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#### **Research Paper**

# Phytochemical Identification and Formulation, Evaluation of Herbal Gel

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ARTICLE INFO	ABSTRACT
Published: 16 May 2025 Keywords: Phytochemical, herbal gel, Tridax procumbens. DOI: 10.5281/zenodo.15430702	The present work was carried out to manufacture and assess polyherbal gel formulation containing extracts of Tridax procumbens leaves and Curcuma amada rhizomes and Lagenaria siceraria fruit, utilizing carbopol as gelling agents. Six batches in total (FG1–FG6) were made and tested for physicochemical properties that were determined to be within the range, including pH, viscosity, spreadability, and drug content. Every formulation that was produced showed good physical stability. For the results showed that the optimized batch formulation had a percentage flavonoid release of 33.6% and a percentage phenol release of 32.32% after some hours. The Excision model was used to test the wound healing properties. Excellent inhibitory action was demonstrated by the produced mixture. Based on the findings, we deduced that ridax procumbens leaves and Curcuma amada rhizomes and Lagenaria siceraria, herbal drugs, have been found to be beneficial for healing the wound when taken in a polyherbal topical gel formulation.

#### **INTRODUCTION**

Active ingredients found in medicinal plants can help cure illnesses or lessen discomfort. In the majority of developing nations, traditional medicines and medicinal plants are frequently employed as therapeutic agents to maintain good health. Eighty percent of people in developing countries utilize traditional medicines, mostly herbal plant cures, for basic medical care, according to the World Health Organization.

Medicinal plants are increasingly being used as raw materials in the production of pharmaceuticals. All civilizations saw a decline in the use of herbalism when modern western medicine first emerged, and synthetic chemicals were seen as the best means of healing and treating sickness. In their quest for a healthier way of life, people are rediscovering the therapeutic benefits of herbs. In a society growing healthier and more conscious of the environment, natural goods are now widely accessible in the west, and herbalism is regaining favour. Herbal treatments can work well without having many of the unfavourable side effects of modern drugs.

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Any medication delivery system's objective is to deliver a therapeutic dosage to the right location in the body in order to quickly reach and then sustain the required drug concentrations. The therapeutic effect of a medication is greatly influenced by the method of delivery. The primary channel of topical medication delivery is the skin, which is also one of the most accessible organs on the human body for topical administration.

# Benefit of the Topical Drug Delivery System: Avoiding first pass metabolism; easy to use and practical.

1. Prevents variations in medication levels across individuals.

2. How simple it is to cease using the medications when needed. 3. In contrast to the nasal or buccal cavities, it has wide variety a rather of use. 4. The potential for more specialized medication distribution to a specific area. 5. The utilization of drugs with short biological half-lives is made possible by Plant components such as seeds, berries, roots, leaves, bark, and flowers are utilized medicinally. Herbal medicine, botanical medicine, or phytomedicine are the terms used to describe this profession. Herbalism outside of orthodox medicine has a lengthy history. Herbs are plants or parts of plants used for their taste, fragrance, or therapeutic properties.

# MATERIAL AND METHOD:

The fresh parts of plants of Tridax procumbens leaves and Curcuma amada rhizomes and Lagenaria siceraria fruit were collected at the flowering stage in August from side of Khadkpurna River, Deulgaon Raja, and Maharashtra State, India.

The methodology use in these research study firstly performulation study for the determine the necessary physicochemical parameter of a new drug substance. In the preformulation studies organoleptic Characterization Colour, odour, shape, test and size were observed and studied the physicochemical characteristics.

The plants used in this study were carefully chosen, cleaned to get rid of contaminants, and shade-dried before the ethanol extract of Tridax procumbens leaves, Curcuma amada rhizomes, and Lagenaria siceraria fruit was prepared. In the mechanical grinder, the dried material was ground into a fine powder. After passing through sieve number 43, the fine powder was put away for later use in an airtight container. Using a Soxhlet equipment and ethanol as a solvent, approximately 100 grams of powdered material were extracted using a hot extraction process.

After the extraction process was completed and the solvent in the thimble turned clear, a few drops of the solvent were collected in the test tube and the solvent was subjected to a chemical test. The extract was dried in a rotary vacuum evaporator following each extraction. Additionally, a portion of the extract was saved for first phytochemical screening in order to identify different plant components, while the remainder was utilized to create gel batches.

In a phytochemical investigation a qualitative chemical analysis was performed on the alcoholic extract. To check for the presence of different phytochemical elements in the extract, the following methods were used. Steroids, terpenoids, carotenoids, flavonoids, alkaloids, tannins, saponin, and glycosides are the most significant of these bioactive plant components. In order to create safe and efficient medications, lead optimization tools use phytochemicals as templates. To check for the presence of different chemical ingredients in the extract, the qualitative test were used. After phytochemical investigation the analytical work were studied specially in the thin layer chromatography, Some quantitate



analysis for the determination of total flavonoids and phenolic contents.

# Formulation of Gel

In a 250 ml beaker, a weighted amount of carbopol was gradually dissolved in 50 ml of pure water. Then, to create a gel base, the liquid was rapidly agitated using a mechanical stirrer. Propylene glycol was added after the necessary amount of methyl and propyl paraben had been dissolved in a tiny amount of distilled water over a water bath and allowed to cool. Additionally, the necessary amount of Curcuma amada rhizome Extract of Ethanol, Leaves of Tridax procumbens, Lagenaria siceraria fruit ethanol extract was added to the combination above, and the remaining distilled water was added to get the volume up to 100 ml. Every item was well combined while being constantly stirred. Drop by drop, tri-ethanolamine was added to the recipe to change the pH of the skin and create a gel with the right consistency.

#### **RESULT AND DISCUSSION**

The utilization of Tridax procumbens, which has qualities like green color, distinctive odor, mucilaginous, and slightly bitter taste, has a scientific foundation according to the findings of an organoleptic investigation.

Curcuma amada (mango ginger) rhizomes are distinguished by their bright orange interior and light yellow to brown outside. They smell strongly of something aromatic and have a spicy, slightly bitter taste that some sources compare to raw mango.

Sr. No.	Organoleptic Characterization	Tridax procumbens	Curcuma amada rhizomes	Lagenaria siceraria fruits
1.	Color	Green yellow	Light yellow to brown	Green
2.	Odour	Mucilaginous	Aromatic	natural aroma
3.	Taste	Slightly Bitter	Slightly bitter	The taste is mild and slightly sweet
4.	Shape/Size	2-3 cm	Small	small to quite large
5.	Texture	-	Fleshy and firm	flesh is soft and tender

Table 1: Organoleptic Characteristics of selected herbal parts of plants

#### Table 2: Extractive value of different plant extract

	Extractive value		
Extractive	Tridax procumbens Curcuma amada		Lagenaria
Parameter	leaves	Rhizomes	siceraria fruits
Total ash	07 %	07 %	06 %
Acid insoluble ash	0.6 %	0.2 %	0.3 %
Alcohol soluble	04 %	04 %	03 %
extraction value			
Water soluble	11 %	10 %	12 %
extract			
Foreign matter	1.1 %	1.2 %	1.1 %

#### **Phytochemical Screening:**

Phytochemical screening of various extracts of Curcuma amada & Tridax procumbens and Lagenaria siceraria are: Ethanol Extract of Curcuma amada shown Alkaloids, Phenol, Flavonoid, Steroids and Carbohydrates. Ethanol Extract of Tridax procumbens shown Alkaloids, Tannin, and Phenol, Flavonoid and Steroids and ethanol extracts of Lagenaria siceraria shown Alkaloids, Phenol, and Flavonoid.

Thin Layer Chromatography (TLC): Assessment of secondary metabolites were observed by TLC. Ethanol extracts of Curcuma amada samples developing solvent and the Rf value was found to be 0.49. Ethanol extracts of Tridax procumbens samples developing solvent and the Rf value was found to be 0.49. Ethanol Extract of Lagenaria siceraria samples developing solvent and the Rf value was found to be 0.48.

# Determination of total phenol and flavonoid content

The ethanol extract of Curcuma amada had a total phenolic content of  $41.2 \pm 0.31$  and  $37.2 \pm 0.31$  mg of gallic acid/g. The total phenolic content of the ethanol extracts of Tridax procumbens and Lagenaria siceraria was determined to be  $35.5 \pm 0.14$  and  $33.2 \pm 0.41$  mg of gallic acid/g, respectively. The total amount of phenolic content was  $31.6 \pm 0.14$ .

Rutin was used as the benchmark to calculate the total flavonoid content. It was discovered that the ethanol extract of curcuma amada contained  $30.33\pm0.04$  and  $31.5\pm0.05$  mg of rutin/g. The ethanol extract of Tridax procumbens has a total flavonoid concentration of  $28.6\pm0.01$  and  $33.8\pm0.03$  mg of rutin/g. Rutin levels in ethanol solutions were determined to be  $31.33\pm0.05$  and  $29.5\pm0.04$  mg/g.

### **Evaluation of Topical Gel Formulations**

Table 5. Viscosity of for indiation			
Formulation batches	Viscosity (cps) at rpm		
	0.5	1.0	1.5
FG1	156200	132200	109200
FG2	172400	79600	117000
FG3	278900	128000	66200
FG4	167900	131400	85500
FG5	193100	132000	99400
FG6	204800	145000	87300

#### Table 3: Viscosity of formulation

#### Table 4: Drug content

Formulation	% Drug content	% Drug content
batches	of Phenol	of flavonoid
FG1	45.64 ±0.01	42.24 ±0.04
FG2	48.35 ±0.04	47.49 ±0.01
FG3	49.10 ±0.03	42.71 ±0.01
FG4	47.54 ±0.01	43.02 ±0.06
FG5	53.21 ±0.02	41.52 ±0.02
FG6	51.12 ±0.02	41.40 ±0.03

# **STABILITY STUDY**

The synthesized topical gel's physical appearance, extrudability, and spreadability did not alter after a month of storage, according to herbal accelerated stability testing. After a month of storage, the produced gel's pH was consistently measured by its spreadability. After one month of accelerated stability, the drug level was being maintained by the gel formulation.



Tuble et Blubinty study for optimized formulation butch (1 66)			
Evaluations	Formulation Batch FG5		
	Initial Value	<b>Final Value</b>	
рН	6.8	7.0	
Spreadability g.cm/sec	20.38	20.20	
Viscosity (cps) at rpm	192100	192105	
	0.5	0.5	
Extrudability (%)	20.10	20.12	
Color	Light Yellow	-	

Table 5:	Stability	study for	optimized	formulation	batch (FG5)
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# CONCLUSION

The existence of flavonoid and phenolic content was demonstrated by ethanol extracts of Lagenaria siceraria, Tridax procumbens leaf, and Curcuma amada rhizome. Carbapol can be used as a gelling agent to successfully create topical herbal gels that comprise extracts of Curcuma amada, Tridax procumbens, and Lagenaria siceraria at varying concentrations (1%). According to the study, the created polyherbal gel formulation with a 1% extract concentration produced much superior outcomes than previous formulations and demonstrated anti-inflammatory action.

# REFERENCES

- 1. "Tridax procumbens L." (https://www.eol.org/pages/503264) at the Encyclopedia of Life Ambulkar, Pranit (2012). "Avanti"- Tridax procumbens Linn The new healing herb of Ayurveda (1. Aufl ed.). Saarbrücken: LAP. ISBN 9783659243851.
- Gamboa-Leon, Rubi; Vera-Ku, Marina; Peraza-Sanchez, Sergio R.; Ku-Chulim, Carlos; Horta-Baas, Aurelio; Rosado-Vallado, Miguel (2014). "Antileishmanial activity of a mixture of Tridax procumbensand Allium sativumin mice"
- 3. Pathak, A.K; Saraf, S; Dixit, VK (1991). "Hair growth promoting activity of Tridax procumbens". Fitoterapia. 62: 307–13.
- 4. Alapati Srinivasa Rao; Bandaru Rajanikanth; Ramachandran Seshadri (1989). "Volatile

aroma components of Curcuma amada Roxb". J. Agric. Food Chem. 37 (3): 740–743. doi:10.1021/jf00087a036

- (https://doi.org/10.10 21%2Fjf00087a036). 5. Leong-Škorničková (2010). "Stability of
- names in Indian Curcuma" (http://ibot.sav.sk/usr/Karo l/docs/PDF\_files/curcuma\_taxon2010.pdf) (PDF). Taxon. 59 (1): 269–282. doi:10.1002/tax.591025 (https://doi.org/10.100 2%2Ftax.591025)
- Saha D, Guite D, Das T. A Complete Review on the Pharmacological Evaluation of Averrhoa Carambola Plant. World J. Pharm. Res. (2018) 12;7:199-210
- Lee H. Lazan H, Othman R, Ali. Purification and properties of a β-from carambola fruit with activity towards cell wall. Phytochemistry, (2005) 66:153.
- Dasgupta P, Chakraborty P, Bala N. Averrhoa carambola: an updated review. International Journal of Pharma Research & Review. 2013 Jul;2(7):54-63.
- Chau CF, Chen CH, Lee MH. Characterization and physicochemical properties of some potential fibres derived from Averrhoa carambola. Food/Nahrung. 2004 Jan;48(1):43-46.
- Palanivelu M, Ramlingam N, Ganesan B. Formulation and Evaluation of Herbal Gel Containing Averrhoa
- 11. Akter, J.; Takara, K.; Islam, M.J.; Hossain, M.A.; Sano, A. and Hou, D. (2019). Isolation



and structural elucidation of antifungal compounds from Curcuma amada. Asian Pacific Journal of Tropical Medicine, 12(3): 123-129.

- Tamta, A.; Prakash, O.; Punetha, H. and Pant, A.K. (2016).Chemical composition and in vitro antioxidant potentialof essential oil and rhizome extracts of Curcuma amadaRoxb. Cogent Chemistry, 2(1): 1168067.
- Sasikumar, B. (2005). Genetic resources of Curcuma: diversity, characterization and utilization. Plant Genetic Resources, 3: 230-251.
- 14. Policegoudra RS, Aradhya SM, Singh L. Mango ginger (Curcuma amada Roxb.)–A promising spice for phytochemicals and biological activities. Journal of biosciences. 2011 Sep;36(4):739-748.
- Meshram MM, Rangari SB, Kshirsagar SB, Gajbhiye S, Trivedi MR, Sahane RS. Nyctanthes arbor-tristis a herbal panacea. International Journal of pharmaceutical sciences and research. 2012 Aug 1;3(8):2432.
- 16. Sasmal D, Das S, Basu SP. Phytoconstituents and therapeutic potential of Tridax procumbens. Pharmacognosy Reviews 2007; 1: 344-349
- Wallander E, Albert VA. Phylogeny and classification of Oleaceae based on RPS16 and TRNL-F sequence data. American Journal of Botany 2000; 87: 1827-1841.
- Chidi BB, Pandeya S, Gharti KP, Bharati L. Phytochemical Screening and Cytotoxic Activity of Nyctanthes Arbor- Tristis. Indian Research Journal of Pharmacy and Science. 2015;5:205-17.
- Biswas1 I, Mukherjee A. Pharmacognostic Studies On The Leaf Of Nyctanthes Arbor-Tristis, Acta Botanica Hungarica. 2011; 53(3):225-34.
- 20. M.W. Whitehouse, Antiinflammatory glucocorticoids drugs: reflections after

60 years. Inflammo Pharmacology.2011;19(1):119.

- 21. Jyothi D, Koland M. Formulation and evaluation of an herbal anti-inflammatory gel containing Trigonella foenum greacum seed extract. International Journal Pharm Pharm Sci. 2016;8(1):41-.44.
- 22. Norris DA. Mechanisms of action of topical therapies and the rationale for combination therapy. J Am Acad Dermatol 2005;53:17-25.
- 23. Yasir EN, Khashab AL, Yasir MK, Hamadi SA, Al-Waiz MM. Formulation and evaluation of ciprofloxacin as a topical gel. Asian J Pharm sci 2010;8:80-95.
- Anonymous. Indian Pharmacopoeia. Vol. II. Controller of Publications, Edition 4th, New Delhi: Government of India; 1996.
- 25. Sawant SB, Bihani G, Mohod S, Bodhankar S. Evaluation of analgesic and anti-inflammatory activity of mEthanol Extract of curcuma caesia roxb. rhizomes in laboratory animals. Int J Pharm Pharm Sci. 2014 Apr;6(2):243-7.
- 26. Jayaprakasha GK, Selvi T, Sakariah KK. Antibacterial and antioxidant activities of grape (Vitis vinifera) seed extracts. Food research international. 2003 Jan 1;36(2):117-22.
- 27. Kandelwal KR, Pawar AP, Kokate CK, Gokhale SB. Practical Pharmacognosy Technique and Experiments. Nirali Prakashan. 1996.pp 9.1-9.15
- Kokate CK, Purohit AP, Gokhale SB. Text book of Pharmacognosy. Pune: Nirali Prakashan. 2003;8(66):1-624.
- 29. Hossain MA, AL-Raqmi KA, Al-Mijizy ZH, Weli AM, Al-Riyami Q. Study of total phenol, flavonoids contents and phytochemical screening of various leaves crude extracts of locally grown Thymus vulgaris. Asian Pacific journal of tropical biomedicine. 2013 Sep 1; 3(9):705-10.

- 30. Araujo LB, Silva SL, Galvao MA, Ferreira MR, Araujo EL, Randau KP, Soares LA. Total phytosterol content in drug materials and extracts from roots of Acanthospermum hispidum by UV-VIS spectrophotometry. Revista Brasileira de Farmacognosia. 2013 Sep; 23:736-42.
- Kadam PV, Yadav KN, Bhingare CL, Patil MJ. Standardization and quantification of curcumin from Curcuma longa extract using

UV visible spectroscopy and HPLC. J Pharmacogn Phytochem. 2018;7(5):1913-1918.

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