•**Assess In Vitro Efficacy** Evaluate the therapeutic potential of the lavender oil-loaded SMEDDS cream through in vitro studies, including antimicrobial and antioxidant testing.

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Formulation of Lavender oil loaded Self-Microemulsifying Drug Delivery System for Psoriasis management.

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INTRODUCTION & AIM

- Psoriasis is a chronic inflammatory skin disorder with rapid abnormal keratinocyte proliferation, leading to scaly skin plaques.

- Lavender oil, extracted from *Lavandula angustifolia*, has anti-inflammatory and antimicrobial properties potentially beneficial for managing psoriasis. However, poor solubility & permeability of lavender oil limits therapeutic potential.

- SMEDDS are oil-surfactant mixtures forming stable microemulsions for improved topical drug delivery
- Thus this project aimed develop and evaluate a self-microemulsifying drug delivery system (SMEDDS) for lavender oil, incorporating it into a topical cream formulation

- **Aims and objectives:**

- To design and optimise the method for the preparation of self emulsifying drug delivery system

- To develop and evaluate lavender oil-loaded SMEDDS and incorporate the optimised formulation into a cream base for topical application.

- To assess In vitro efficacy of lavender oil loaded SMEDDS cream through in vitro studies.

METHOD

- **Preformulation Studies**

Lavender oil was assessed for appearance, color, solubility in various solvents, FT-IR spectra, and gas chromatography to confirm identity and purity.

- **SMEDDS Formulation & Optimization**

➢ Solubility Studies: Lavender oil solubility in oils, surfactants, and co-surfactants determined via shaking flask method.

➢ Pseudo-Ternary Phase Diagrams: Constructed using water titration to identify microemulsion regions.

➢ Formulation Selection: Optimised formulation was selected based on clarity, stability, and emulsification efficiency.

- **Characterization of SMEDDS**

➢ Visual inspection for transparency and phase separation.
➢ pH & viscosity: Measured using pH meter and Brookfield viscometer.
➢ % Transmittance: Assessed at 632 nm using UV spectroscopy
➢ Droplet Size & Zeta Potential: Measured using Malvern Zetasizer.

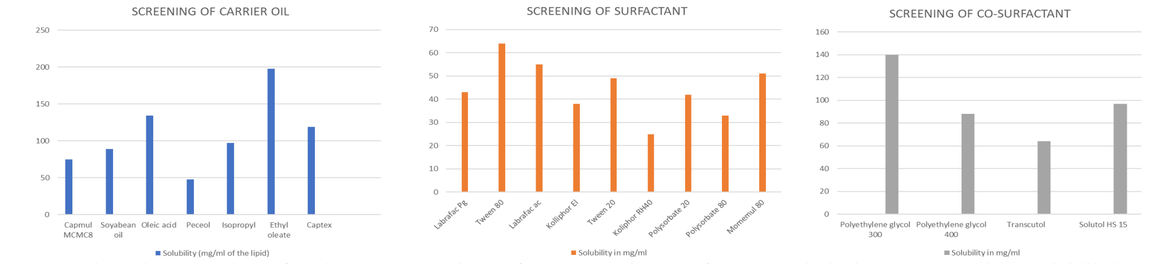
➢ SMEDDS were incorporated into cream formulation and it was evaluated as per standard pharmaceutical procedures.

- **In Vitro anti psoriasis Evaluation**

➢ Gene Expression Analysis: Drug-treated HaCaT cells were analyzed for psoriasis-associated inflammatory markers via SYBR Green-based real-time PCR following RNA extraction and cDNA synthesis.

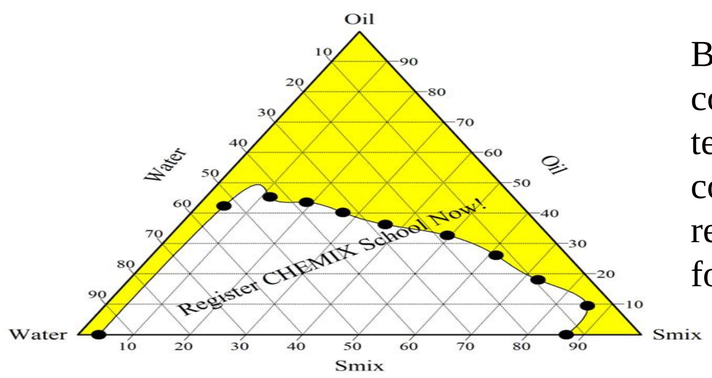
RESULTS & DISCUSSION

SCREENING OF SURFACTANT, CO-SURFACTANT AND CARRIER OIL



Based on the screening of various carrier oils, surfactants, and co-surfactants, ethyl oleate (197 mg/mL solubility), Tween 80 (64 mg/mL solubility), and PEG 300 (140 mg/mL solubility) were selected as the optimal carrier oil, surfactant, and co-surfactant

Pseudo-Ternary Phase Diagram



Based on the screening of surfactants, co-surfactants, and carrier oils, pseudo-ternary phase diagrams were constructed, which identified the regions where stable microemulsion formulations

Optimization of SMEDDS formulation with Lavender oil:

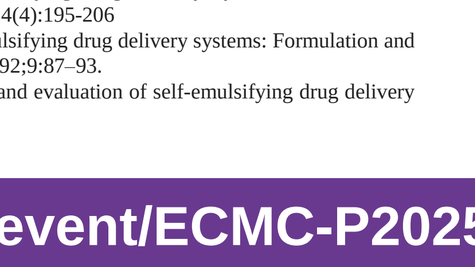
From the pseudo-ternary phase diagram, formulation batch with oil and Smix in the ratio of 1:37 was established, as an optimized batch.

The drug content of the optimized batch was 92%

Sr	Parameter	Result
1	Viscosity	280cp
2	pH	7.4
3	Transmittance	92.57
4	Zeta potential	-26.1 mV
5	Droplet size	147.3 d.nm
6	Centrifugation test	PASS
7	Freeze taw	PASS
8	Heat cooling test	PASS

Cream formulation: optimized SMEDDS batch, was incorporated stearic acid cream bases and the batch containing 10% stearic acid exhibited desirable drug release of 94.89% over 24 hours in comparison to conventional formulation (33.78%) and also passed all the pharmaceutical evaluation parameters of cream.

RT-PCR : When compared with control, proinflammatory marker, TNF-α expression was significantly reduced around 56% in lavender oil SMEDDS loaded cream.



CONCLUSION

This study successfully formulated and optimized a self-microemulsifying drug delivery system (SMEDDS) for lavender oil to enhance its solubility, stability, and suitability for topical application. Incorporation into a cream base demonstrated favorable physical properties, supporting the potential of lavender oil-loaded SMEDDS as a promising approach for managing psoriasis through topical delivery.

FUTURE WORK / REFERENCES

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