

Indian Science Technology and Engineering facilities Map (I-STEM)

Invites application for

1. **Partial financial support for using R&D facilities in other institutions through the I-STEM web portal to Users from Academic Institutions and Start-ups (Format-1)**

Format for requesting support for accessing and using facilities through the I-STEM web portal.

(i) Details of the Personal Information

- a. Name of the Researcher/Faculty Member: Dr Arun Dev Sharma
- b. Name of the Institution/Start-up: Lyallpur Khalsa College, Jalandhar, Punjab
- c. Name of the Department: Biotechnology
- d. Degree registered for/Product being developed (for start-up)

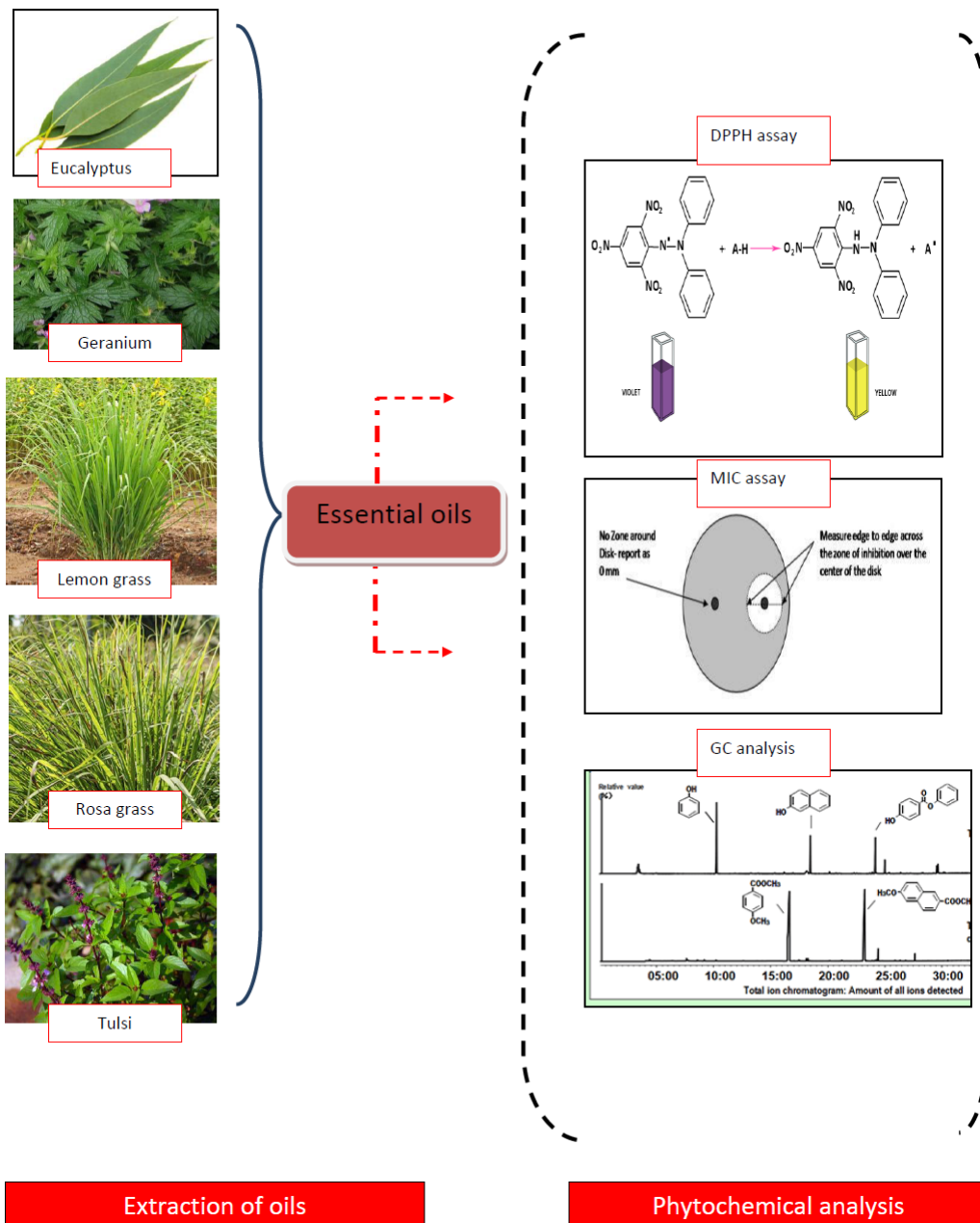
(ii) Project/Research topic Details:

- a. Project Title/Research Title: **Aromatic oil extraction, compositional profiling and biological activities of essential oils extracted from underutilized crops Eucalyptus and Lemon grass: Waste to Wealth**
- b. Sub area: Phytochemistry
- c. Area Description: This area deals with analysis of bioactives from underutilized crops
- d. Aims & Objective (in Bullets):
 - **Extraction of aromatic oils from aromatic crops**
 - **Aromatic profiling of essential oils**
 - **Evaluation of biological activities of extracted oils**
- e. Duration (MM/YYYY): 04/2022-04-2024 (3 yrs)
- f. Project Summary (1000 words): Plz see Annexure-I
- g. **Technical Details**
 - a. TRL
 - b. Methodology:

The photochemical analysis of active compounds in Eucalyptus, and , Lemon grass oils in the target area will be analyzed and standardized as per follows:

1. The healthy leaves from the above mentioned aromatic crops shall be harvested
2. Leaves (20 gms) will be chopped to pieces and oil yield shall be measured first by using Clevenger apparatus using hydro-distillation.
3. Once it will be standardized, then at large scale, leaves will be harvested (50-100 kg) and essential oil will be harvested by the process of steam distillation.
4. Obtained essential oils will be analyzed for Phytoactive compound ingredient analysis (like presence of terpens, terpenoids, phenolics, alkaloids, flavenoids) by GC-FID and HPLC-chromatography system. For identification and quantification of Bioactive phytochemicals being present in essential oils, standards like Gallic acid, Rutin, Vanillin and Ascorbic acid will be used)

5. The antioxidant/free radical scavenging activity will be analyzed by DPPH assay using standardized protocols
6. The antimicrobial activity will be measured by calculating ADDM (agar disc diffusion method), MIC (Minimum Inhibitory conc), and IC₅₀ assays.



- c. Design & development: NA
- d. Facilities and Instrumentation required: HPLC system,
Justification for requirement of equipment
Essential oils from aromatic crops like Eucalyptus, and Lemon grass are rich in Bioactive compounds like phenolics, terpenes, flavenoids etc, so in order to do phytochemical analysis, HPLC is required for analysis.
- e. Consumables (Scientific materials): Plz see annexure-II

- h. **Expected output and outcome**
- Extraction and analysis of essential oil
 - Production at cottage level
 - Marketing of essential oil
- i. **Industry/Institute Collaboration** **If, yes**
- (i) Name of the Collaborating Industry/Institute; **CSIR-IIIM Jammu**
- (ii) Collaboration Details: **Plz see Annexure-III**
- (iii) Additional Details if any
- j. **Funding required from I-STEM (with justification: Plz see annexure-IV)**

Details of Requirements & Mode of the Engagement: (Attach the quotation for the consumables)

- (i) Short term Engagement:
- a. Usage of testing/characterization facilities across the country (Characterization Mode)
- i. Testing Charges: **Plz see Annexure-IV**
 - ii. Consumable charges: **Plz see Annexure-IV**
 - iii. Travel Cost (Boarding and Lodging, if any) **Plz see Annexure-IV**
- b. Usage of fabrication and testing facilities across the country (Fabrication Mode)
- i. Fabrication and testing Charges
 - ii. Consumable charges (if any)
 - iii. Travel Cost (Boarding and Lodging, if any)
- (ii) Medium term Engagement:
- a. Execution of project in any one of the Host Institution (Project Mode)
- a. Fabrication and or testing Charges
 - b. Consumable charges (if any)
 - c. Travel Cost (Boarding and Lodging, if any)
- b. Execution of project in Multi Host Institutions (Project Mode)
- a. Fabrication and or testing Charges
 - b. Consumable charges (if any)
 - c. Travel Cost (Boarding and Lodging, if any)

(Round-trip to the Host Institution by 2nd class (Non-AC) railway via the nearest route)

Details of User's Bank Account:1549001300000759

(Please send a copy of the cancelled cheque/copy of the passbook carrying all the information needed)

Beneficiary Name (User's name)Arun dev sharma

PAN:avpps6088q

Bank Account No. 1549001300000759

Name of the Branch:defence colony

IFSC Code: PUNB0154900



Dr. Arun Dev Sharma, Associate Prof, HOD, Dean Research, PG
Department of Biotechnology ,Cont: 8558885524,E-mail:
arundevsharma47@gmail.com

Annexure-I

Research Title: Aromatic oil extraction, compositional profiling and biological activities of essential oils extracted from underutilized crops Eucalyptus and Lemon grass: Waste to Wealth

Aroma crops are source of natural essential oils widely used in the fragrance, flavor, food, pesticides and pharmaceutical industries. Apart from generating higher incomes for the farmers, most of the aromatic crops have inherent tolerance to various biotic and abiotic stresses and are also not damaged by the wild and domestic animal, therefore provide economic insurance to the farmers. As these crops (eucalyptus and lemon grass) can be accommodated very well under prevalent cropping systems and even can be co-cultivated with many of the food crops, the earnings of the farmers can be substantially enhanced. Some of these crops providing appreciable returns could be suitable candidates for doubling the farm income. These crops (eucalyptus and lemon grass) represent “underutilized crops” as much less interest has been paid to these kinds of plants at research and community level.

Day by day, interest of human being has been increased tremendously in aromatic plants because they pose a number of bioactive compounds. These bioactive compounds pose a number of biological activities. As mentioned earlier, essential oils are very important in food, perfume and pharmaceutical industries. However, very less interest has been paid to essential oils from said underutilized crops. Hence, Novelty of the project lies in the fact that this technology does not exist at present in Punjab as such and Jalandhar particular. Using hydrodistillation technology, aromatic oils will be extracted and chemically profiled using HPLC and GC-FID systems. Biological activities like DPPH, antioxidant capacity, iron reducing power of oils will be evaluated. Potent antimicrobial analysis using MIC will also be evaluated to find out key potential of aromatic oils.

Expected Deliverables

- ✓ Extraction of essential oil
- ✓ Production at cottage level
- ✓ Marketing of essential oil

Expected benefits

- ✓ Increase in self sustainability of target Group
- ✓ Opportunity to become small, medium and cottage entrepreneur
- ✓ Augmentation in livelihood of target population

Annexure-II [Consumables]

ITEM	Item	PRICE
DPPH	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	4000x2
NBT	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	5000x3
ABTS	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	7000x2
MICROBIAL CULTURE	TO STUDY ANTI MICROBIAL POTENTIAL OF OILS	5000
AGAR	FOR MAKING PLATES	3000
BROTH	TO STUDY IC50 OF OILS	4000x3
DMSO	TO DESOLVE DPPH	500x2
ETHANOL	USED IN DPPH ASSAY	1000x10
RUTIN	WILL BE USED IN GAS CHROMATOGRAPHY	500.
VENNILIN	SAME AS ABOVE	5000
LPG GAS CYLINDER	REQUIRED FOR HYDRODISTILLATION	1400X12=16800
GALLIC ACID	WILL BE USED IN GAS CHROMATOGRAPHY	5000
ASCORBIC ACID	SAME AS ABOVE	5000x2
Eugenol	HPLC standard	8000x2
Gernoil	HPLC standard	7000x2
Citral	HPLC standard	9000x2
cineole	HPLC standard	
Pot ferricynde	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	1000
TAA	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	2000
Sod nitroproside	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	1500
Sulphanillic acid	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	1700

Phenanthroline	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	5000
H ₂ O ₂	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	500
Vanilin sol	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	1000
Methanol	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	700x5
Sod nitrite	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	1100
Al chloride	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	800
NaoH	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	1500x2
Triton-X 100	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	800
FeSo ₄	TO STUDY FREE RADICAL SCAVENGING ACTIVITY OF ESSENTIAL OIL IN DPPH ASSAY	700

Annexure-III



भारतीय समवेत औषध संस्थान

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्)

केनाल रोड, जम्मू - 180001

Indian Institute of Integrative Medicine

(Council of Scientific & Industrial Research)

Canal Road, Jammu - Tawi - 180 001 (INDIA)

Dr. Sumeet Gairola
Senior Scientist and Assistant Professor (AcSIR)
Plant Sciences Division, CSIR-IIIM, Jammu

IIIM/RRLH/2020/01

Dated: 2nd January 2020

To
The Principal,
Lyallpur Khalsa College
Jalandhar, Punjab

Subject: Acknowledgement of support provided by the Lyallpur Khalsa College in the implementation of CSIR-Aroma Mission at Jalandhar and nearby areas.

Dear Sir,

We feel happy to inform you that during the past couple of years, under CSIR-Aroma Mission, CSIR-IIIM Jammu has successfully introduced various aromatic cash crops in 2000 ha area at different locations of the country. Many prominent institutions at various states throughout the country have supported us in implementing CSIR-Aroma Mission successfully. Your college is one such organization that has helped us to extend to the small and marginal farmers at Punjab. With your support, a training-cum-awareness program was conducted on 12-03-2019 at Lyallpur Khalsa College, Jalandhar, in which 30 farmers from Punjab had participated. Besides, a nursery of aromatic crops under CSIR-Aroma Mission was developed at Lyallpur Khalsa College, Jalandhar for demonstration purposes. The staff of the college has supported the CSIR-Aroma Mission team from time to time in the implementation of activities in various villages of Punjab. We thankfully acknowledge the support provided by the Lyallpur Khalsa College, Jalandhar in the implementation of the CSIR-Aroma Mission in the Jalandhar and nearby areas of Punjab.

On the occasion of New Year 2020, we thank Lyallpur Khalsa College and hope that we will keep on receiving support in future also.

Yours sincerely


02/01/2020
(Sumeet Gairola)

Nodal (CSIR-IIIM), CSIR-Aroma Mission

Annexure-IV

BUDGET ESTIMATES – SUMMARY*

Sl. No.	Items	Budget (in Rs.)			
		1 st Year	2 nd year	3 rd year	Total
A.	<i>Recurring</i>				
1	Consumables	50000	50000	50000	150000/
2	Travel	50000	50000	50000	150000/
3	Contingency/Testing charges	40000	40000	40000	112000/
4	Overheads	30000	30000	30000	90000/
	Total (A)				5,02,000
B.	<i>Non Recurring</i>				
5	Equipment HPLC CHROMATOGRAPHY SYSTEM	12,00,000/	-	-	12,00,000/
	Total (B)		-	-	12,00,000
	Grand Total (A+B)				17,02,000/

1. **Justification:** Required to purchase chemical for various assays
2. **Justification:** Required to collect plant material, attend meetings and trainings
3. **Justification:** Required for testing and purchase other lab material other than consumables like pipes, LPG, Containers for oil, leaves etc
4. **Justification:** For provide basic infrastructural Facilities
5. **Justification:** Funds required purchasing HPLC chromatography system to analyse Phyto-chemical analysis of Bioactive compounds being present in essential oils