International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)
IJAMSCR |Vol.12 | Issue 2| Apr - June -2024
www.ijamscr.com
ISSN: 2347-6567
DOI : https://doi.org/10.61096/ijamscr.v12.iss2.2024.196-200

Research/Review

Anti-Bacterial Activity And Formulation Of Cream From The Medicinal Plant: Nyctanthes Arbor-Tristis

B.V. Shilpa*, K. Urukunda, P. Catherine Sandra, Rakibul Islam, Musharof Hussain kamal

Department of Pharmaceutical Chemistry, Pulla Reddy Institute Of Pharmacy, Hyderabad, India, 502313

*Author for Correspondence: B.V. Shilpa
Email: shilpakrishnamurthi2@gmail.com

Published on: 04 June 2024

Published by:
DrSriram Publications

2024| All rights reserved.

Creative Commons Attribution 4.0 International License.

Abstract

Nyctanthes arbor-tristis is well known Indian medicinal plant. Qualitative analysis was carried out to identify the different classes of secondary metabolites in various chemical extracts such as water and methanol. Qualitative analysis of the extracts proved the presence of phytochemicals such as Saponin, Tannin, Flavonoid, Steroid, Terpenoid, Quinine, Coumarin, Emodin and Gum and Mucilage. The pharmacological interest of these compounds, coupled with the use of this plant in traditional medicine prompted the authors to check for its possible antibacterial activity. The extract ethanol were found to possess maximum potency against infectious pathogens like gram(+ve)Staphylococcus aureus, Bacillus subtilis and gram(+ve) Escherichia coli, Pseudomonas aeruginosa. The zone of inhibition was observed after conformed with cell diffusion method with selected bacteria. Minimum inhibitory concentrations of the extracts were found to be significant. The obtained results provide a support for the use of this plant in traditional medicine and its further investigation.

Keywords: Nyctanthes Arbor-tristis, Creams, Antibacterial, Microorganisms, Ethanol extract.

INTRODUCTON

Nyctanthes arbor-tristis, commonly referred to as the night-flowering jasmine or Parijat, has long been recognized in traditional medicine for its therapeutic properties. Recent scientific investigations have focused on elucidating its antibacterial potential, owing to the urgent need for novel antimicrobial agents amidst rising antibiotic resistance. This study aims to explore the antibacterial activity of Nyctanthes arbor-tristis extracts against a range of pathogenic bacteria. Understanding its antibacterial properties could unveil new avenues for harnessing this natural remedy in combating bacterial infections, thereby contributing to the development of alternative therapeutic strategies.

The escalating threat of antibiotic resistance poses a significant challenge to public health worldwide, necessitating the exploration of alternative antimicrobial sources. In this context, natural products have gained

attention for their potential as novel antibacterial agents. Among these, Nyctanthes arbor-tristis, commonly known as the night-flowering jasmine or Parijat, holds promise due to its rich history in traditional medicine and anecdotal evidence of its medicinal efficacy.

Definition of antibacterial activity

Antibacterial activity refers to the ability of a substance, compound, or organism to inhibit the growth or kill bacteria. This activity is often assessed through laboratory experiments where the substance of interest is tested against various bacterial strains to determine its effectiveness in preventing bacterial growth or causing bacterial death.

The measurement of antibacterial activity can involve different parameters, including:

1.Minimum Inhibitory Concentration(MIC): The lowest concentration of a substance that inhibits visible growth of bacteria. This indicates the potency of the substance against the bacterial strain tested.

2.Minimum Bactericidal Concentration(MBC): The lowest concentration of a substance that kills bacteria. This demonstrates the ability of the substance not only to inhibit growth but also to cause bacterial death.

3.Zone of Inhibition: This is a qualitative measure observed in disc diffusion assays. A clear zone around the substance-impregnated disc indicates inhibition of bacterial growth,with larger zones indicating higher antibacterial activity.

Creams that are used for medical purposes are usually semi solid or very viscous liquid emulsions that contain medicaments dissolved or dispersed in the emulsion and are meant to be used externally [Barry, 1999; Okorie and Ofoefule, 2002]. Medicated creams are preferred to ointments because they are usually less greasy, spread quickly and the inflamed tissues are soothed due to evaporation of water [Barry, 1999; Okorie and Ofoefule, 2002]. The incorporated medicament could be synthetic, semi synthetic or natural product. Natural products are predominantly obtained from plants, although animals and soil materials may also be used. Plants contain wide range of chemical constituents that are of therapeutic importance. They contain a lot of secondary metabolites and one plant may contain enormous spectrum of biologically salient active compounds [Koteshwasr, 2017].

METHODS AND PREPARATION

Agar well diffusion method

The well diffusion test was performed using Agar medium, 3gms of agar medium with 100ml distilled water placed in the autoclave at 15lbs pressure at 121c for 15min then was cooled for some time.

Culture media is sterilizied in autoclave then transfered into four petridishes, we should wait until it solidifies, then take the bacteria by innocculam loop and transfer it on the culture media and spread with the spreader, now with the help of the boror make the hole in middle of the petridish and add a drop of the extract in all the four petridishes and place it in the incubator. The antibacterial activities were determined after 24-72 hours at 37ºC incubation in the incubator. The diameter of zone of inhibition produced by the extract.



Fig 1: Bacterial Activity



Fig 2: Zone Of Inhibition

Preparation of nyctanthes arbor-tristis seeds extract

Nyctanthes Arbor-tristis seeds are extracted. A 10g quantity of the powdered dried seeds of Nyctanthes Arbor-tristis was weighed and transferred into a 100ml of Solvents such as Ethanol & kept it aside for 48 hours with occastional stirring. After 48 hours filter the extract & boiling in a water bat upto the 1/3 rd evaporation of solvent. The concentrated ethanol extract was stored in beaker and wrapped in aluminum foil.

Preparation of emulsifying cream base

The emulsifying cream base was prepared according to the formula on Table 1. Nine grams of emulsifying wax was weighed and melted in a water bath at 60 °C ± 0.5 using a beaker. Fifteen grams of white soft paraffin was added to it.There after, 6.98 mL of liquid paraffin was incorporated into the melted-mix and stirred properly. The beaker was removed from the water bath and with continuous stirring the content was allowed to solidify.

Table 1: Composition of the emulsifying ointment

Ingredients	Fomulae	Amount used
Emulsifying wax	300 g	9 g
White soft Paraffin	200 g	15 g
Liquid Paraffin	200 g	6 g (6.98 ml)

Preparation of Nyctanthes Arbor-tristis topical antibacterial cream

The topical antibacterial cream was prepared using the formula on Table 2. Six grams of the emulsifying cream base was transferred into a porcelain dish. It was melted in a water bath at 60 ± 0.5 0C and the required amount of the ethanol extract of Nyctanthes Arbor-tristis was incorporated into it with continuous stirring until it was evenly mixed.Sufficient quantity of warm distilled water to produce 20 g of the topical creams was incorporated in portions into the mixture prior to stirring until a uniform blend was obtained, which was then allowed to cool before it was transferred into the cream jar and then labelled.

Table 2: Composition of Nyctanthes Arbor-tristis topical antibacterial creams

Formulations	Ethanol Extract (%w/w)	Emulsifying ointment (g)	ointment (g) Distilled water to 20g
BF1	4	6	Q.s
BF2	3	6	Q.s
BF3	2	6	Q.s

RESULTS AND DISCUSSION

Physical Evaluation of the Nyctanthes Arbor-Tristis Cream

Homogeneity: The herbal creams formulated were evaluated for homogeneity by visual inspection and were ranked as follows: (Good = +)

Determination of pH: We have done with Litmus paper we got neutral pH (7).

Organoleptic Test: Organoleptic properties like appearance, texture, and odor were evaluated. We were determined using various sense organs such as eyes, nose, etc.
Ease of Removal: This was determined by taking a finger tip unit of each of the creams and these units were applied consecutively on the skin. By washing the applied part with tap water, the creams were ranked according to their ease of removal as follows: Very Good = ++
Emolliency: A fingertip unit of the formulated creams was applied on the skin and checked for emolliency and greasiness.



Fig 3: Anti-Bacterial Cream



Fig 4: Emulsifying base

CONCLUSION

It was determined from the study that the crude ethanol extract of the powdered dried seeds of Nyctanthes Arbor-tristis has antibacterial property against Escherichia coli, Streptococcus, Pseudomonas fluorescens and Bacillus. There was no loss of antibacterial activity on formulation of the extract into creams.The study revealed that the ethanol extract and the formulated cream have antibacterial properties and there was no loss of activity on formulation of the extract into a cream.

REFERENCES

1. Abubakar, M.S. Isolation of Kaempferide and Antimicrobial Activity of Fractions of Aqueous Ethanol Extract of ThesiumViride. Afr. J. Pharm. Res. Dev., 2016; 8(1): 19-23.
2. The Pharmaceutical Codex, (1979). 11th Ed. The Pharmaceutical Press, Her Majesty's
3. Opinde HR, Gatheri GW, Nyamache AK. Antimicrobial evaluation of crude methanolic leaf extracts from selected medicinal plants against Escherichia coli. J. Bacteriol. Parasitol. 2016;7:272.https://www.academia.edu/download/79830199/Antimicrobial_Evaluation_of_Crude_Methanolic_Leaf_Extracts_from_Selected.pdf
4. Tiwari SS. Medicinal Plants-Perspectives and Needs. J Pharmacogn Nat Prod. 2016;Vol 2, pp105.
5. Bouyahya A, Abrini J, El-Baabou A, Bakri Y, Dakka N. Determination of phenol content and antibacterial activity of five medicinal plants ethanolic extracts from North-West of Morocco. J Plant PatholMicrobiol. 2016 Jun 22;7(342):2.
6. UNESCO. Culture and Health, Orientation Texts – World Decade for Cultural Development 1988 – 1997, Document CLT/DEC/PRO – 1996, Paris, France 19960.
7. Mahato SB, Sen S. Advances in triterpenoid research, 1990–1994. Phytochemistry. 1997 Apr 1;44(7):1185-236.https://www.sciencedirect.com/science/article/pii/S0031942296006395
8. Aliyu, A.B., Musa, A.M., Abdullahi, M.S.,Ibrahimi, H and Oyewale, A.O. Phytochemical screening and antibacterial activities of Vernoniaambigua, Vernoniablumeoides and Vernoniaoocephala (Asteraceae). Acta Polo. Pharm. 2011; 68(1): 67-73.
9. Ashish, A., Mohini, K. and Abhiram, R. Preparation and evaluation of polyherbal cosmetic cream. Scholars Res. Libr., 2013; 5(1): 83-88.
10. Barry, B.W.: Topical preparations. In: Pharmaceutics, The Science of Dosage Form Design. Ed.: Aulton ME. Churchill Livingstone, Edinburgh, International student edition, 1999; 381-411.
11. Builders, M.I., Wannang, N.N., Ajoku, G.A., Builders, P.F., Orisadipe, A and Aguiyi, J.C. Evaluation of the Antimalarial Potential of VernoniaambiguaKotchy and Peyr (Asteraceae). Int. J. Pharmacol., 2011; 7(2): 238- 247.
12. Chen, M.X., Alexander, K.S., and Baki, G. Formulation and Evaluation of Antibacterial Creams and Gels Containing Metal Ions for Topical Application. J. Pharm., 2016; Article ID 5754349, 10 pages.

13. Hossain, M.S., Hossain, M.M., Zaman, S., Mondal, M. and Rana, S. Phytochemical screening, antioxidant and antimicrobial activities of leaf extracts of Randiauliginosa. World J Pharm Sci, 2014; 2(12): 1687-1696.