Journal of Pharmacognosy and Phytochemistry
Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
Impact Factor (RJIF): 6.35
www.phytojournal.com
JPP 2025; 14(5): 113-119
Received: 12-06-2025
Accepted: 15-07-2025

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Exploring the herbal medicinal applications *of Manilkara kauki, Maranta arundinacea, Tridax procumbens and Anthoshorea roxburghii*

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DOI: https://www.doi.org/10.22271/phyto.2025.v14.i5b.15560

Abstract
The increasing demand for herbal products has opened new avenues in the pharmaceutical and cosmeceutical markets, driven by their perceived safety and efficacy. The selected herbs *Manilkara kauki*, *Maranta arundinacea*, *Tridax procumbens*, and *Anthocephalus cadamba* demonstrate promising medicinal properties that warrant further exploration for formulation development. The formulations exhibiting promising anti-inflammatory, antibacterial, antifungal, and crack healing properties hold significant potential for commercial development. Conducting further development of formulation and preclinical studies are crucial for translating the findings of the study into clinical practice. Assessing the potential global health impact of the formulations, particularly in regions with high burdens of inflammatory diseases, bacterial infections, and fungal infections, is essential by leveraging the medicinal properties of *Manilkara kauki*, *Maranta arundinacea*, *Tridax procumbens*, and *Anthocephalus cadamba*, there is a promising opportunity to develop effective herbal formulations that meet the growing demand for safe and efficacious natural products in the pharmaceutical and cosmeceutical markets.

Keywords: *Manilkara kauki*, *Maranta arundinacea*, *Tridax procumbens*, *Anthoshorea roxburghii*, anti-inflammatory activity

Introduction

Materials and Methodology

Herbal Authentication

- ***Manilkara kauki*** and *Tridax procumbens* herbs were collected from our campus – Viswanadha Institute of Pharmaceutical Sciences.
- *Maranta arundinacea* herb was collected *from Paderu area.*
- *Anthoshorea roxburghii* herb collected from Andhra University area.

The herbs were sent to Andhra University- Botany Dept for Herbal Authentication.

Herbarium Preparation Technique

This technique involves Collection, Drying, Positioning, Stitching, Labelling, and Deposition.

Fig 1: *Tridax procumbens* herbarium

Fig 2: *Mimusops elengi* herbarium

Fig 3: *Maranta arundinacea herbarium*

Fig 4: *Anthoshorea Roxburghii* herbarium

Extraction of Active Materials from the Herbs

Mimusops elengi (Manilkara kauki) [1]

- The fruits of *Mimusops elengi* were collected, washed thoroughly with water and the pulp of the fruits was separated. The pulp was dried and powdered. The powder was sieved using 24 sieve. The fine powder was used for the formulation.
- This powder used for formulation of Facial cream for whitening and glowing purpose

Formulation of *Mimusops elengi* gel - FME [5]

Procedure: 100 mg of carbopol was weighed accurately and soaked in distilled water for a period of 12hrs. The soaked gel was triturated in to a smooth paste. To this paste *Mimusops elengi* powder- 100 mg was added and mixed thoroughly in a mortar and pestle. Required qty of rose water, almond oil, olive oil were added and mixed thoroughly, finally preservative was added and the formed gel was stored in a container for further analysis. Total qty of the cream was one gram.

Tab 1: Formulation of *Mimusops elengi* gels

FME-1	FME-2
Mimusops elengi powder- 100 mg	***Mimusops elengi*** powder- 100 mg
Carbopol 934 -100 mg	Sandal wood powder-50 mg
Rose water- qs	Carbopol -934 100 mg
Almondoil-1ml	Rose water- qs
Olive oil-2ml	Almondoil-1ml
	Olive oil-2ml
Methyl paraben-2 mg	Methyl paraben-2 mg

Tridax procumbens [3]

The flowers, stem and leaves of *Tridax procumbens* were collected from the garden and grinded by using electric mixer. The extract was filtered using cotton Muslin cloth. The filtrate was used for preparation of the formulation.

Tab 2: Formulation *TRIDAX PROCUMBENS* of crack cream- FTP

FTP
***Tridax procumbens* extract- 100ml**
Carbopol T314 -100 mg
Methyl paraben-2 mg
Olive oil-2ml

Formulation of *Tridax procumbens* extract crack cream Procedure

100 mg of carbopol was weighed accurately and soaked in the extract for a period of 12hrs. The soaked gel was triturated in to a smooth paste. To this paste required qty of rose water, olive oil were added and mixed thoroughly, finally preservative was added and the formed gel was stored in a container for further analysis. Total qty was found to be 500 mg.

Maranta arundinacea [2]

The roots of arrowroot plants were collected from Paderu area and dried under the shade. The skin of the arrowroot was peeled off and dried.he dried arrowroot was powdered using the electric mixer. The powder was sieved using 24 sieve. The fine powder was used for the formulation.

Formulation of facial Scrubber: FMA

Table 3: Formulation of facial Scrubber: FMA

FMA
***Maranta arundinacea powder*- 100 mg**
Carbopol 934 -100 mg
Rose water- qs
Methyl paraben-2 mg
Olive oil-2ml

Procedure: 100 mg of carbopol was weighed accurately and soaked in the rose water for a period of 12hrs. The soaked gel was triturated in to a smooth paste. To this paste required qty of *Maranta arundinacea* powder was added and mixed thoroughly, olive oil was added and mixed thoroughly, finally preservative was added and the formed gel and stored in a container for further analysis. Total qty was found to be one gram.

***Anthoshorea roxburghii* (*Shorea robusta*)** [4]

The resin of *Shorea robusta* was finely grinded using mortar and pestle. The grounded powder was sieved using fine cotton cloth. The powder was sieved using 24 sieve. The fine powder was used for the formulation.

Formulation of Crack Cream: FAR

Tab 4: Formulation of facial Scrubber

FAR
Anthoshorea roxburghii powder- 200 mg
Coconut oil-50 ml
Distilled water-50ml
Methyl paraben-2 mg

Procedure: Virgin Coconut oil was prepared by extracting coconut milk. The Obtained oil was heated in beaker and transferred to a mortar and pestle containing 200 mg of ***Anthoshorea roxburghii*** powder. It was stirred thoroughly

until formation of smooth gel. Distilled water was added slowly to the gel by stirring until gel formation. Finally preservative was added and the formed gel and stored in a container for further analysis. Total qty was found to be 100 g.

The formulated herbal formulations were to subjected to various evaluation parameters

Evaluation tests

- Phytochemical evaluation
- Physical characteristics
- Skin irritation tests

Stability tests

- It evaluates how the formulations holds up under various conditions such as temperature, and light exposure.
- This helps to determine its efficacy and whether it remains effective over time.
- All the formulations were to subjected to stability analysis. All the formulations were kept at room temperature and subjected for physical appearance every month.

Pharmacological activities of the formulations

All the formulations were subjected to pharmacological activities. The samples were to Sandip University for analysis.

- **FME-1:** subjected to antibacterial activity.
- **FME-2:** Glowing and Soothening effect (Activity was performed at VNIPS- Viswanadha Institute of Pharmaceutical Sciences)
- **FTP:** Anti-fungal activity
- **FMA:** Anti-inflammatory activity.
- **FAR:** Crack healing and wound healing activity (Activity was performed at VNIPS)

Anti-inflammatory activity of FMA compound on carrageenan induced inflammation

Carrageenan-induced rat paw edema model

The rats were divided into Five groups (n -4), each receiving distilled water (control), Diclofenac 20 mg/kg p.o. (reference standard), and 50, 100, mg/kg p.o. dose of FMA-1, respectively. Carrageenan (0.1 mL of 1%) was injected into the sub plantar tissue of the right hind-paw of each rat. The volume of the carrageenan injected into the foot was measured at 0, 60, 120, and 180 minutes using a plethysmometer (Biodevices, New Delhi, India). The results were depicted and discussed in later section.

Anti-bacterial activity of FME-1

The extracts mentioned above were tested against pathogenic bacterial strains, *S. aureus*, Antibacterial screening was done using agar well diffusion method. For this 20 mL of sterile Mueller Hinton Agar (Hi-media) was poured in sterile autoclaved petri plates. After solidification, the sterile cotton swab was dipped into the bacterial culture. The entire agar surface of each plate was evenly inoculated by swabbing. The seven uniform wells were prepared with the help of sterile 6 mm diameter cork-borer. Each well was filled with the various concentrations test compound (10, 20, 25, and 30 mg/mL), respectively, and allowed for diffusion for 45 minutes. The plates were then incubated at 37°C for 24 hrs. Triplicate plates were prepared for each treatment and the average zone of inhibition excluding well was recorded. 9% DMSO was used as negative control. Turbidity of bacterial culture was maintained up to 1 × 108 CFU/mL. The antibacterial potential of test compounds was compared with standard antibiotic Ampicillin (10 μg/disc) with paper disc (Hi-media) method. The results were depicted and discussed in later section.

Anti-fungal activity of FTP

An antifungal assay of the FTP was conducted using the agar well diffusion method according to the National Committee for Clinical Laboratory Standards (NCCLS). Isolates of *A. niger* (ATCC 16404). Potato dextrose agar (PDA) was used as the culture medium for the agar well diffusion method. The final pH of the medium was adjusted to 5.2 ± 0.2 using a sodium phosphate buffer. Uniform wells were prepared with the help of sterile 6 mm diameter cork-borer. Then, the plates were left at room temperature for one hour to allow diffusion of the test samples and incubated with *A. niger* at 37 °C for 48 h. After the incubation period, the diameters of all the zones of inhibition were measured. Four different concentrations (10, 25, 50 and 100 mg/mL) were prepared. Commercially available Clotrimazole cream was the positive control, and the cream base without active hexane extract used as the negative control. Both of these were dissolved separately in 5 mL of DMSO to fill in to the wells. After that, these test samples and the positive and negative control samples were filled into the wells of the prepared culture plate as previously mentioned.

Results and Discussion: Authentication Reports

All the collected herbs were sent to Botany Dept, AU. Herbal authentication reports suggested that there is a small change in the *sps* of two herbs *Mimusops elengi* and *Shorea robusta*

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Date: 29-02-2024.

CERTIFICATE

This is to certify that the plant specimen identified as ***Anthoshorea roxburghii*** (G.Don) **P.S.Ashton & J.Heck.** belongs to the **Dipterocarpaceae** family, collected and herbarium deposited by **Dr. B. Nagamani,** Department of Pharmacy, Viswanadha institute of pharmaceutical sciences, Visakhapatnam at Andhra University Herbarium, Department of Botany, Andhra University, Visakhapatnam with **Coll. No. 25434AUV**

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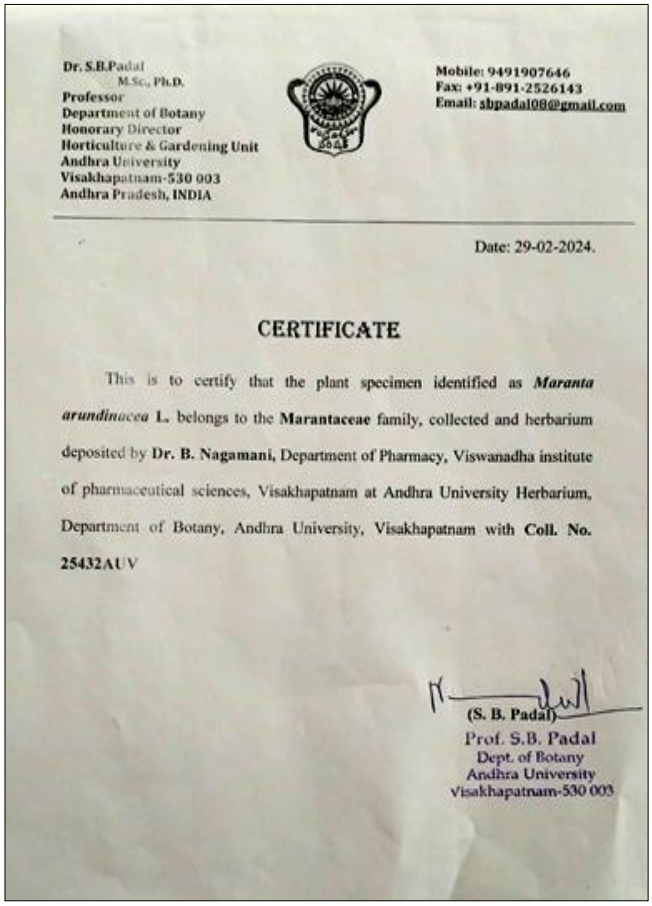
Fig 5: *Shorea robusta reported as Anthoshorea roxburghii* Herbarium report



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CERTIFICATE

This is to certify that the plant specimen identified as ***Maranta arundinacea*** **L.** belongs to the **Marantaceae** family, collected and herbarium deposited by **Dr. B. Nagamani,** Department of Pharmacy, Viswanadha institute of pharmaceutical sciences, Visakhapatnam at Andhra University Herbarium, Department of Botany, Andhra University, Visakhapatnam with **Coll. No. 25432AUV**

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Fig 6: *Maranta arundinacea* herbarium report

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CERTIFICATE

This is to certify that the plant specimen identified as ***Tridax procumbens*** **L.** belongs to the **Asteraceae** family, collected and herbarium deposited by **Dr. B. Nagamani,** Department of Pharmacy, Viswanadha institute of pharmaceutical sciences, Visakhapatnam at Andhra University Herbarium, Department of Botany, Andhra University, Visakhapatnam with **Coll. No. 25431AUV**

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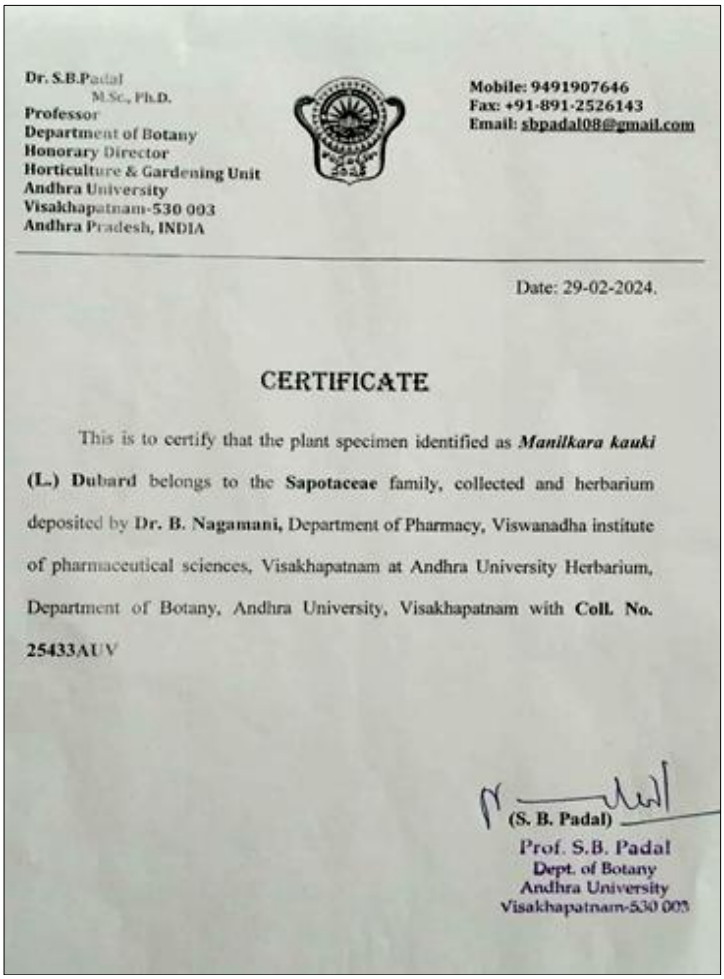
Fig 7: *Tridax procumbens* Herbarium report



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CERTIFICATE

This is to certify that the plant specimen identified as ***Manilkara kauki*** **(L.) Dubard** belongs to the **Sapotaceae** family, collected and herbarium deposited by **Dr. B. Nagamani,** Department of Pharmacy, Viswanadha institute of pharmaceutical sciences, Visakhapatnam at Andhra University Herbarium, Department of Botany, Andhra University, Visakhapatnam with **Coll. No. 25433AUV**

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Fig 8: *Mimusops elengi* reported as *Manilkara kauki sps*- herbarium report

Tab 5: Physical Evaluation of the formulations

S. No	Formulation	Skin irritation	Spreadability	Stability	Physical appearance	Washability
1	FME-1	-	Spreads easily	Stable	Soft and Light Pink color	Easily
2	FME-2	-	Spreads easily	Stable	Soft and Light Brown color	Easily
3	FTP	-	Spreads easily	Stable	Soft and green color	Easily
4	FMA	-	Spreads easily	Stable	Soft and whitish color	Easily
5	FAR	-	Moderate spreadablity	Stable	Soft and wheat color	Moderate

All the formulations are stable for a period of two months. The formulations are physically stable. Color and appearance of the formulations are intact.

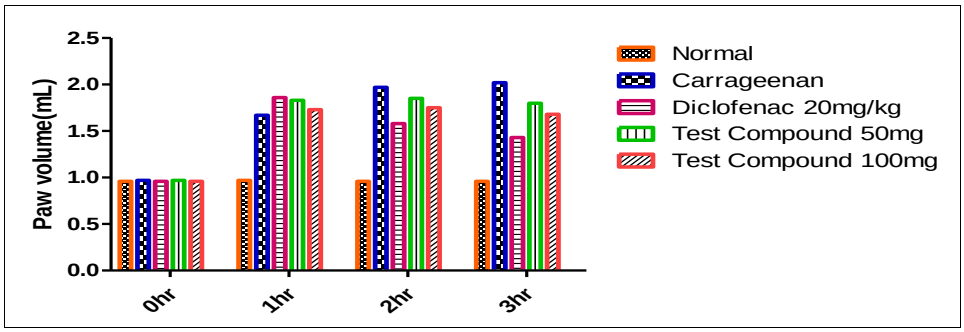
Phyto chemical evaluation of the herbal extracts:

1. *Mimusops elengi* fruit extract revealed the presence of alkaloids, flavonoids, tannins, saponins, terpenoids, and steroids**.**
2. *Tridax procumbens plant parts* extract revealed the presence of alkaloids, flavonoids, phenols, saponins, steroids, and tannins.
3. *Anthoshorea roxburghii –oleo resins* revealed the presence o*f* alkaloids, flavonoids, tannins and terpenoids
4. *Maranta arundinacea root* revealed the presence of alkaloids, glycosides, flavonoids, terpenoids, saponins, and tannins

Table 6: Anti-inflammatory activity of FMA compound on carrageenan induced inflammation

Paw volume(mL) Mean±SEM				
Groups	**0hr**	**1hr**	**2hr**	**3hr**
Normal	0.96±0.12	0.97±0.96	0.96±0.78	0.96±0.58
Carrageenan	0.97±0.16	1.67±0.58	1.97±0.14	2.02±0.28**
Diclofenac Sodium 20 mg/kg	0.97±0.18	1.86±0.25	1.58±0.26	1.43±0.47
FMA_-50 mg of cream	0.97±0.02	1.83±0.63	1.85±0.78	1.80±0.18
FMA -100 mg cream	0.96±0.45	1.73±0.78	1.75±0.96	1.68±0.14***

Values are presented as the mean ± SEM, n-4 in each group; One-way ANOVA. *** p<0.001, as compared to the carrageenan group.



Graph 1: Anti-inflammatory activity of FMA

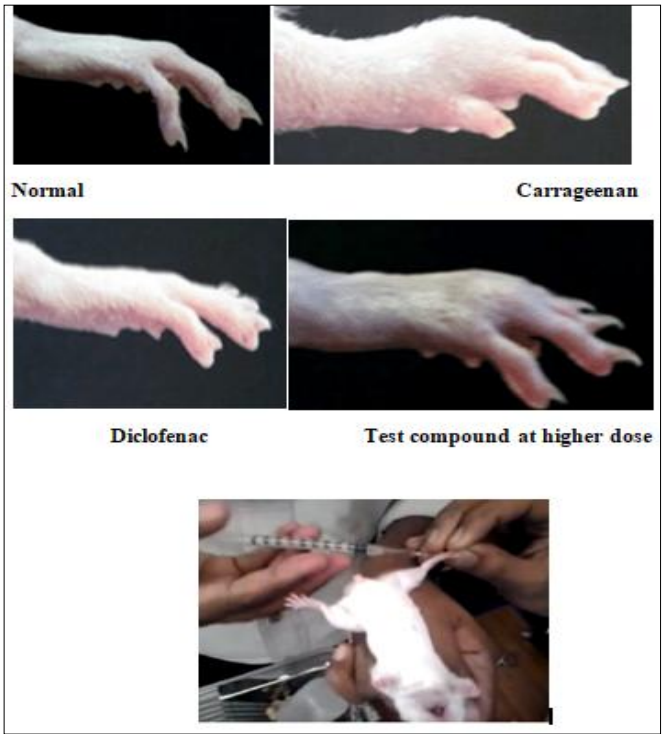


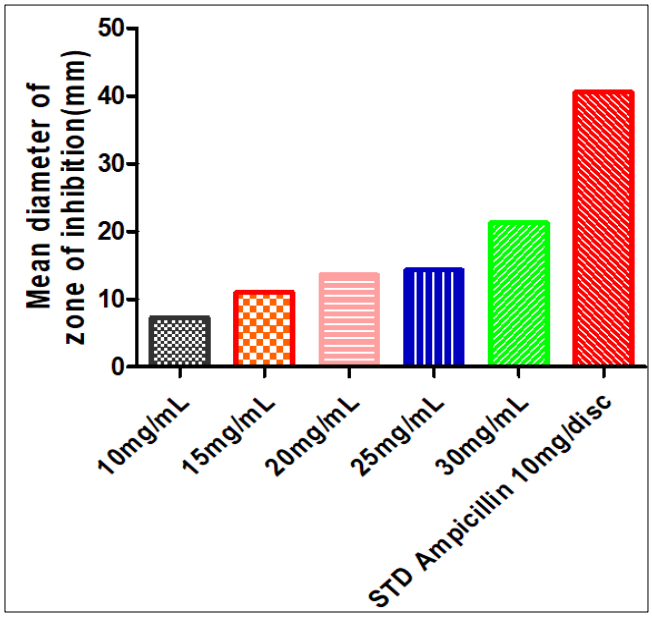
Fig 9: Anti-inflammatory activity of FMA

FMA formulation has shown good anti-inflammatory activity. 100 mg of active extract was present in one gram of cream. 50 mg of cream (5 mg of active extract) 100 mg of cream (10 mg of active extract). The test compound (presumably the FMA formulation) was found to be superior to Diclofenac sodium in terms of its anti-inflammatory activity.

Table 7: Anti-bacterial activity of FMA

Conc. mg/ml	10	15	20	25	30	STD Ampicillin 10 mg/disc	Control DMSO
Name of the bacteria	**Mean diameter of zone of inhibition(mm)** Mean±SEM						
S. aureus	7.33±0.12	11±0.46	13.6±0.75	14.3±0.47	21.3±0.89***	40.6±0.46**	0

Values are expressed as mean ± SEM and analysed by one-way analysis of variance (ANOVA) ****P*< 0.001.



Graph 2: Zone diameter vs Standard and test compounds

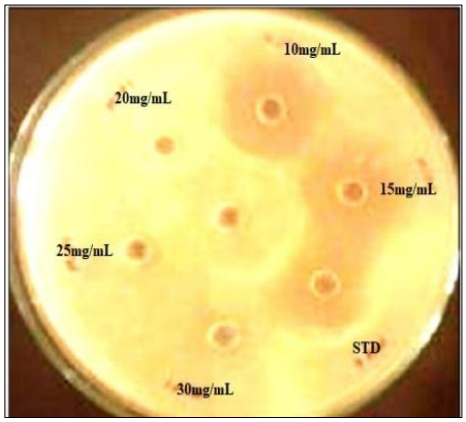


Fig 10: Antibacterial activity of FME

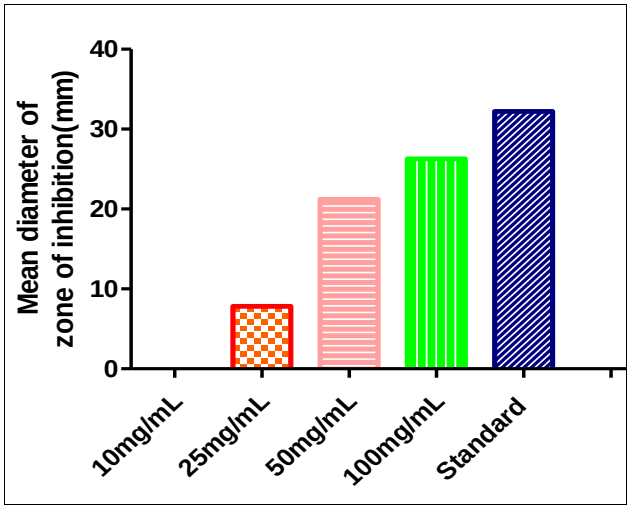
FME formulation has shown good anti-bacterial activity. 100 mg of active extract was present in one gram of cream. 20, 25, 30, mg/ml of cream (0.2,0.25,0.3 mg of active extract). The test compound (presumably the FME formulation) 30 mg/ml was found to be active and has shown antibacterial activity.

Table 8: Anti-fungal activity of FTP

S.no	Concentrations mg/mL	Mean diameter of Zone of inhibition(mm) *A.niger* Mean±SEM
1	10	Nil
2	25	7.8±0.26
3	50	21.2±0.58
4	100	26.2±0.89***
5	DMSO	Nil
6	Standard	32.2±0.46**

Values are expressed as mean ± SEM and analysed by one-way analysis of variance (ANOVA); ****P*< 0.001.

Crack healing property of FAR *Maranta arundinacea:* The formulated gel was applied to cracked foot for a period of 10 days. Healing of cracks was observed after one week.



Graph 3: Zone diameter vs Standard and test compounds

Fig 11: Antifungal activity of FTP

Note: FTP formulation has shown good anti-fungal activity. 500 mg of cream consists of 100ml active constituent. 10, 25, 50,100 mg of cream. The test compound (presumably the FTP formulation) was found to be active with respective to Clotrimazole in terms of its anti-fungal activity.

Discussion

- All the formulations, with the exception of the *Shorea robusta* (*Anthoshorea roxburghii* cream) were observed to exhibit easy spreadability and washability characteristics.
- Each formulation remained stable over a period of two months, demonstrating physical stability with no alteration in color or appearance.
- FMA formulation has shown good anti-inflammatory activity. 100 mg of active extract was present in one gram of cream. 50 mg of cream (5 mg of active extract) 100 mg of cream (10 mg of active extract). The test compound (presumably the FMA formulation) was found to be superior to Diclofenac Sodium in terms of its anti-inflammatory activity.
- FME formulation has shown good anti-bacterial activity. 100 mg of active extract was present in one gram of cream. 20, 25 30, mg/ml of cream (0.2,0.25,0.3 mg of active extract). The test compound (presumably the FME formulation) 30 mg/ml was found to be active and has shown antibacterial activity.
- FTP formulation has shown good anti-fungal activity. 500 mg of cream consists of 100ml active constituent. 10, 25, 50,100 mg of cream. The test compound (presumably the FTP formulation) was found to be active with respective to Clotrimazole in terms of its anti-fungal activity.
- ***Shorea robusta (****Anthoshorea roxburghii)* cream has shown better crack healing property.

Conclusion

- The formulations exhibiting promising anti-inflammatory, antibacterial, antifungal, and crack healing properties hold significant potential for commercial development.
- Conducting further preclinical is crucial for translating the findings of the study into clinical practice.
- Assessing the potential global health impact of the formulations, particularly in regions with high burdens of inflammatory diseases, bacterial infections, and fungal infections, is essential. Collaborating with public health organizations, to facilitate access to these formulations in underserved communities could contribute to improving healthcare outcomes worldwide.

References

1. Kadam PV, Yadav KN, Deoda RS, Shivatare RS, Patil MJ. Mimusops elengi: A review on ethnobotany, phytochemical and pharmacological profile. J Pharmacogn Phytochem. 2012;1(3):64-74.
2. Ingole VV, Mhaske PC, Katade SR. Phytochemistry and pharmacological aspects of *Tridax procumbens*. Phytomed Plus. 2021;2667-0313.
3. Singh DC, Dhyani S, Kaur G. A critical review on guggulu [*Commiphora wightii* (Arn.) Bhand.] and its miraculous medicinal uses. Int J Ayurveda Pharma Res. 2015;3(1):1-9.
4. Nair C, Abhirami VS, Ahamed MA, Haripriya SP, Vijay RS, Rand S, Prasobh S. Formulation and evaluation of face powder by arrowroot. World J Pharm Res. 2023;12(12).
5. Ubaid M, Ilyas S, Mir S, Khan AK, Rashid R, Khan MZU, Kanwal Z, Nawaz A, Shah A, Murtaza G. Formulation and in vitro evaluation of Carbopol 934-based modified clotrimazole gel for topical application. An Acad Bras Cienc. 2016;88(4):2303-2317.