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PHYTO CHEMICAL SCREENING, FORMULATION OF CREAM AND IT'S ANTIFUNGAL ACTIVITY OF STEM EXTRACT FROM PANIKOORKA PLANT

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Abstract

The panikoorka plant is a noble plant which is packed with various benefits, belonging to the family Lamiaceae as it may help in lowering blood sugar levels, maintaining heart health, and helps in digestive system, the stem of panikoorka is also having the anti-cancer activity some studies also prove that the extract of panikoorka stem are effective against the acne causing bacteria (anti-microbial).We are formulating the anti-fungal cream with the extract of panikoorka stem, we have collected the different extracts of the panikoorka stem, we have formulated 2 different formulations with the stem of panikoorka (Plectranthus barbatus). The Plant extract is used to treat different types of infectious disease, hence microbial screening attempted to prove its anti-bacterial and anti-fungal activity. The demonstration of therapeutic efficacy was achieved through the use of defined settings to restrict microbial development. The paper disc diffusion method was employed in this work to assess the synthetic compounds' in vitro antifungal efficacy. One technique for figuring out the relative efficacy of the anti-fungal activity is the paper disc diffusion method. The anti-microbial drugs' toxicity and their capacity to permeate into the medium both affect the outcomes of this approach. Although it is not as effective as standard, our produced cream has antifungal action against both Aspergillus niger and Candida albicans bacteria.

Keywords: panikoorka plant, anti-microbial Plant extract, in vitro antifungal efficacy.

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Introduction

In India, knowledge of medicinal plants is very old and medicinal properties of plants are described in Rig Veda and in Atharvana Veda. Throat infections are more common disease in today's world. Most of these cases are viral origin and occur as a part pf the common cold [1].

The fragrant, upright herb Plectranthus barbatus (Lamiaceae) is derived from a perennial rootstock that is found throughout tropical East Africa, West Asia, the Himalaya, India, and Sri Lanka. Over 68% of all traditional uses of the plant are for treating a wide range of illnesses, including nausea and purgatives, burns, wounds, sores, allergies, measles, relief from colds and coughs, and general respiratory ailments [2-4]]. According to Baerts and Lehmann (1989), the plant's leaves can be slightly burnt and applied to the neck's skin to ease stiffness and treat bone dislocations. The herb is anti-tumor promoting and cytotoxic.

Panikoorka, also known as Plestrathus barbatus:

Plectranthus barbatus, a member of the Lamiaceae family, usually referred to as the mint family, was once known as Coleus forskohlii. This botanical family also includes well-known herbal plants like thyme (Thymus), basil (Ocimum), and sage (Salvia). Coleus barbatus and Njavara are synonyms. Plectranthus barbatus is the scientific name.

Geographical sources: South through Arabia, Sudan, Eritrea, Ethiopia, Somalia, East Africa, South Tropical Africa, and naturally into southern Africa are Pakistan, India, Nepal, and Ceylon.

Vernacular Names in India

Telegu: Vaamaku
Gujrati: Ajmet
Hindi: Patta ajwain
English: Plectranthus
Assamese: Borthekera
Malayalam: Panikoorka
Tamil: Karpuravalli

Scientific classification

Kingdom	Plantae
Clade	Angiosperms
Order	Lamiales
Family	Lamiaceae
Genus	Coleus
Species 	C. barbatus

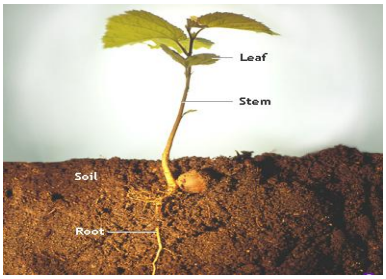


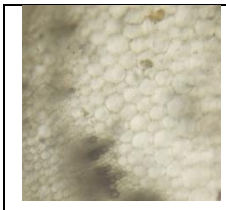
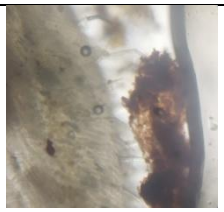
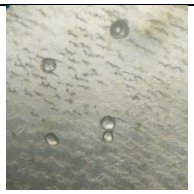
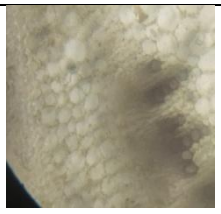
Figure 1.Images of Plectranthus barbatusplant

Morphological features of Plectranthus barbatus

Plectranthus barbatus is an upright, rapidly growing shrub that grows to be 6 to 8 feet tall. It has broad, thick stems that support big, oval, light green leaves that are 4-6 inches long, slightly fuzzy, and have tiny dentations along their margins. The eye-catching dark blue-purple flowers with their piled verticles, each bearing six to eight blossoms, appear in fall, continue into late spring, and frequently continue far into summer. The inflorescence is ten inches long.

Small-scale personality

Plectranthus barbatus plant stems under the microscope show unique anatomical characteristics. The stem usually includes of vascular bundles, pith, cortex, and epidermis, among other tissues. The skin's surface on the outermost layer, often contains stomata and may have trichomes. Beneath the epidermis, the cortex comprises parenchyma cells, providing structural support. Vascular bundles, responsible for transporting nutrients, are embedded in the cortex. The arrangement and types of cells in the stem contribute to the plant's overall structure and functionality, influencing its potential medicinal properties, such as antifungal activity.

			
Pith	**Vascular Bundle**	**Branch multicellular hair**	**Parenchyma**
			
Epidermis	**Cortex**	**Collenchyma**	**Palisade Parenchyma**

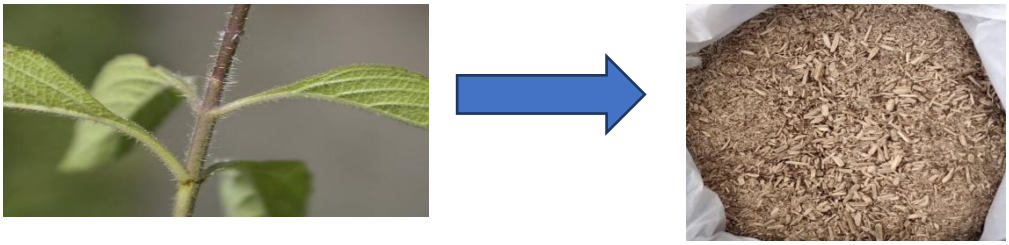
Materials and methods

Plant material Collection and authentication

Stem of *plectranthus barbatus* were collected from in and around areas of Tripati, 517 502. On 28 Sept 2023. Plant material was authenticated by Dr. K. Madhava Chetty (retd). Assistant professor, Department of Botany, Sri Venkateswara University, Tirupati and with Voucher No. 0558.

Extraction Procedure

Collected stems were washed,air - dried undershade dryfor 3-4 days, and ground intoa coarse powder using a mechanical grinder. The powdered materials wasmixed with ethanol and distilled water 1;10 ratio.The extracts were filtered,and the solvents were evaporated under reduced pressure using a rotary evaporator .



Phytochemical screening

The Plant extracts were subjected to preliminary phytochemical screening to detect the presence of various phytochemical constituents, including alkaloids,carbohydrates,tannins,saponins,flavonoids,glycosides,terpenoids,following standard qualitative tests described in the literature.

Test organisms

The antifungal activity of the extracts was evaluated against two clinically relevant fungal stains:Candida albicans (MDCC- 227), Aspergillusniger.

Inoculation of microorganism

The media was covered with the standard medication tetracycline disc, and the Whatman filter disc (5 mm diameter) was cut and loaded into vials that had cotton plugs in them. For 30 minutes, these vials were sterilized by being placed in a hot air oven set to 160°C.After that, it was given a separate bath in plant extract, allowed to dry out, and then placed on the medium (5 mm height). As a control, one other disk was submerged in DMSO and left on the medium. It was maintained at 37°C in the incubator for a full day. The zone of inhibition surrounding the extracts was observed, and its values were compared to the standard.

Anti Fungal Activity

- Since the plant extract is used to treat a variety of infectious diseases, microbial screening was done to demonstrate its anti-fungal and anti-bacterial properties. The demonstration of therapeutic efficacy was achieved through the use of defined settings to restrict microbial development.The paper disc diffusion method was employed in this work to assess the synthetic compounds' in vitro antifungal efficacy. One technique for figuring out the relative efficacy of the anti-fungal activity is the paper disc diffusion method. The anti-microbial drugs' toxicity and their capacity to permeate into the medium both affect the outcomes of this approach.
- Fungi - Candida albicans (MDCC- 227)
- Standard used : Tetracycline (10 µg/mL)
- Control: DMSO(Dimethyl sulfoxide)
- Test concentration: 200µg/mL

Working procedure

In a conical flask that had previously been filled with 100 ml of distilled water and dissolved in water, the following ingredients were gathered in the appropriate proportions: peptone, yeast extract, beef extract, sodium chloride, and agar-agar. After adjusting the medium's PH to 7.4, the PH was measured using universal indicator paper, which

displayed a green tint at this point. After that, it was moved to a conical flask, sealed with cotton that wasn't absorbent, and autoclaved for 30 minutes at 121°C and 15 pounds of pressure to sterilize it. then put into sterile Petri plates aseptically.

Composition of media

S. no	Composition of media	Amount
1	Peptone	1 gm
2	Beef extract	0.1gm
3	Yeast Extract	0.2 gm
4	Agar-Agar	2gm
5	Sodium Chloride	5gm
6	Distilled Water up to	100ml
7	P^H at 25°C	7.4 ±0.2

Preparation of anti-fungal cream (alcohol base)

Take 50 ml of panikoorka plant stem extract in the beaker.Add 1g of Carbopol 934 into the beaker.Add 0.05g of methyl paraben,0.025g of propyl paraben Above ingredients are mixed well with the help of stirrer.Now, add o.5ml of triethanolamine. And triturate the mixture with the help of mortar and pestle until the consistency of the cream is obtained.

Sl.No	Number Composition	Amount (g)
1	Panikoorka stem extract	50ml
2	Methyl paraben	0.05g
3	Tri ethanolamine	0.5ml
4	Propyl paraben	0.025g
5	Carbopol 934	1g
6	Rose oil	Qs

Preparation of anti-fungal cream (water base)

Take 100 ml of panikoorka plant stem extractin the beaker. Add 2g of Carbopol 934 into the beaker.Add 0.1g of methyl paraben,0.05g of propyl paraben Above ingredients are try to mixed with the help of stirrer. But those are not mixed well because moisture and density.

Sl.No	Number Composition	Amount (g)
1	Panikoorka stem extract	100ml
2	Methyl paraben	0.1g
3	Propyl paraben	0.05g
4	Carbopol 934	2g

Results

Phytochemical screening

The preliminary phytochemical screening of ethanol extract from the stem of Panikoorkarevealed the presence of various phytochemical constituents. The results are summarized in Table 1.The ethanol extract showed the presence ofAlkaloids,tanins, glycosides,terpenoids,
glycosides, flavonoids,saponins.

Table 1.Results of phytochemical screening

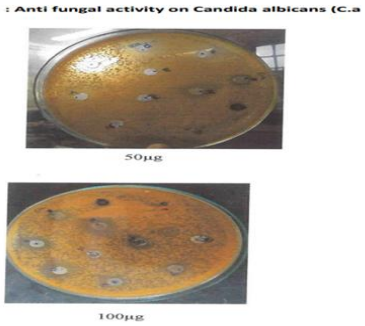
Phytochemicals	Ethanol Extract
1. Test for Alkaloid:	
➢ Hager's Reagent Test	+
➢ Wagner's Reagent Test	+
➢ Tannic Acid Test	+

➢ Mayer's Test	+
2. Test for Tannin:	
➢ Gelatine Test	-
➢ Ferric Chloride Test	+
➢ Lead Acetate Test	+
3. Carbohydrates Test	+
4. Glycosides Test	+
5. Flavonoid Test	+
6. Saponin Test	+
7. Terpenoid	+

Antifungal activity

Antifungal activity of extracts against candida albicans,Aspergillus nigerare summerized in Table 2.

S.no	MICROORGANISM	CONCENTRATION (µg/ml)	ZONE OF INHIBITION	
		50 µg	100 µg	STANDARD
1.	*Aspergillus niger*	10mm	16mm	17mm
2.	*candida albicans*	9mm	13mm	15mm



Evaluation of cream:

Evaluation	Result
Texture	Smooth
Spread ability	Good
When applied on skin	Non irritant
Odor	Pleasant
Color	Lighter green
pH	3.10
Wash ability	Easily washable
Greasiness	Oily

Discussion

The present study investigated the antifungal activity of ethanol extracts obtained from the stem of Panikoorkaagainst clinically relevant fungal stains candida albicans,Aspergillus Niger.The results demonstrated that ethanol extract of stem exhibited promising antifungal activity.

Numerous secondary metabolites, including alkaloids, flavonoids, glycosides, tannins, steroids, and saponins, were found during the initial phytochemical screening.It is well recognized that the phytochemical ingredients have a variety of biological functions, including antifungal ones.These substances may have contributed to the extracts' noted antifungal action.The paper disc diffusion method, a generally recognized and trustworthy technique for assessing the antibacterial potential of plant extracts and isolated chemicals, was used to assess the extracts' antifungal activity.

The combined actions of the several phytochemical ingredients contained in the extracts may be responsible for the reported antifungal activity of the ethanol extract.The traditional usage of plectranthus barbatus for the treatment of illnesses has been further supported by numerous studies that show the plant's leaf extracts exhibit antifungal efficacy against a variety of fungal strains.

Conclusion

The present study demonstrated the antifungal activity of ethanol extracts obtained from the stem of plectranthus barbatus against Aspergillus niger, candida albicans. The observed activity could be attributed to the presence of various phytochemical constituents, such as alkaloids, flavonoids, glycosides, saponins, tannins, terpenoids, inextracts.These findings provide scientific validation for the traditional use of plectranthus barbatus treating bacterial, fungalin fections. Further studies are warranted to isolate and identify the specific bioactive compounds resonsible for antifungal activity and elucidate their mechanism actions.

Conflicts of Interests

There are no conflicts of interest.

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Nil

Authors Contributions

All the authors have contributed equally.

Ethical Statement and Inform Consent

Not required

References

1. Thangavel P, Britto SJ, Senthilkumar SR. Adventitious shoot regeneration from leaf explants of the valuable medicinal herb Plectranthus barbatus. Afr J Biotechnol. 2011 Aug 10;10(43):8562-9.
2. Murtaza G, Mukhtar M, Sarfraz A. A Review: Antifungal Potentials of Medicinal Plants. J Bioresour Manag. 2015;2(2):4.
3. Sharma Y, Vasundhara M. Coleus (Plectranthus barbatus) – a multipurpose medicinal herb. Int Res J Pharm. ISSN 2230-8407.
4. Fernandes LCB, Camara CC, Soto-Blanco B. Leaves of Plectranthus barbatus for anti-convulsant activity. Evid Based Complement Alternat Med. 2012;2012:860153. doi:10.1155/2012/860153.
5. Abdel Khalik KN, Karakish EA. Comparative Anatomy of Stems and Leaves of Plectranthu L. (Lamiaceae) in Saudi Arabia and Systematic Implications. Microsc Res Tech. 2016;79:583-94.
6. Cordeiro MF, Nunes TRS, Bezerra FG, Damasco PKM, Silva WAV, Ferreira MRA, et al. Leaf extract of Plectranthus barbatus: Phytochemical characterization and biological activities. Braz J Biol. 2022;82:e236297.
7. Kulbat-Warycha K, Oracz J, Zyzelewicz D. Root extract of Plectranthus barbatus for various extraction method. Molecules. 2022;27:8986.
8. Solanki M, Jain N, Koshta A, Malviya S, Kharia A. Formulation and evaluation of antifungal cream. Bull Pharm Res. 2019;9(1-3):167.
9. Duarte MR, Lopes JF. Stem and leaf anatomy of Plectranthus neochilus Schltr, Lamiaceae. Rev Bras Farmacogn. 2007;17(4):549-56.
10. Ramkumar B, Logeshwaran A, Vedhanayaki TC. Phytochemical screening and evaluation of antimicrobial activity of Plectranthus barbatus rhizome. Pramana Res J. ISSN NO: 2249-2976.
11. Galbiatti MI, Cassola F, Mesquita AT, Pinheiro GP, Mayer JLS, Sawaya ACHF, et al. Plectranthus neochilus Schltr: Anatomic and cytogenetic analyses and chemical characterization of its essential oil. S Afr J Bot. 2021;143:97-106.
12. Kumar P, Sangam, Kumar N. Pharmacognostical, Pharmacological Studies and Traditional uses of Plectranthus Ambonicus: A Review. Res J Pharmacogn Phytochem. 2019;11(4):1-16.
13. Alasbahi RH, Melzig MF. Plectranthus barbatus: A review of phytochemistry, ethnobotanical uses and pharmacology—Part 2. Planta Med. 2010;76:753-65.
14. Kanne H, Burte NP, Prasanna V, Gujjula R. Extraction and elemental analysis of Coleus forskohlii extract. Pharmacogn Res. 2015;7:237-41.
15. Navindgikar NN, Kamalapurkar KA, Chavan PS. Formulation and evaluation of multipurpose herbal cream. Int J Curr Pharm Res. 2020;12(3):25-30.
16. Premkumar A, Muthukumaran T, Ganesan V, Shanmugam R, Priyanka DL. Formulation and evaluation of cream containing antifungal agents, antibacterial agents and corticosteroids. Hygeia.J.D.Med. 2014;6(2):October-March.

17. Sonalkar MY, Nitave SA. Formulation and evaluation of polyherbal cosmetic cream. World J Pharm Pharm Sci. 2016;5:772-9.
18. Ashara KC. Importance of trituration technique on preparation and evaluation of cold cream. Inventi Rapid Pharm Tech. 2013;1-2:2012.
19. Saheb SU, Reddy AP, Rajitha K, Sravani B, Vanitha B. Formulation and evaluation of cream from naturally containing plant extracts. World J Pharm Pharm Sci. 2018;7:851-62.
20. Parmar RB, Baria AH, Faldu SD, Tank HM. Design and evaluation of poly-herbal formulation in semisolid dosage form for its antibacterial activity. J Pharm Res. 2009;2:1095-7.
21. Parashar B, Kabra A, Chandel A. Formulation and evaluation of gel containing miconazole nitrate an antifungal agent. Int J Pharma Res Rev. 2013;2:8-28.
22. Rao PK, Khaliq K, Kharat SS, Sagare P, Patil SK. Preparation and evaluation of o/w cream for skin psoriasis. Int J Pharm Biol Sci. 2010;1:3.
23. Chen MX, Alexander KS, Baki G. Formulation and evaluation of antibacterial creams and gels containing metal ions for topical application. J Pharm. 2016;2016(5):1-10.