTRACTS OF AZADIRACHTA INDICA, CAPSICUM ANNUUM (CHILI POWDER), ANNONA SQUAMOSA ON APHID
7	NITISH KUMAR	MIXTURE OF BAJRA FLOURE AND AQUEOUS CASTOR LEAVES EXTRACT ACT AS A BIOPESTICIDES FOR PLANT PATHOGENIC FUNGI.
8	PRAGATI SINGHAL	DEVELOPMENT OF LOW COST, ANTIMICROBIAL, NUTRITION PROVIDING MATS FOR FARMERS MADE OUT OF ORGANIC WASTE, CELLULOSE FIBERS, EARTHEN CLAY AND COW DUNG
9	PRATIKSHA PUNDIR	EFFECT OF AZADIRACHTA INDICA FERMENTED IN COW URINE ON APHIDS
10	FASNA MUSTHAFA	STUDY OF BIOACTIVE COMPOUND AND THERAPEUTIC POTENTIAL OF PSORALEA CORYLIFOLIA FOR CURING ECTOPARASITES ON CATTLES
11	GOPIKA P.	USE OF FERULA ASAFOEDITA, CINNAMOMUM CAMPHORA, MUSA PARADISIACA AND SUCROSE FOR CURING MASTITIS
12	ABHINAV TYAGI	DEVELOPMENT OF HERBAL FORMULATION USING URGINEA INDICA (JUNGLI PYAZ) AND PONGAMIA PINNATA BARK TO KILL ECTOPARASITES (TICKS) IN CATTLE.
13	MEGHANATH SOMAROWTHU	MIXTURE OF ANNONA SQUAMOSA, FEROLA ASAFETIDA, PENNISETUM, TYPHOIDES (BAJRA FLOUR), COW URINE AS THE ANTI LEAF CURL AGENT
14	V. SIVA PRASAD	ALL IN ONE BIOPESTICIDE AND A WELLBEING AGENT
15	J.CHIRSTINA MAGDALIN	ANTITERMITE EFFICACY OF PONGIMA PINNATA, MADHUCA LONGIFOLIA AND AZADIRACHTA INDICA FOR THE CONTROL OF WHITE TERMITE IN PEGION PEA PLANT
16	D. ANUSHALI	DEVLOPMENT OF AN ANTITERMITE FORMULATION FOR PIGEON PEA PLANT
17	FARHANAZ	EVALUATION OF BIOPESTICIDE ACTIVITY OF AQUEOUS EXTRACT OF LEAVES OF JATROPHA CURCAS
18	POOJA VERMA	DEVELOPMENT OF HERBAL FORMULATION TO CURE MASTITIS USING MUSA PARADISIACA, CINNAMOMUM CAMPHORA, CITRUS LEMON, AZADIRACHTA INDICA, CURCUMA LONGA AND RICINUS COMMUNIS
19	ASUTOSH KUMAER SINGH	EFFET OF BOILD AQUOES EXTRACTOF ANNONASQUAMOSA ,ADHATODA VASICA ON CAERPILLAR
20	SNEHIL JAISWAL	EFFECT OF AZADIRACHTA INDICA AQUEOUS EXTRACT AND GOAT MILK
21	PRACHI SHARMA	ALLIUM SATIVUM,CAPSICUM ANNUUM,AZADIRACHTA INDICA AND DETERGENT AS A BIOPESTICIDE ON CATERPILLAR
22	PARVATHI JAYARAJ	ALOE BARBADENSIS AQUEOUS EXTRACT AS THE GROWTH PROMOTER
23	KAISER SYED	AN EVALUATION OF INNOVATORS FORMULATION FOR SWELLING OF UDDER IN ANIMAL USING CURCUMA LONGA (TURMERIC) AND AZADIRACHTA INDICA (NEEM)

24	JUNAID RIYAZ FAZILI	DEVELOPMENT OF HERBAL OINTMENT FORMULATION USING A LOT VERA, TURMERIC TUBERS AND TECOMELLA UNDULATA TO CURE UDDER INFLAMMATION
25	DIKSHA SHARMA	MIXTURE OF BAJRA FLOR AND LEMON JUICE AS A CATERPILLAR BIOPESTICIDE
26	ABHINA K.	DEVELOPMENT OF HERBAL MIXTURE FROM BARK OF BUTEA MONOSPERMA, ACACIA CATECHU, MADHUCA INDICA TO CURE DIARRHOEA IN CATTLE
27	RAMEEZ MOHAMMAD DAR	PREPARATION OF NOVEL AND EFFECTIVE FORMULATION (PENNISETUM TYPHOIDES, COMMON SALT AND CURCUMA LONGA) FOR EARLY CURING OF MASTITIS
28	DEEPIKA PAL	HEALING THE IRRITATION CAUSED BY THE ECTOPARASITES IN CATTLE BY USING THE DRY LEAVES OF MADHUCA LONGIFOLIA, CASTOR OIL, CURCUMA LONGA & PSORALEA CORYLIFOLIA
29	PRASANSHA	A NOVEL, EFFICIENT AND COST EFFECTIVE HERBAL COMBINATION THERAPY FOR ECTOPARASITIC INFESTATIONS IN CATTLES
30	SIDDARTH RAINA	EVALAATION OF ACACIA DECOCTION SILVER NANOPARTICLE IN MANAGEMENT OFCATTLE DIARRHEA
31	RUHAAN RASHID	PAPER BASED ELECTROCHEMICAL SENSOR FOR THE DETECTION OF MASTITIS.
32	SAIKA	USE OF SYZYGIUM JAMBOLANA AND MANGIFERA INDICA SEED POWDER TO TREAT DIARRHOEA IN CATTLE
33	KALYANI SINGH	DEVELOPMENT OF MASTITIS EARLY DETECTION KIT BASED ON SELECTIVE MEDIA STRIPS OF THE CAUSETIVE AGENTS, STAPHYLOCOCCUS SP AND STREPTOCOCCUS SP.

Student have started their respective experiments from 15th November, 2019

List of experts to deliver lectures during BIIS-4 from November 13th - December 3rd, 2019.

Name and Designation	Date
Dr. Viswajanani. J. Sattigiri, Head, CSIR-Traditional Knowledge Digital Library Unit	18/11/2019
Dr. V. J. Bhavsar, Head (AH) Mehsana District Co-opertive Milk producers Union Limited, Dudh Sagar Dairy, Mehsana	21/11/2019
Dr. Abhijit Kate, Assistant Profesor, NIPER, National Institute of Pharmaceutical Education & Research Ahmedabad, Gujarat, India.	23/11/2019

Additionally, Depending upon the experiment students have visited agriculture farms and dairy for sample collection and experimental design as well as observation. Students who wanted to work in the night are allowed for the research work in the lab.

Dr. Kiran Kaliya, Director, NIPER, Ahmedabad , Dr. Sanjay Gill and Dr. Rama Shankar Yadav have visited lab and interacted with students and shared their journey in research field on 16th November, 2019 .

Dr. Mohd. Aslam, Adviser (Scientist 'G'), Department of Biotechnology, Ministry of Science & Technology along with Dr. Sanjay and Dr. Sharma have visited lab, interacted with students on 28th November,2019.

Valedictory session and Award Ceremony

All the participating students presented their work in the front of evaluation committee on the final day of Biotech Innovation IgnitionSchool (BIIS-4) from November 13th - December 3rd, 2019. Further a presentation ceremony was conducted where a certification of participation was given by the chair person of the valedictory session, Dr. Vipin Kumar, National Innovation Foundation, Grambharti. Also, the **11 best projects were selected for appreciation grant up to Rs. 1 lakh** to further continue their research work. The schedule for the final day was:-

BIIS-4 (Biotech Innovation Ignition School-4) <i>November 13-December 3,2019</i> <i>Venue- Grambharti</i>	
December 3, 2013,Tuesday	
10:30-10:45	Tea & Breakfast
10:45 -11:15	Introduction of the session Chairperson Prof. Anil K Gupta , Founder-Honey Bee Network, Coordinator-SRISTI, GIAN, Visiting faculty-IIM-A & IIT-B
11:15-11:20	Dr. Nirmal S Sahay , Advisor-SRISTI, Bilodara, Mansa, Gandhinagar
11:20-11:25	Mr. Amrutbhai Patel Niyamak, Grambharti
11:25-11:30	Dr. Shilpy Kochhar , Entrepreneurship Development Manager. Biotechnology Industry Research Assistance Council
11:30-12:30	Presentation by BIIS Students
12:35-12:45	Tea break
12:45-13:45	Presentation by BIIS Students

13:45-14:30	Lunch
14:30-15:30	Presentation by BIIS participants
15:30-15:45	Valedictory address by Dr. Vipin Kumar , Director, National Innovation Foundation, Gandhinagar
15:45-16:00	Certificate distribution to all the BIIS participants
16:00-16:10	Concluding remarks by Dr. Megha Barot, BIIS Coordinator
16:10-16:15	Vote of thanks by Mr. Ramesh Patel, Secretary, SRISTI

The exhaustive work done for twenty-one days reflected on the outcome and key output is attached herewith where the eleven best shortlisted projects of BIIS-4 are given:-

Sr. No.	Name	Project Title	Innovator's approach	Student's approach	Value addition	Future studies to be done	Technical Inputs from our side
1.	Junaid Riyaz	Development of herbal ointment formulation using Aloe vera, Turmeric tubers and Tecomella undulata To cure udder inflammation	<ul style="list-style-type: none"> • 500gm of aloe vera pulp , 100gm of white turmeric tubers and 500gm of Tecomella undulata • Crushed in 1l of water • Filter the mixture and feed 500ml of juice per day for 2 days • The debris obtained by filtering was applied to the affected area will reduce the udder inflammation 	<ul style="list-style-type: none"> • To evaluate the innovator's practice on cattle. • In vitro analysis of formulations and individual extracts • Antibacterial activity of formulation and ingredients used. 	<ul style="list-style-type: none"> • Explored efficacy of individual plants and ingredients used in original practice. • Antimicrobial activities and phytochemical screening of different extracts. 	To find out component from the extract responsible for antimicrobial activity through HPLC method. Development of formulation by using the extracts which are showing significant microbial inhibition zone. Development of ointment by using the most effective formulation.	<ul style="list-style-type: none"> • Selection of media and experiment designing for bioassay. • Phytochemical screening of different solvents extracts to know the bioactive compounds.
2.	Ruhaan Rashid	Paper based electrochemical sensor for the Detection of mastitis	Nil	To design a cost efficient paper based electrochemical	Nil	The prototype developed in this short period of time is	Idea implementation and Experimental

				sensor for detection of mastitis.		working fine but device can made with higher precision and accurate. Validation of this device is needed with large number of mastitis milk samples (as test was performed on 5 to 6 samples).	design
3.	Kalyani Singh	Development of mastitis early detection kit based On selective media strips of the causative agents, <i>Staphylococcus</i> sp and <i>Streptococcus</i> sp.	Nil	Development of strip based CFUs detection kit.	Nil	<ul style="list-style-type: none"> • It can be used to develop into an affordable and more reliable detection kit. • The kit would be a realistic approach for detection. • The colonies count would be set up into a standard limits by 	Idea implementation and Experimental design

						testing milk from different regions. • The CFU may vary from one region to another.	
4	Fatimah Jan	Use of Jatropha root, <i>Butea monosperma</i> and tea leaf (<i>Echinoehola frumentacea</i>) to cure diarrhea in Cattle	Take Powder of Jatropha root 100g, Butea Monosperma root 100g and Tea leaf 10g, Mix 1 lit water, provide 200 ml morning and evening for two days as food supplement to the infected animal	<ul style="list-style-type: none"> Literature review on diarrhea and active ingredient of plant sample. Plant extraction by different scientific method as well as comparing it with original practice Activity assay toward pathogenic organisms by agar well diffusion method, micro broth dilution method 	Different methods have been employed to extract phytoconstituent from consortia of <i>Butea monosperma</i> , Jatropha root and tea leaves based on the solvent solubility and polarity.	Dose effective study and different formulation combination of used herbs for Non-infectious diarrhea	Extraction of herbs in different solvents to check their activity against diarrhea causing organisms.
5.	Snehil Jaiswal	Effect of <i>Azadirachta indica</i> aqueous extract and	Fresh water extract of neem and goat milk in equal	Validation of innovators practice with different	Studied efficacy of formulation at	Protease activity of <i>Azadirachta</i>	Experimental design, and lab as well as field

		Goat milk on different crop pest	proportions against Army worm	dilution of the formulations and their effect on different crop pest	different proportion for different crop pest. Dose and time optimization to get maximum results with respect to each pest selected.	<i>indica</i> will be explored both separately and in combination with Goat milk. Identification and isolation of active ingredients for anti insecticidal activity to be done.	observation. Evaluation of effect of formulation at different dilution against various crop pests.
6.	Pragati Singhal	Development of low cost, bio-composite, ergonomic floor surfaces	Nil	Low cost, eco-friendly mats that provide nutrition from absorption by the body, made out of a combination of locally available sustainable materials, which can be used by people and communities alike. The surfaces could be made by	Nil	<ul style="list-style-type: none"> To use more types of natural materials and organic waste to benefit more people from different age groups and communities. To create a DIY solution kit, people especially in the urban areas to create the tiles for their 	Provided platform to implement idea. Arranged meetings with villagers and rural area visit.

				combining different materials based on the locality to be used.		workspaces and homes could purchase that. • It could also be used as an educational medium for play while teaching them about the rural life and connecting them back to their roots.	
7.	Meghanath Somarowthu	Mixture of <i>Annona squamosa</i> , <i>Ferula asafetida</i> , <i>Pennisetum typhoides</i> (bajra flour), cow urrine as the anti leaf curl agent	For 1kg of annona squamosa leaves add 6L of water and boil it until water becomes 2L, collect and add 250gm of <i>Ferula asafetida</i> , 500g of bajra flour (<i>Pennisetum typhoides</i>), to this semi slurry add 5L of cow urine and can be diluted up to 10 times and filtered to use as a spray.	Validation of original practice for leaf curls disease and also studied combination of milk, ash and Copper in certain proportions.	The original practices didn't show any positive results that may work for mineral deficiency induced leaf curl. For viral infection induced leaf curl student studied by making combination of Ash and Cu with milk,	• Standardizing the proportions treatment from the seed level so that white flies are avoided. Using limonine compounds which have repellent property to white flies and these plants fatty acid	Experimental design, planning and field observation

					revealed that infection was not increased while flowering was increased.	derived aldehyde compounds having attractive properties towards white flies and using them as traps.	
8.	Fasna Musthfa	Study of bioactive compound and therapeutic Potential of <i>Psoralea corylifolia</i> for curing Ectoparasites on cattles.	Applying Bavchi leaves onto the skin of ectoparasite infested cattles.	Validation of actual practice and comparative analysis of different methods using same plant	Studied different methods and mode of application using <i>Psoralea corylifolia</i> , like dry powder extract, fresh leaves paste , boiled extract and rubbing of fresh leaves on affected area where she found most effective solution is powder concentrated extract	<ul style="list-style-type: none"> • Further studies related with the effects on larvae are to be done. • Wider aspect of sampling was needed for an accurate conclusion. • More time durated aspects are needed. 	Scientific evaluation of extracts made by phytochemical screening

9.	Gopika P	Use of <i>Ferula asafoedita</i> , <i>Cinnamomum camphora</i> , <i>Musa paradisiaca</i> and sucrose for curing mastitis	Feed 5 gm Hing, 3 tablets of camphor and 6 bananas to the affected cattle for 4 days. Healing will be observed from very next day.	<ul style="list-style-type: none"> • Validation of practice suggested by grass root innovator to cure mastitis • Check antimicrobial activity of the extract prepared as suggested by grass root innovator • Phytochemical screening of extract 	The farmers practice results revealed reduction in inflammation and negative results in CMT after treatment but no antimicrobial activity was recorded in the lab. Phytochemical screening of the extracts.	<ul style="list-style-type: none"> • Extraction will be carried out with organic solvents to check antimicrobial activity • New medicine can be created using same formulation • Anti-inflammatory activity test of the extract • Check the efficacy of extract by applying on udder • Performing TLC 	Antimicrobial activity of individual ingredients of the original practice and innovators formulation against <i>E.coli</i> and <i>S. aureus</i> bacteria. Phytochemical screening of different extract and original formulation.
10.	Deepika Pal	Healing the irritation caused by the ectoparasites in cattle by using the dry leaves of <i>Madhuca longifolia</i> , castor oil, <i>Curcuma longa</i> and <i>Psoralea corylifolia</i>	Dry leaves of 50gm <i>Madhuca longifolia</i> , 100gm <i>Psoralea corylifolia</i> , 100 gm Tubers of <i>Curcuma longa</i> were powdered in a grinder. Then add 300 ml castor oil	Validation of original practice on farm. In vitro study of farmers practice with different doses.	Checked the effectiveness of given practice at different doses to minimize the concentration and number of applications.	<ul style="list-style-type: none"> • Acaricidal activity of this mixture should be tested other ectoparasites to know that this combination have a broad 	Phytochemical screening of formulations. In vitro mortality test of different doses.

			and mixed into it. Add some more water to dilute the concentration of this mixture. Then apply on the cattle in affected area for 7 days.			spectrum activity. • To understand bioactivities of effecting and modifying tick feeding behavior molting process fecundity and viability of test.	
11.	Siddharth Raina	Evaluation of Acacia decoction silver nanoparticle in management of cattle diarrhea.	Nil	To develop cost effective formulation for diarrhea in cattle and to minimize additional cost of medicine	Nil	Nanoparticle characterization, Dose optimization, Toxicology studies are to be performed, and the experiments will be repeated in more animals for congruency of the results.	Experimental design for silver nanoparticle synthesis with acacia decoction. Anti microbial study of the nanoparticles.

Announcement

SITARE BIIS: Opportunity for technology students to work on grassroots innovations

SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions) in collaboration with BIRAC (Biotechnology Industry Research Assistance Council, Department of Biotechnology, Govt. of India) is organizing a three-week SITARE BIIS (Students Innovations for Translation & Advancement of Research Explorations-Biotech Innovation Ignition School) for validating, value adding and product development around grassroots innovations. The BIIS will try to develop solutions for grassroots applications for human, animals, and agricultural applications including herbal technologies, medical devices and microbial application.

The BIIS-4 will be held at SRISTI, Grambharti, Gandhinagar from 13th November to 4th December, 2019.

The selected students will be assigned individual projects in primarily five action-research areas drawing upon the Honey Bee Network Database:-

1. Pharmacognosy/Phytochemistry - SRISTI's Grassroots database contains many traditional knowledge practices as well contemporary innovations from across the country. These projects would involve validation/ value addition to these practices. A few of these practices are presented here- http://www.sristi.org/hbnew/honeybee_database.php
2. Soil Microbiology-SRISTI has a Microbial diversity bank containing 8000+ organisms (bacteria, fungi, and actinomycetes) isolated from the soil samples collected during ShodhYatras (learning walks for scouting and sharing innovations and local practices) in different parts of the country (<http://www.sristi.org/cms/shodhyatra>). An extensive study of screening these isolated microbes for novel human, animal and agricultural application would be conducted.
3. Veterinary Medicine- Validation of traditional practices for the improvement of livestock health, nutrition and productivity.
4. Agriculture- Validation of grassroots practices by conducting trials in lab, on station and in field for product development/improvement.
5. Medical devices- Value addition/product development of any of the open source projects listed on our summer school website (<http://summerschool.sristi.org/>) or medical devices for human and animal health care or meeting any other unmet social needs.

Eligibility to apply

Students pursuing Bachelors programme in any discipline can apply. The student should have a valid ID issued by the Institution/University.

A few seats are reserved for post graduate students also. In exceptional cases, even school children with interesting ideas may be considered.

The abstracts along with the objective of the projects will be shared with the selected students three weeks before the start of the BIIS. The participants would be expected to do literature review before joining the School. They are likely to develop a project proposal as well as work plan. These students would receive an expert feedback on their proposals from the reviewers. These students will also receive hands-on training in various techniques of microbiology, phytochemical extraction procedures, and using various lab equipment (AAS, HPTLC, HPLC, ELISA, PCR, BSL-I & II etc.) as per the need of the project in the first week of the event.

Application Process

Applications need to be submitted online at BIRAC site after Sept 20, 2019 and can also be sent directly to SRISTI at biis@sristi.org

Format of application with Statement of Purpose will be accessed through the website.

Selected students will be informed 3 weeks prior to start of the workshop.

Process for submitting the proposals online is detailed below:

- Log on to the BIRAC website www.birac.nic.in
- If you are a registered user, log-in using the credentials, else you need to register yourself as an individual by clicking on New User Registration.
- In case of new user registration, a computer generated password would be sent to the email-id provided at the time of registration. The password can be changed later.
- Once you login, you would be navigated to the page displaying SITARE-BIIS link.
- Click on the SITARE-BIIS application link under Programmes and the active call would be highlighted.
- Click on the active call against which you wish to submit the proposal.

Selection Process

Selection will be based on Statement of Purpose (SoP) submitted by the Student. Key factors for selection of applications include

- Originality (40%)
- Clarity of Purpose (20%)
- Implementation Plan (15%)

- Potential impact (15%)

Travel/Accommodation

Following expenses will be covered for student participants:

- Class II Rail fare and local travel expenses
- Hostel accommodation
- Breakfast, lunch, dinner
- Shuttle facility from hostel to project site

Frugality will be practiced at all stages and in all functions. The students should be willing to adapt to simple conditions of subsistence with high expectation of hard work.

The work done by students during BIIS will be assessed on the last day of the school and the outstanding studies (up to 10 per BIIS) going to be identified for further support of INR 1 lakh each as SITARE-Appreciation Award Grant. The grantees are expected to conduct further research on the topic either at home institution or at SRISTI's lab.

Above all, students would get an invaluable opportunity to interact with both national and international experts as well as grassroots practitioners/innovators in their respective fields. It is hoped that each participant becomes a volunteer of the Honey Bee Network which has helped in scouting and disseminating rural creativity and innovation over the last three decades.

All the output will be credited to the grassroots knowledge providers and can be published thereafter with prior written concurrence of the BIIS team and knowledge providers.

Highest ethical code of biotech research is expected to be followed. Team spirit and willingness to develop open source solutions will be highly encouraged. Peer learning will be strongly encouraged. The findings will be shared with knowledge providers in local language with the help of SRISTI and Honey Bee Network team.

Kindly email at biis@sristi.org or call at 9426140041 (Dr. Megha Barot) for further queries.

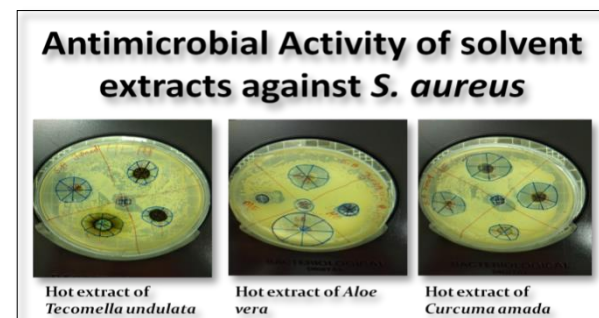
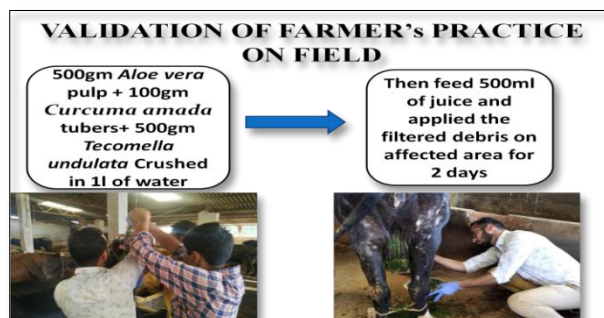
Last date for submission of application is October 10, 2019 on or before 12:00 p.m.

Annexure I

The eleven awarded projects of BIIS -4 (November 13- December 3, 2019)

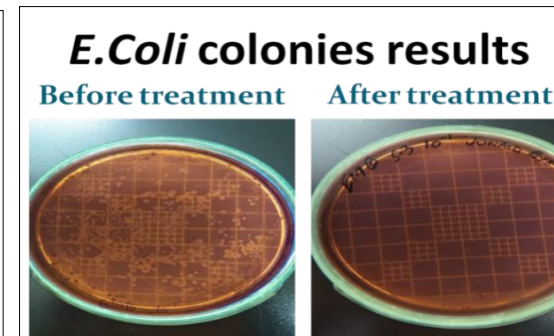
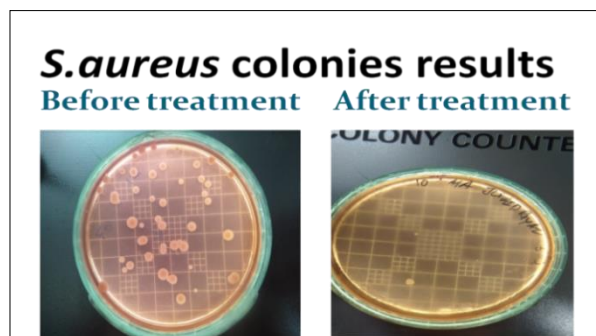
1. Project Title:- Development of herbal ointment formulation using Aloe vera, Turmeric tubers and *Tecomella undulata* to cure udder inflammation.

Participant's Name- Junaid Riyaz



Zone of inhibition observed against *S. aureus*

Solvents of the Hot Extract	Aloe vera (mm)	Curcuma amada (mm)	Tecomella undulata (mm)
Hexane	2	14	6
Ethyl acetate	23	13	8
Methanol	0	7	10
-ve control	0	0	0
+ve control	11	11	12



Results: Aqueous extract of the ingredients didn't show antimicrobial activity against mastitis causing bacteria. Solvent extract of the individual ingredients showed antimicrobial activity against *S. aureus* in which hot extract of Aloe vera in ethyl acetate solvent showed maximum zone of inhibition followed by hot extract of white turmeric in hexane and hot extract of *Tecomella undulata* in methanol solvent.

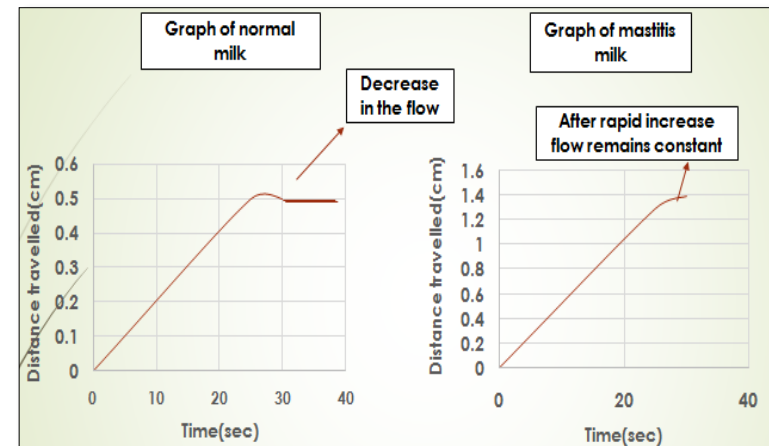
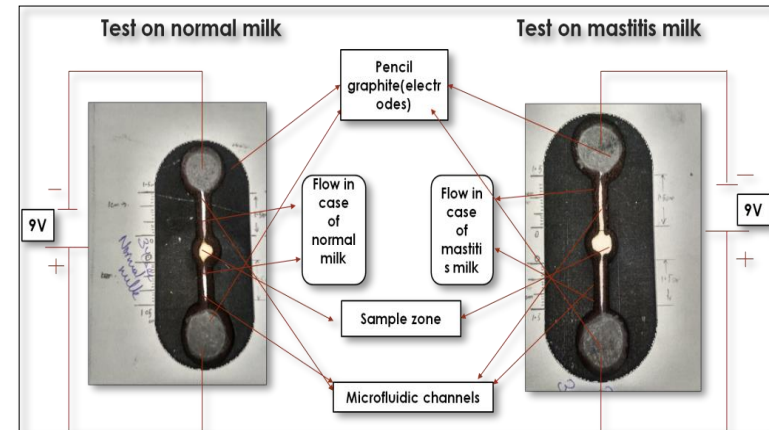
Future work to be done: Find component from the extract responsible for antimicrobial activity through HPLC method. Development of formulation by using the extracts which are showing significant microbial inhibition zone. Development of ointment by using the most effective formulation.

2. Project Title:- Paper Based Electrochemical Sensor For The Detection Of Mastitis
Participant's Name- Ruhaan Rashid

- Device that was formulated comprises of the sample zone at the centre, microfluidic channels connecting to their respective electrodes.
- After finalizing the design, it was printed on whattman filter paper (grade 4), which happens to be hydrophilic in nature therefore in order to make it hydrophobic, used marker pen. Only the area of sample zone and microfluidic channels has to remain hydrophilic.
- Shades of pencil graphite were used as electrodes.
- Battery (9V), wires were required in the process.
- Sample zone was marked by the universal indicator (with the help of pipette) in order to make the flow of fluid visible.
- As the prototype was ready, test was conducted to check the electrical conductivities of both normal and the mastitis milk and difference between the flow of both types of milk would determine the results.

Test procedure

- The positive and negative terminals of 9V battery connected in series with another 9V battery were connected to the prototype.
- Sample of normal milk (20 μ l) was loaded in the pipette and was dropped into the sample zone.
- The battery was kept intact for 30 seconds.
- After 30 seconds the terminals of the battery were withdrawn.
- Movement of milk had to be observed.
- Same procedure was followed for the mastitis milk.



Results: Normal milk flowed for the distance of 0.6cm from the sample zone in one direction and 0.4cm in another direction of the microfluidic channel. While the mastitis milk flowed for the distance of more than 1.3cms in both directions of the microfluidic channel.

Future work to be done: The prototype developed in this short period of time is working fine but device can made with higher precision and accurate. Validation of this device is needed with large number of mastitis milk samples (as test was performed on 5 to 6 samples).

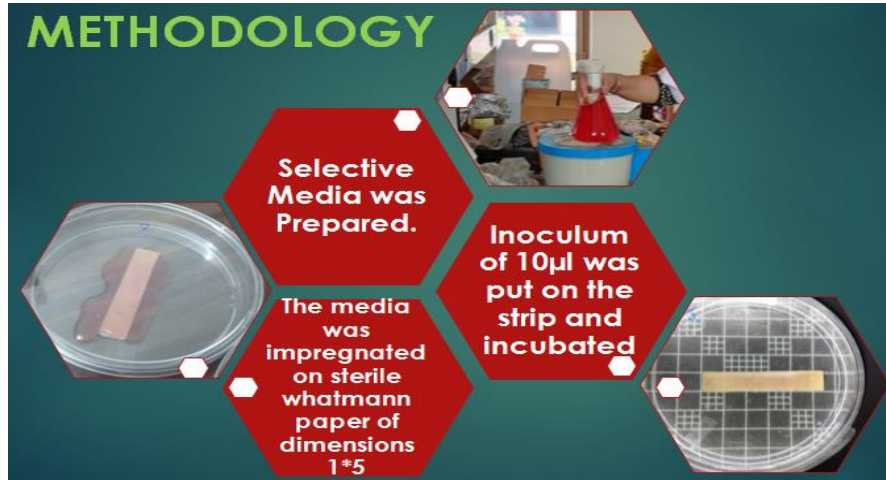
3. Project Title:- Development Of Mastitis Early Detection Kit Based On Selective Media Strips Of The Causative Agents, *Staphylococcus Sp* And *Streptococcus Sp*.

Participant's Name- Kalyani Singh

OBJECTIVES

- ▶ Isolation of micro-organisms from different milk samples on selective media.
- ▶ Based on CFU of staphylococcus ascertaining the case of subclinical mastitis.
- ▶ Development of strip based CFUs detection kit.

METHODOLOGY



Results

- ▶ Distinctive results were observed
- ▶ The no. of colonies were well visualised after providing them with incubation.
- ▶ Naked eye visualisation of colonies made.
- ▶ More appropriate results in comparison to any of the prevailing detection kits.

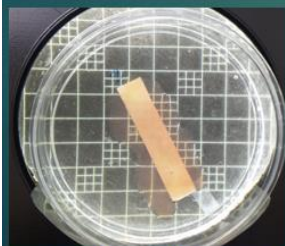


Fig:-Initial growth stage of colonies detected by yellowing

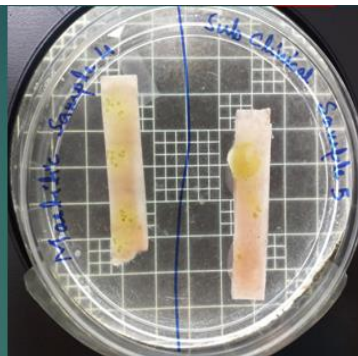


Fig:- Colonies growth on strip for Mastitis milk and Sub clinical Mastitis milk.

Conclusion

- The paper based media test ,a great succour to detect sub-clinical mastitis.
- Visible difference in CFU in the inoculum of different milk samples.

Future Work Aspects

- It can be used to develop into an affordable and more reliable detection kit.
- The kit would be a realistic approach for detection.
- The colonies count would be set up into a standard limits by testing milk from different regions.
- The CFU may vary from one region to another.

4. Project Title:- Use of Jatropha root, *Butea monosperma* and tea leaf (*Echinoehola frumentacea*) to cure diarrhea in cattle

Participant's Name- Fatimah Jan

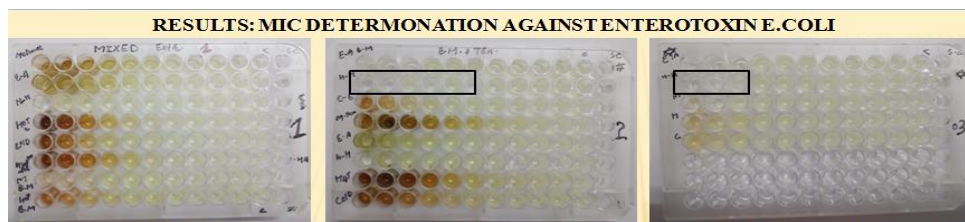


PLATE A: Mixed Extraction

PLATE B: BUTEA MONOSPERMA AND TEA Extraction

PLATE C: JATROPHA ROOT Extraction

Minimum Inhibitory Concentration (MIC) in mixed extraction				
MIC	<i>S. Aureus</i> (mg/ml)	<i>Proteus</i> (mg/ml)	ETEC (mg/ml)	<i>Pseudomonas aeruginosa</i> (mg/ml)
Methanol	NGI	NGI	NGI	NGI
Ethyl acetate	NGI	NGI	NGI	NGI
Hydroxy alcoholic	NGI	NGI	NGI	NGI
n-Hexane	NGI	NGI	NGI	NGI
Aqueous	NGI	NGI	NGI	NGI

NOTE: In Plate A Growth Inhibition were not observed but in Plate B & C growth inhibition were observed only in n-HEXANE Extraction. Gentamycine were taken as positive control
NGI: No Growth Inhibition

QUALITATIVE PHYTOCHEMICAL SCREENING

S. No	Test	Method	Observation	Inference Aqueous Ext (M)	Inference Hexane Ext (M)	Inference Ethyl acetate Ext. (M)	Inference Ethanol Ext (M)
1.	Alkaloids (Meyers Test)	Filtrate (400 µl) + Meyer's reagent	Reddish Brown ppt.	-ve	+ve	+ve	+ve
2.	Triterpenoids (Salkowski's Test)	Filtrate (400 µl) + CHCl ₃ + of conc. H ₂ SO ₄ + Shake + Allow to stand	Greenish Yellow color	+ve	+ve	+ve	+ve
3.	Flavanoids (Shinoda Test) and (Lead Acetate Test)	Filtrate (400 µl) + Magnesium Ribbon + conc. HCl Filtrate (400 µl) + Lead acetate (10%) + NaOH (10%) + Dil. HCl	No Change White ppt.	+ve	+ve	+ve	+ve
4.	Phenols and Tannins (Ferric chloride Test)	Filtrate (400 µl) + FeCl ₃ solution (3-4 drops)	No Change	+ve	+ve	+ve	+ve
5.	Saponins (Foam Test)	Filtrate (400 µl) + Equivalent amount of H ₂ O	No change	+ve	+ve	+ve	+ve

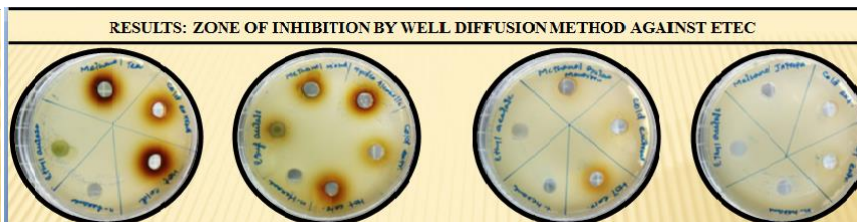


PLATE D

PLATE E

PLATE F

PLATE G

Sr. No	Plant extract	Zone of Inhibition (ZOI)			
		Mixed	BM Root	Jatropha root	Tea leaf
1	Methanol	Nil	Nil	Nil	Nil
2	N-Hexane	Nil	Nil	Nil	Nil
3	Cold extract	Nil	Nil	Nil	Nil
4	Hot extract	Nil	Nil	Nil	Nil
5	Ethyl acetate	Nil	Nil	Nil	Nil

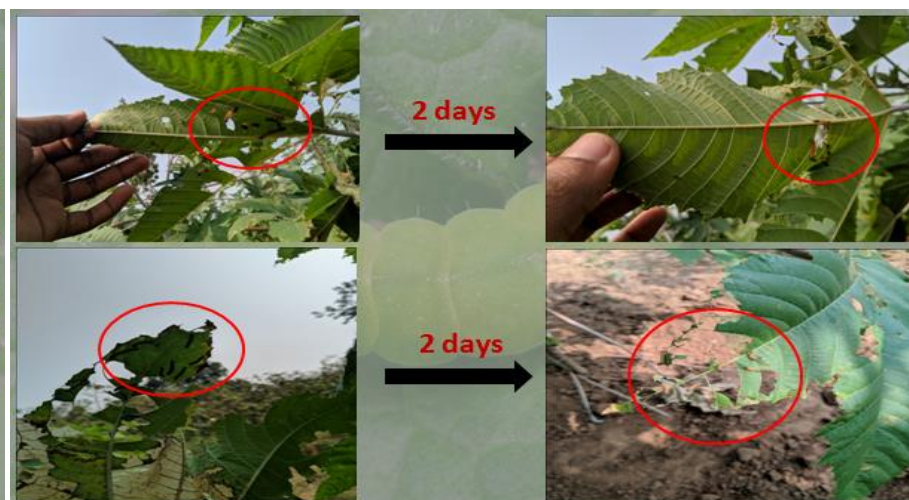
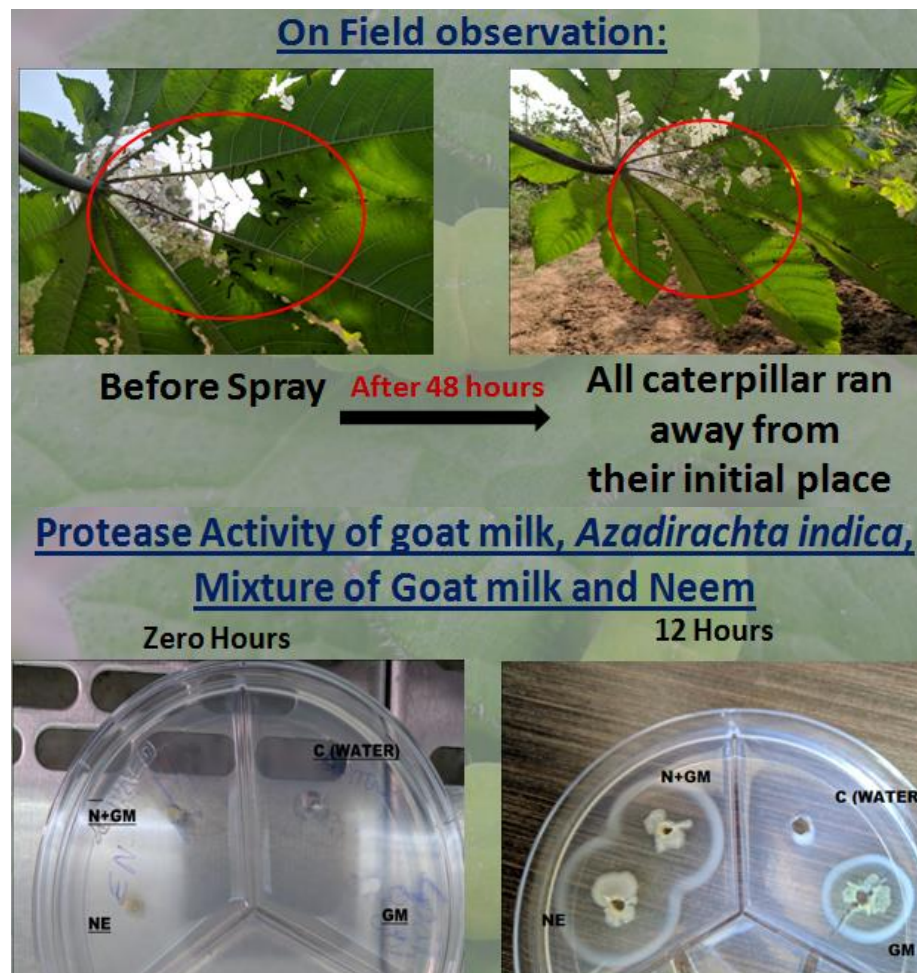
100 µl sample were taken at concentration of 100 mg/ml

- Results:** 96 well plate - Micro titer broth dilution method and Agar well diffusion have been performed against all extraction toward *S.aureus* and Enterotoxigenic *E.coli*. Since no growth inhibition was observed in mix
- Growth inhibition was only observed in n-hexane extraction of *Butea monosperma* and *Jatropha root* with MIC of 62.5 mg/ml and 250 mg/ml against Enterotoxigenic *E.coli* (ETEC) respectively.
- These plant mixture is preferable to treat Non-infectious Diarrhoea that is caused by oxidative stress occurring inside subject body due to production of Reactive Oxygen Species (ROS)
- Mixture of *Butea monosperma*, *jatropha root* and *Tea leaf* showed considerable antioxidant activity.
- Flavonoid detection by lead acetate paper and Shinoda Test confirm the presence of flavonoid in the consortia of *Butea monosperma* root, *jatropha root*, and *tea leaf* extract.

Future work to be done: To check the efficacy of formulations in different cattles for non-infectious diarrhea. To explore rehydrating properties of formulation in case of non-infectious diarrhea in cattles.

5. Project Title:- Effect of *Azadirachta indica* aqueous extract and Goat milk

Participant's Name- Snehil Jaiswal

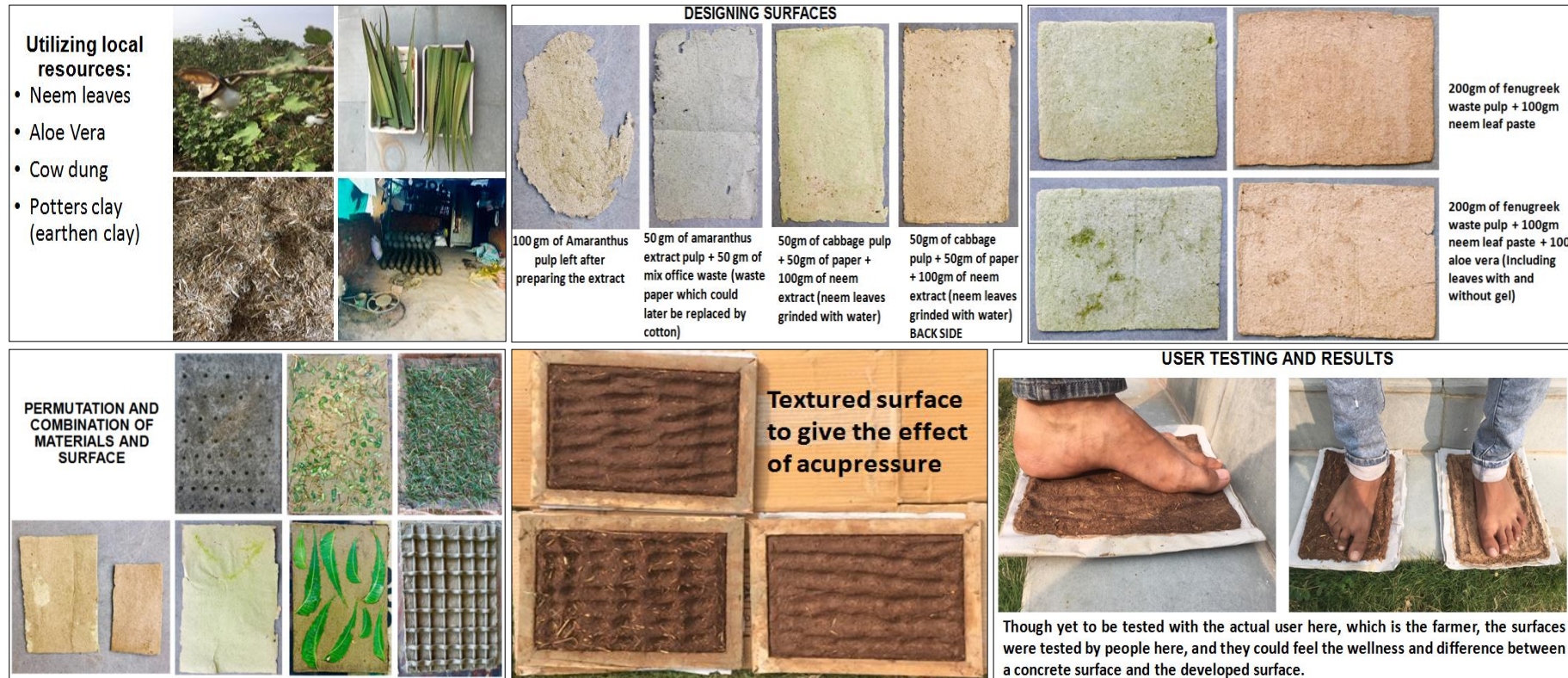


- **Results** shows that the mixture of *Azadirachta indica* (neem) and Goat milk in equal proportion may act as a Anti-feedant, Repellant and killing agent
- Increased Protease activity observed when Neem + Goat milk used, this new finding may be helpful as a better biopesticide agent
- The former prescribed for Armyworm but our lab experiments showed that the formulation may be effective for all the pests at caterpillar stage
- Value addition may be possible if we make Goat milk powder + Neem aqueous extract by spray drying.

Future work to be done: Protease activity of *Azadirachta indica* will be explored both separately and in combination with Goat milk. Identification and isolation of active ingredients for antiinsecticidal activity to be done.

6. Project Title: - Development of low cost, bio-composite, ergonomic floor surfaces.

Participant's Name- Pragati Singhal















Results: The tiles created were textured to resemble an acupressure surface that could be used at workplaces or home entrances in urban places and as home front yard in rural places. Testing the tiles with few clients it was observed that it made them feel much more relaxed, and the use of cow dung on the surface of the made it give cooler feeling helping in relaxing the overall mind. The tiles did not observe any cracks or microbial build up which marks it safe to be used at home indoor spaces.

Future work to be done: To use more types of natural materials and organic waste to benefit more people from different age groups and communities. To create a DIY solution kit, people especially in the urban areas to create the tiles for their workspaces and homes could purchase that. It could also be used as an educational medium for play while teaching them about the rural life and connecting them back to their roots.

7. Project Title:- Mixture of *Annona squamosa*, *Ferola asafetida*, *Pennisetum typhoides* (bajra flour), cow urine as the anti leaf curl agent

Participant's Name- Meghanath Somarowthu

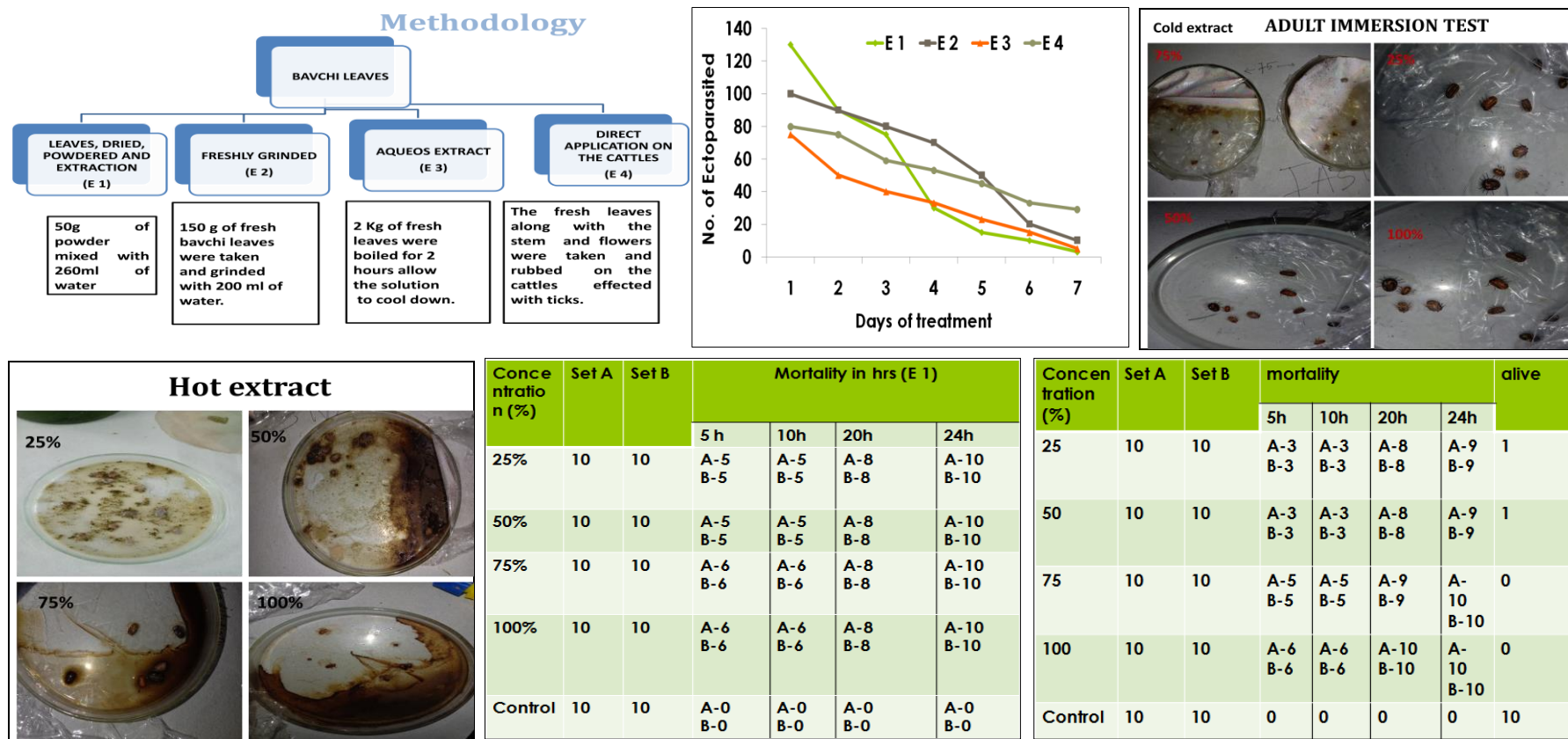
RESULTS(Original farmers practice)				OBSERVATIONS:	
				<ul style="list-style-type: none"> ▪ The insects/pests are feeding on the leaves . ▪ Burnt tips and yellowish black leaves were observed . ▪ The weight of formulation caused the plant leaves to bend that drained down the formulation sprayed. ▪ Instances of recovery was not seen in the already infected plants ▪ Flowering of the plant has not been observed may be due to infection 	
				Observations: <ul style="list-style-type: none"> • Ash which is added as an ingredient in updated protocol is rich in minerals such as P,K,Mg,Ca, etc, also acts as binding agent, the phosphorous is proven to increase flowering in plants and potassium which can reduce yellowing of leaves, It can also interfere the chemical signals from plants which attract insects. • Leaf curl may even be caused due to the deficiency of copper so all in one biopesticide which contains copper in it is added to the soil. • There is no change in the plants which are uninfected but infected plants remained as same flowering was observed to increase in plants which contained ash in them some plants even showed black leaf edges which indicates the concentration effect. 	
					

Results: Infection was not increased while flowering was increased using modified practice of innovator.

Future work to be done: Standardizing the proportions treatment from the seed level so that white flies are avoided. Using limonine compounds which have repellent property to white flies and these plants fatty acid derived aldehyde compounds having attractive properties towards white flies and using them as traps.

8. Project Title:- Study of bioactive compound and therapeutic potential of *Psoralea corylifolia* for curing ectoparasites on cattles

Participant's Name- Fasna Musthfa

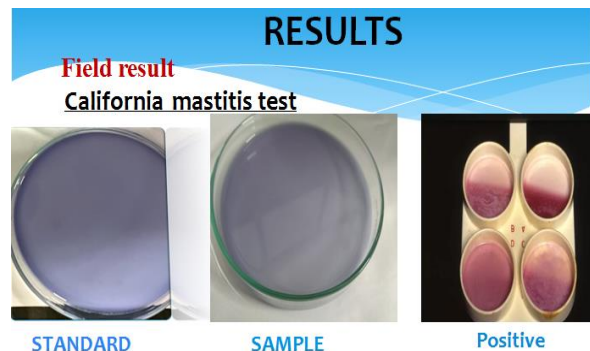


Results: Dry powder extract of the plant showed maximum activity with reduction from 150 counts to less than 5 after 7 days.

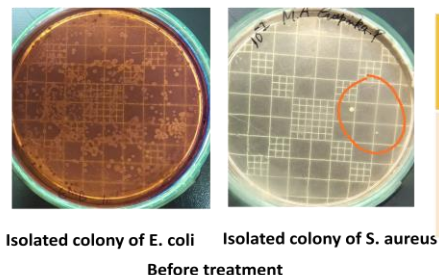
Future work to be done: Further studies related with the effects on larvae are to be done. Wider aspect of sampling was needed for an accurate conclusion. More time durated aspects are needed.

9. Project Title:- Use of *Ferula asafoedita*, *Cinnamomum camphora*, *Musa paradisiaca* and sucrose for curing mastitis

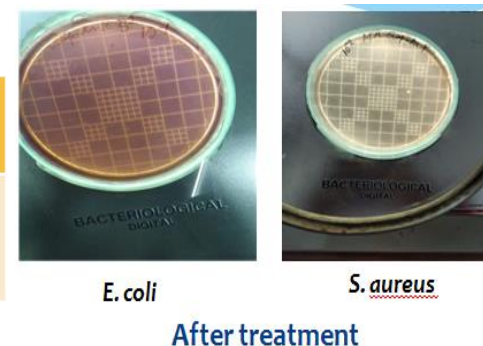
Participant's Name- Gopika P



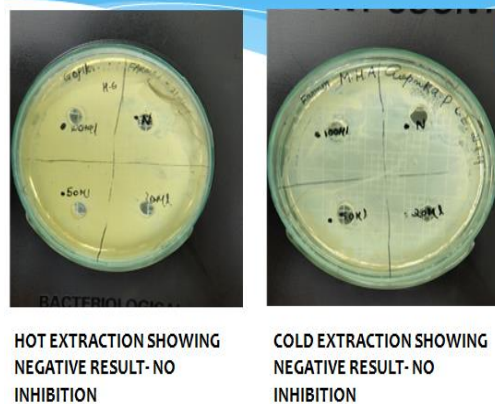
Isolated colonies of E. coli and S. aureus



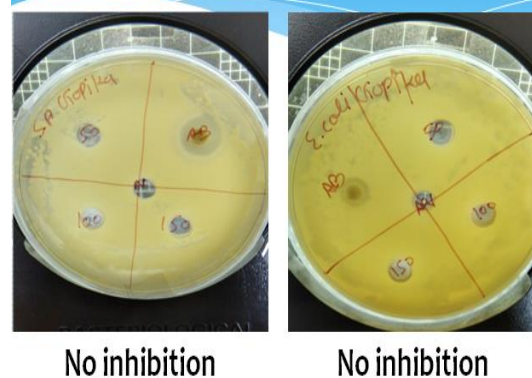
Sample Name	Dilution	No. of colonies
S-2	10 ⁻¹	1[S.aureus] >100[E.coli]



Antimicrobial activity of aqueous extracts



Antimicrobial activity of farmers practice



Phytochemical screening

※ Mixture of *ferula asafoedita*, *camphor*, *musa paradisiaca* [farmers practise]

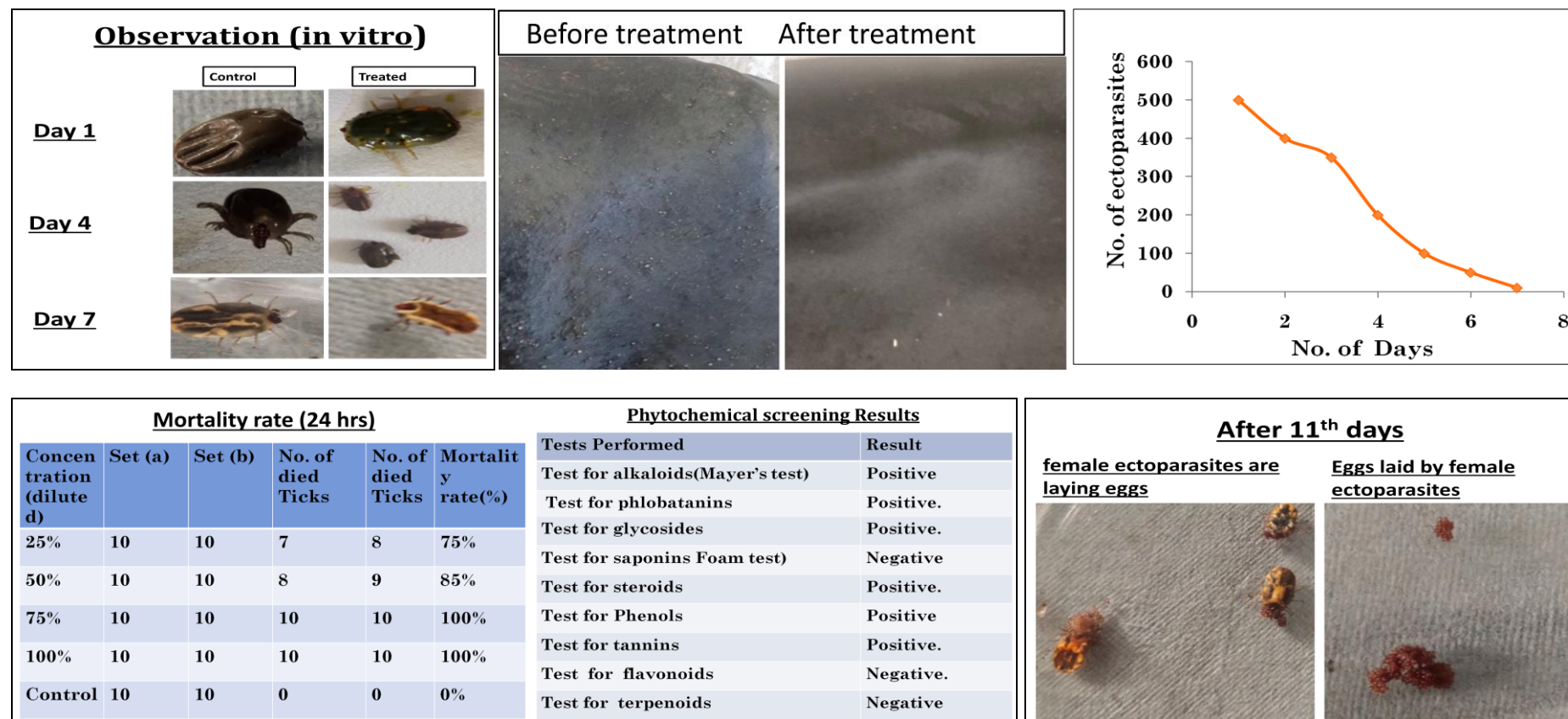
S.NO.	COMPOUNDS	NAME OF TEST	RESULT
1	Protein	Biuret test	-ve
2	Carbohydrates	Fehling test	+ve
3	Flavonoids	Alkaline reagent test	+ve
4	Glycosides	Salkowski's test	+ve
5	Alkaloids	Mayer's test	-ve
6	Tannin		-ve
7	Steroids	Salvoski test	+ve
8	Saponin	Test for saponin	+ve
9	Cardiac steroidal glycosides	Keller-killani test	+ve
10	Phenols	Test for phenol	-ve
11	Terpanoids	Test for terpanoids	+ve

Results: Antimicrobial activity of the aqueous extract was not observed in lab. Phytochemical screening showed presence of some active compounds like steroids, carbohydrates, protein, flavanoids, glycosides, steroids, terpanoids, saponins.

Future work to be done: Extraction will be carried out with organic solvents to check antimicrobial activity. New medicine can be created using same formulation. Anti-inflammatory activity test of the extract. Check the efficacy of extract by applying on udder.

10. Project Title:- Healing the irritation caused by the ectoparasites in cattle by using the dry leaves of *Madhuca longifolia*, *castor oil* , *Curcuma longa* and *Psoralea corylifolia*

Participant's Name- Deepika Pal

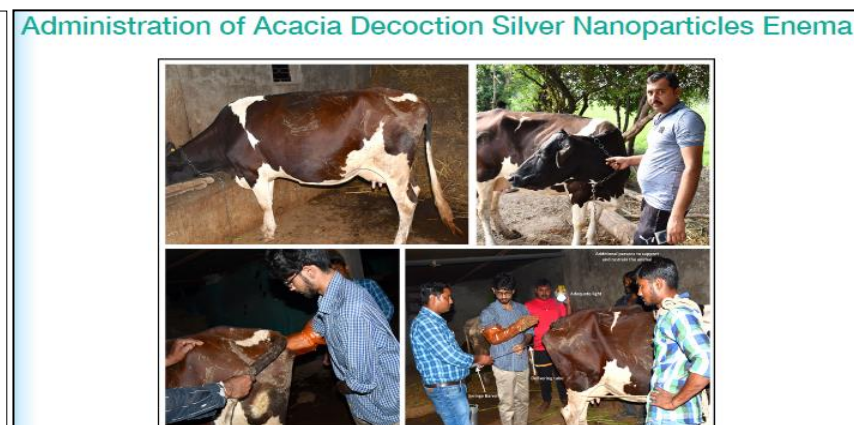
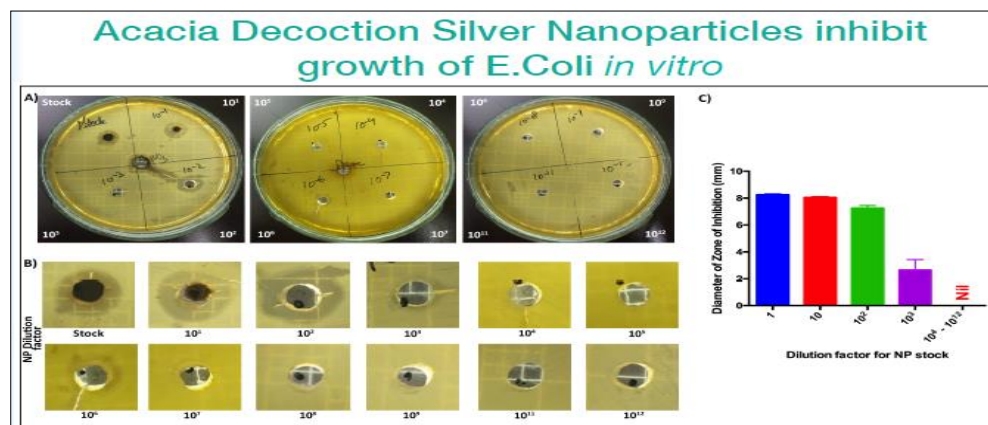


Results: The formulation proposed by the innovator it shows very good results on ectoparasites (ticks). It is easy to found in our environment. This formulation has a potential to generate an ointment against the ectoparasite infestation.

Future work to be done: Acaricidal activity of this mixture should be tested other ectoparasites to know that this combination have a broad spectrum activity. To understand bioactivities of effecting and modifying tick feeding behavior molting process fecundity and viability of test.

11. Project Title:- Evaluation of Acacia decoction silver nanoparticle in management of cattle diarrhea

Participant's Name- Siddharth Raina



Acacia Decoction Silver Nanoparticles enema decreases bacterial load and enhances stool consistency in diarrhea inflicted cow

History

- Age: 6 years old cow
- Breed: Punjabi
- Complaints: Anorexia, Constipation, Distention of abdomen, Signs of discomfort, greasy stool from past 2-3 days
- Diagnosis: Distal Intestine Infection post obstruction
- Vet Prescription: Oral oil for constipation (No relief)

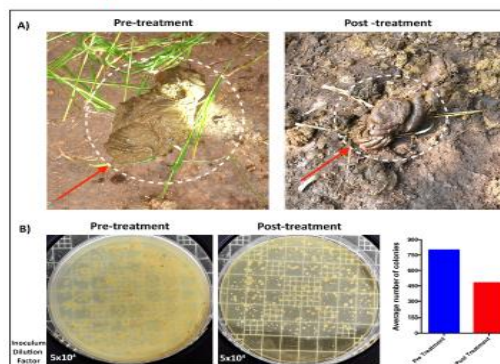
Evaluation pre and post treatment

Pre-treatment:

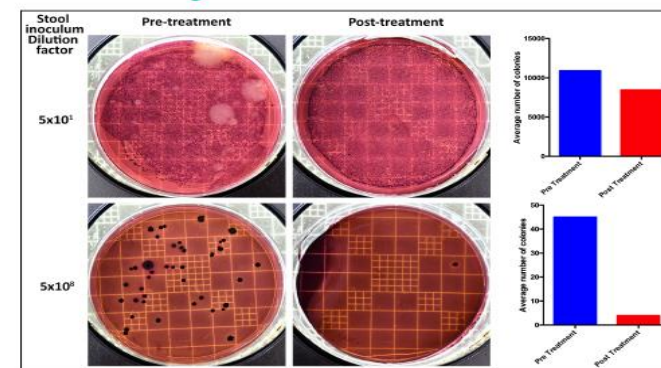
- Clay coloured, greasy greyish stool, high bacterial load

Post-treatment:

- Putty cakes, brown coloured stool, low bacterial load
- Started feeding
- Frequency of stool stabilised
- Increased activity
- Allowed milking after enema and yielded 7.5 lts of milk



Acacia Decoction Silver Nanoparticles enema decreases lactose fermenting bacterial load in diarrhea inflicted cow



Results: Acacia decoction Silver nanoparticles (ADSN) have bactericidal effects in-vitro. Major decrease in bacterial load in stool of diarrhea infected cow following enema treatment. Study proposes a cost effective, simple and relatively straightforward regimen from common sources.

Future work to be done: Nanoparticle characterization, Dose optimization, Toxicology studies are to be performed, and the experiments will be repeated in more animals for congruency of the results.