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Extraction, Formulation, and Evaluation of Herbal Cream Containing Ethyl Acetate Leaf Extract of *Artocarpus heterophyllus* For the Treatment of Vaginal Infection.

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Abstract

The study aimed to evaluate the antifungal activity of a cream formulated using the ethyl acetate leaf extract of *Artocarpus heterophyllus.* The antifungal properties of the extract were assessed using the agar well diffusion method on a medium composed of Mueller-Hinton agar and Potato Dextrose Agar in a 1:1 ratio. This mixture was poured into sterile glass Petri plates and allowed to solidify. A standardized inoculum of *Candida albicans* was uniformly spread across the surface using a sterile cotton swab. Four wells, each 8 mm in diameter and spaced 20 mm apart, were aseptically punched into the agar using a sterile cork borer. The test samples (50 µL and 100 µL) were introduced into the wells. Clotrimazole (10 mg/mL) in two concentrations served as the positive control, while DMSO was used as the negative control.

The cream's physicochemical properties were found to be within acceptable limits. The minimum inhibitory zone diameters observed were 9 mm for 500 µg and 10 mm for 1000 µg of the extract and cream, respectively. A significant enhancement in antifungal activity was noted upon the addition of 2 g of pure *A. heterophyllus* extract to the cream formulation. The findings conclude that the ethyl acetate extract of *A. heterophyllus* and its herbal cream formulation exhibit promising antifungal activity against *Candida albicans.* This effect is likely due to the presence of bioactive phytoconstituents such as phenols, flavonoids, tannins, and alkaloids. The study suggests that this formulation holds potential for treating vaginal infections.

Keywords: *Artocarpus heterophyllus; Candida albicans*; Antifungal; Agar well diffusion

Introduction

Since ancient times, plants have served as a fundamental source of therapeutic agents for the treatment and prevention of various human diseases. Across centuries and civilizations, traditional systems of medicine have relied heavily on the healing properties of herbs and plant-derived compounds. Even in the modern era, these traditional practices continue to be widely used in many parts of the world, reflecting their cultural significance and therapeutic effectiveness. Herbal remedies are employed not only for the prevention of ailments but also for the management and treatment of a wide range of health conditions, including chronic and infectious diseases. This enduring reliance on medicinal plants has prompted a growing interest among researchers and healthcare practitioners in exploring plant materials as valuable sources for drug development. As a result, there is a renewed emphasis on the scientific investigation and validation of herbal medicines, with the goal of discovering novel bioactive compounds that can contribute to the advancement of modern pharmacotherapy [1]. Recently WHO notes that between 25-40% of pharmaceutical drugs are derived from plants. It is also noted that 40-50% of medicines are direct or synthetic copies of plant ingredients. The use of medicinal plants offers poorer populations the ability to fight diseases at a low cost.

Artocarpus heterophyllus, commonly known as jackfruit, belongs to the family Moraceae (Fig. 1, Table 1) [2]. It is a significant tropical tree species native to regions such as India, Bangladesh, Nepal, Sri Lanka, Thailand, Malaysia, and Indonesia. In India, it is widely distributed across various states including Assam, West Bengal, Uttar Pradesh, Maharashtra, Kerala, Tamil Nadu, and Karnataka. In Malayalam, it is known as “Chakka,” while in Sanskrit, the ancient Indian language, it is referred to as “Atibruhatphala” [3]. Various parts of the jackfruit tree have long been used in traditional medicine. The roots are used to treat asthma and fever; the seeds help relieve biliousness and diarrhea; the wood acts as a sedative for convulsions; and the leaves are employed as a galactagogue to stimulate lactation in both women and animals, as well as for their anti-syphilitic and vermifuge properties in humans.

Jackfruit is a medium size, evergreen tree with a height of 8–25 m (26–82 ft) and a stem diameter of 30–80 cm. The shape is usually conical or pyramidal in young trees and becomes spreading and domed in older trees. The tree casts a very dense shade. Heavy side branching usually begins near the ground. All parts of the tree exude sticky white latex when injured. Leaves are dark green, alternate, entire, simple, glossy, leathery, stiff, large with a length of (16 cm), and elliptic to oval in form Figure1. Leaves are often deeply lobed when juvenile and on young shoots [4].

Jackfruit is a rich source of various classes of phytochemicals, including phenols, flavonoids, tannins, and sterols. The leaves, in particular, are abundant in phenolic acids, flavonoids, terpenoids, and tannins. These bioactive compounds contribute to the plant’s traditional use in the treatment of conditions such as asthma, diarrhea, and dermatitis. Moreover, jackfruit leaves have been reported to exhibit a wide range of pharmacological properties, including antifungal, anti-inflammatory, anthelmintic, anti-diabetic, antibacterial, antioxidant, anti-allergic, and immunomodulatory activities. [5]

Vaginal candidiasis is the second most common type of vaginal infection, with *Candida albicans* responsible for approximately 85–95% of cases [6]. *C. albicans* is a normal component of the human microbiota and is commonly

found in the oral cavity, digestive tract, and vaginal mucosa [7]. However, the effective management of *Candida* infections poses several challenges, including a limited number of antifungal agents, potential toxicity of existing treatments, the emergence of drug-resistant *Candida* strains, frequent recurrence of infections, and the high cost of antifungal medications. These challenges highlight the urgent need for the development of new, safe, and cost-effective antifungal agents with broader activity against *Candida* species [8].

The study was conducted to evaluate the antifungal activity of the ethyl acetate leaf extract of *Artocarpus heterophyllus* against the pathogenic fungus *Candida albicans*, as well as to assess the efficacy of a cream formulated using the same extract. Traditionally, the leaves of *A. heterophyllus* have been used in the treatment of fever, boils, wounds, and various skin diseases. Additionally, the ash derived from the leaves has been employed in the management of ulcers. The plant is also reported to possess anti-carcinogenic and hypoglycemic properties, further supporting its potential therapeutic applications.

Materials and methods

Materials

All chemicals and reagents used in this study were of analytical grade. The primary solvents and excipients included ethyl acetate, stearic acid, cetyl alcohol, coconut oil, glycerol, methyl paraben, triethanolamine, and ethanol. For phytochemical screening and formulation, various reagents were utilized, including Wagner's reagent, Dragendorff's reagent, ferric chloride ($FeCl_3$), distilled water, 10% lead acetate solution, gelatin, sodium chloride (NaCl), potassium permanganate ($KMnO_4$), sodium hydroxide (NaOH), concentrated sulfuric acid (H_2SO_4), chloroform ($CHCl_3$), acetone (CH_3COCH_3), and Silica gel-G for thin layer chromatography (TLC) analysis.

Apparatus

The apparatus employed for the study included a Soxhlet extractor for plant extraction, a China dish, a heating mantle, round-bottom flasks, and a condenser. Additional laboratory equipment comprised TLC plates and chambers, test tubes, beakers, volumetric flasks, spatulas, glass stirrers, thermometers, glass slides, filter paper, and funnels. These instruments were used throughout the processes of extraction, formulation, and evaluation of the antifungal cream.

Methods

Collection and authentication of the plant

The leaves of *Artocarpus heterophyllus* were collected from Thrissur, Kerala. They were separated, thoroughly washed with tap water to remove any debris, and then shade-dried for three weeks. The dried leaves were

subsequently pulverized into a coarse powder using an electric blender. The plant material was authenticated by Dr. R. Soumya, Assistant Professor, Department of Botany, Christ College, Irinjalakuda, Thrissur.

Preparation of extract

Approximately 16 g of the dried, powdered leaves of *Artocarpus heterophyllus* were evenly packed into a Soxhlet apparatus (Figure 2) and extracted using ethyl acetate as the solvent over a period of 48 hours. The resulting extract was collected and evaporated to dryness to obtain a crude ethyl acetate extract. This crude extract was subsequently evaluated for its antifungal activity against *Candida albicans* [9].

Phytochemical screening

The crude ethyl acetate leaves extract of *Artocarpus heterophyllus* were subjected to chemical test for identification of its active constituents.

Chemical test for alkaloids

The presence of alkaloids in the ethyl acetate leaf extract of *Artocarpus heterophyllus* was confirmed through a series of standard chemical tests. In Dragendorff's test, the addition of 1 mL of Dragendorff's reagent to 2 mL of the extract resulted in the formation of an orange-red precipitate, indicating a positive reaction for alkaloids. Similarly, in Mayer's test, a few drops of Mayer's reagent added to 1 mL of the extract produced a yellowish or white precipitate, further confirming the presence of alkaloids. In Hager's test, the treatment of 2 mL of the extract with a few drops of Hager's reagent yielded a yellow precipitate, again indicative of alkaloidal compounds.

Chemical test for phenols

The presence of phenolic compounds and tannins in the ethyl acetate leaf extract of *Artocarpus heterophyllus* was confirmed through ferric chloride and lead tetra acetate tests. In the ferric chloride test, the addition of 2 mL of 5% neutral ferric chloride solution to 1 mL of the extract resulted in a dark blue coloration, indicating the presence of phenolic constituents and tannins. Similarly, in the lead tetraacetate test, the addition of 1 mL of lead tetraacetate solution to 0.5 mL of the extract led to the formation of a precipitate, further confirming the presence of phenolic compounds and tannins.

Chemical test for flavonoids

The presence of flavonoids in the ethyl acetate leaf extract of *Artocarpus heterophyllus* was confirmed using the alkaline reagent and Shinoda's tests. In the alkaline reagent test, the addition of 2–3 drops of sodium hydroxide to 2 mL of the extract produced a deep yellow color, which gradually turned colorless upon the addition of a few drops of dilute hydrochloric acid—indicating the presence of flavonoids. In the Shinoda's test, the addition of ten drops of dilute hydrochloric acid and a small piece of magnesium to 1 mL of the extract resulted in the development of a deep pink color, further confirming the presence of flavonoid compounds.

Chemical test for tannins

The presence of flavonoids in the ethyl acetate leaf extract of *Artocarpus heterophyllus* was confirmed by the alkaline reagent and Shinoda's tests. In the alkaline reagent test, the addition of 2–3 drops of sodium hydroxide to 2 mL of the extract resulted in a deep yellow colour, which gradually became colorless upon the addition of a few drops of dilute hydrochloric acid, indicating the presence of flavonoids. Similarly, in Shinoda's test, the addition of ten drops of dilute hydrochloric acid and a small piece of magnesium to 1 mL of the extract produced a deep pink colour, further confirming the presence of flavonoid compounds.

Chemical test for sterols

The presence of sterols in the ethyl acetate leaf extract of *Artocarpus heterophyllus* was confirmed by the Salkowski test. In this test, the extract was shaken with chloroform, and concentrated sulfuric acid was carefully added along the walls of the test tube. The appearance of a red color indicated a positive reaction for the presence of steroids [10].

Thin layer chromatography (TLC)

Thin Layer Chromatography (TLC) is a widely used chromatographic technique for the identification and separation of chemical compounds in a mixture. It operates on the principle of differential affinities of compounds towards a stationary phase and a mobile phase. As the mobile phase moves over the stationary phase by capillary action, the individual components in the mixture travel at different rates depending on their affinity to each phase, resulting in effective separation. In this study, two solvent systems—chloroform:acetone (7:3) and chloroform:ethanol (9:1)—were prepared and poured into a TLC chamber, which was left undisturbed until three-fourths of the solvent had eluted. The TLC plate was pre-activated, and the extract was spotted 1.5 cm above the base. The plate was then placed in the chamber to allow development. After separation, individual spots were visualized, and the Rf (retention factor) values were calculated using the standard equation, Rf=Distance travelled by solvent Distance traveled by solute [11].

Assessment of in-vitro Anti-Fungal Activity The agar well diffusion method was employed to evaluate the antifungal activity of the test samples. A mixture of Mueller-Hinton Agar and Potato Dextrose Agar (MH096, Himedia) in a 1:1 ratio was prepared and poured into sterile glass Petri plates of uniform size. Once solidified, a standardized inoculum of the test organism (*Candida albicans*) was uniformly spread over the surface using a sterile cotton swab. Four wells of 8 mm diameter, spaced 20 mm apart, were aseptically punched into each plate using a sterile cork borer. Test samples (50 µL and 100 µL) from a 10 mg/mL stock were added into two wells labeled T1 and T2. Clotrimazole (40 µL from a 300 µg/mL stock) was used as the positive control, while DMSO, the solvent used for sample dilution, served as the negative control. The plates were incubated at 27°C ± 1°C for 48 hours under aerobic conditions. After incubation, zones of inhibition around the wells were measured in millimeters to assess antifungal efficacy.

For culture media preparation, Mueller-Hinton Agar and Potato Dextrose Agar were mixed in equal proportions, boiled until completely dissolved, and sterilized by autoclaving at 15 lbs pressure (121°C) for 15 minutes. After

cooling to 45–50°C, the media were mixed well and poured into sterile Petri dishes. The fungal inoculums used for the antifungal study were obtained from the Microbial Type Culture Collection and Gene Bank (MTCC), Chandigarh, as listed in Table 2.

To formulate the *Artocarpus heterophyllus* antifungal cream, the oil phase consisting of stearic acid, cetyl alcohol, and coconut oil was accurately weighed and melted at 70°C in a china dish. Simultaneously, the aqueous phase was prepared in a separate dish by combining the ethyl acetate leaf extract, glycerol, methyl paraben, triethanolamine, and distilled water, which was also heated to 70°C. The aqueous phase was then slowly added to the oil phase with continuous stirring at room temperature to form a uniform emulsion. Perfume was added in the final stage of preparation, and the cream was transferred into a suitable container as described in Table 3 [12].

The prepared herbal cream was evaluated for its physicochemical properties. The pH was determined using a standard digital pH meter by diluting an adequate amount of the formulation in a suitable solvent. The appearance of the cream, including its color and texture, was assessed visually and by touch with the help of three volunteers. Spreadability was evaluated by placing a sample between two glass slides and applying a 1 g weight for five minutes. The spreadability (S) was calculated using the formula: $S = m \times l / t$, where *m* is the weight applied, *l* is the length the slide moved, and *t* is the time taken.

Short-term stability studies were conducted over one month, with observations recorded at intervals of 10, 20, and 30 days. Portions of the cream were stored at room temperature and at 4°C to monitor changes. The homogeneity of the cream was assessed by visually examining the uniform distribution of the extract in the base. Additionally, the ype of film or smear formed upon application to the skin was observed, and the ease of removal was tested by rinsing with tap water [13,14].

Assessment of antifungal activity of *Artocarpus heterophyllus* cream

The agar well diffusion method was employed to evaluate the antifungal activity of the test samples. A mixture of Mueller-Hinton Agar and Potato Dextrose Agar (MH096, Himedia) in a 1:1 ratio was prepared and poured into sterile glass Petri plates of uniform size, then allowed to solidify. A standardized inoculum of the test organism, *Candida albicans*, was evenly spread across the surface using a sterile cotton swab. Four wells, each 8 mm in diameter and spaced 20 mm apart, were aseptically punched into each plate using a sterile cork borer. Test samples (50 µL and 100 µL from a 10 mg/mL stock) were introduced into two wells labeled T1 and T2. Clotrimazole (40 µL from a 300 µg/mL stock solution) served as the positive control, while dimethyl sulfoxide (DMSO), the solvent used for sample dilution, was used as the negative control. The inoculated plates were incubated under aerobic conditions at 27°C ± 1°C for 48 hours. After incubation, zones of inhibition around the wells were measured in millimeters to assess antifungal activity. The culture medium was prepared by heating the agar mixture until fully dissolved, followed by sterilization in an autoclave at 121°C (15 lbs pressure) for 15 minutes. Once cooled to 45–50°C, the medium was

poured into sterile Petri plates. The fungal inoculums used in the study were procured from the Microbial Type Culture Collection and Gene Bank (MTCC), Chandigarh [12].

Results and Discussion

The dried leaves of *Artocarpus heterophyllus* were pulverized into a coarse powder and extracted with ethyl acetate using a Soxhlet apparatus (Fig. 2). The percentage yield of the ethyl acetate extract was found to be **11.42% w/v**, and the extract appeared dark green in color with a consistent texture (Table 4). Preliminary phytochemical screening of the ethyl acetate extract revealed the presence of alkaloids (positive in Wagner's and Dragendorff's tests), phenols, flavonoids, tannins, and sterols, as summarized in Table 5.

Thin Layer Chromatography (TLC) analysis of the ethyl acetate extract showed an **Rf value of 0.59**, indicating the presence of a distinct phytoconstituent. The antifungal activity of the extract was evaluated using the agar well diffusion method (Fig. 3). The minimum inhibitory concentration (MIC) assay demonstrated that the extract exhibited antifungal activity against *Candida albicans*, with a zone of inhibition measuring **9 mm** at 1000 µg concentration, while the lower dose (500 µg) showed no inhibition. Clotrimazole (120 µg) used as a standard positive control produced a **20 mm** zone of inhibition, whereas the negative control (DMSO) showed no inhibition (Table 6).The herbal cream formulated using the ethyl acetate extract (composition detailed in Table 3) was dark green in color, smooth in appearance, and exhibited a pleasant odour. It was of oil-in-water (O/W) type, homogeneous, non-greasy, and showed good and uniform spreadability (Table 7). The formulation was further evaluated for its antifungal potential against *Candida albicans* using the agar well diffusion method (Fig. 4). The cream showed a zone of inhibition measuring **10 mm** at a concentration of 1000 µg, while the 500µg dose and the negative control showed no antifungal activity (Table 8).

These results indicate that both the ethyl acetate extract and its cream formulation possess antifungal activity against *Candida albicans*, with enhanced efficacy observed in the formulated cream. The findings suggest potential application of *A. heterophyllus* extract in the development of herbal antifungal treatments.

The current study demonstrated the antifungal efficacy of ethyl acetate leaf extract of *Artocarpus heterophyllus* and its formulated herbal cream against *Candida albicans*. The agar well diffusion assay showed measurable inhibition zones for both the crude extract and the cream formulation, supporting the antifungal potential of this plant. The ethyl acetate extract produced a 9 mm zone of inhibition at a 1000 µg concentration, while the cream formulation showed a slightly enhanced activity with a 10 mm zone. These findings correlate with earlier studies that established the antimicrobial and phytotherapeutic potential of *A. heterophyllus*, attributed to its rich content of phenols, flavonoids, tannins, alkaloids, and sterols (1–4).

Phytochemical screening in this study confirmed the presence of several secondary metabolites in the ethyl acetate extract, consistent with reports by Amadi et al. (2) and Prakash et al. (4,5). Flavonoids and phenolic compounds are

well-known for their antimicrobial and antioxidant activities and may contribute significantly to the antifungal properties observed. The Rf value (0.59) derived from TLC analysis suggests the presence of moderately polar compounds, aligning with standard chromatographic separation principles (11).

The herbal cream formulation was evaluated for various physicochemical parameters, including pH, spreadability, homogeneity, and stability. The formulation was smooth, easily spreadable, non-greasy, and stable over a 30-day period, making it suitable for topical application. Such physical properties are crucial for ensuring patient compliance and drug efficacy, as described in previous formulation studies (13,14).

The use of the agar well diffusion method provided reliable in vitro evidence of antifungal activity. Notably, clotrimazole served as a positive control, highlighting the comparative efficacy of the plant extract and cream. With increasing cases of resistance to conventional antifungals like azoles and the rising cost and side effects of synthetic drugs, there is a growing demand for safer, plant-based alternatives (6–8).The traditional use of *A. heterophyllus* leaves in treating infections and inflammatory conditions is supported by this study, which not only affirms its ethnomedical value but also introduces a topical herbal formulation that may be effective in managing superficial fungal infections, including vaginal candidiasis. Further in vivo and clinical studies are warranted to validate these findings and explore large-scale applications.

Conclusion

The present study provides substantial evidence supporting the antifungal potential of Artocarpus heterophyllus (jackfruit) leaf extract, particularly in its ethyl acetate fraction, against Candida albicans, a major causative agent of vaginal candidiasis and other fungal infections. Phytochemical screening confirmed the presence of key bioactive compounds such as flavonoids, phenols, tannins, alkaloids, and sterols, which are widely recognized for their antimicrobial and therapeutic properties. The in vitro evaluation using the agar well diffusion method revealed that the ethyl acetate extract exhibited significant antifungal activity, and this activity was further enhanced when the extract was formulated into a topical herbal cream.

The formulated cream demonstrated improved physicochemical characteristics, including smooth texture, easy spreadability, non-greasy consistency, and good stability, indicating its potential as a patient-friendly topical antifungal treatment. The enhanced zone of inhibition observed in the cream formulation compared to the crude extract alone highlights the synergistic effect of the active constituents with the cream base, optimizing the delivery and activity of the extract.

These findings not only validate the traditional use of *A. heterophyllus* in the treatment of skin infections and other ailments but also underscore its potential as a promising natural alternative to conventional antifungal agents. This is particularly relevant in the context of growing antifungal resistance, limited treatment options, and adverse effects associated with synthetic drugs.

While the current study focused on crude ethyl acetate extracts and preliminary in vitro evaluations, it lays a strong foundation for future research. Further studies involving isolation and structural characterization of specific active compounds, detailed mechanism-of-action investigations, and in vivo efficacy and safety assessments are necessary to establish clinical relevance. Advanced pharmacological, toxicological, and formulation development studies will help translate these preliminary findings into a viab le therapeutic product.

In conclusion, *Artocarpus heterophyllus* ethyl acetate leaf extract and its cream formulation exhibit promising antifungal activity, indicating their potential role in the development of effective, safe, and affordable herbal treatments for fungal infections.

Figures and Tables

Fig.1 *Artocarpus heterophyllus*

Fig.2 Soxhlet apparatus

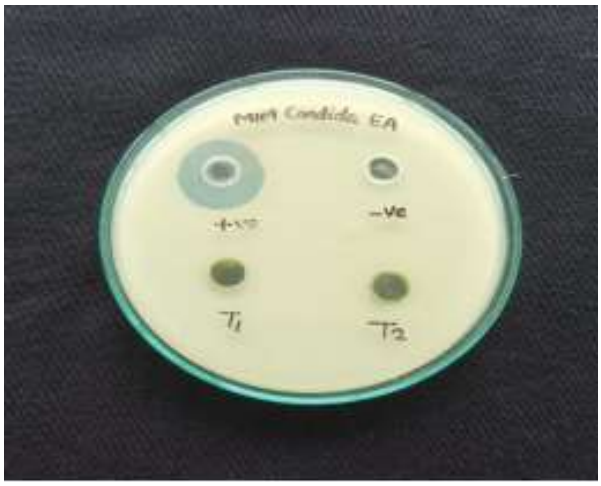

Fig.3 Agar well diffusion method of EA Extract

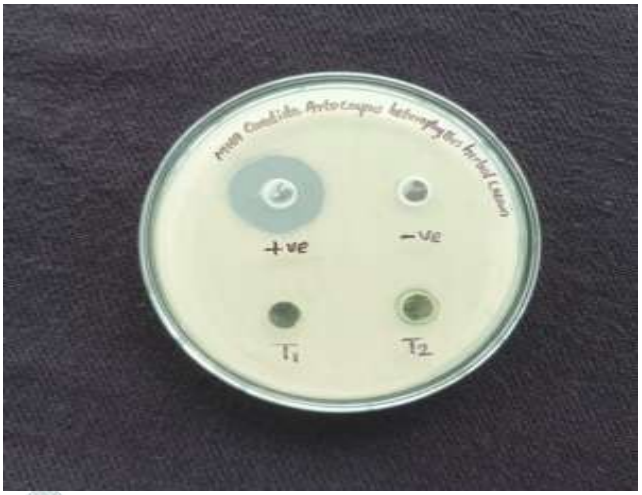

Fig 4 Agar ell diffusion method of AHH cream

KINGDOM	Plantae
PHYLLUM	Spermatophyta
CLASS	Dicotyledonae
ORDER	Urticales
FAMILY	Moraceae
GENUS	Artocarpus
SPECIES	*Artocarpus heterophyllus*

Tab.1 Scientific Classification

Name of Microorganism	**MTCC.No.**	**Incubation conditions**
Candida albicans	227	27ºC for 48hours

Tab.2 Inoculums details

Ingredients	**Quantity**
Plant extract	0.2g
Stearic acid	0.5 g
Cetyl alcohol	1 g
Coconut oil	0.5 ml
Glycerol	0.3 ml
Methyl paraben	0.002 g
Triethanolamine	q.s
Water	q.s

Tab.3 Formulation for 10g of herbal cream

SL.NO	**EXTRACTS**	**COLOUR & CONSISTENCY**	**% YIELD**
1.	Ethyl acetate extract	Dark green	11.42% w/v

Tab.4 Percentage yield of Ethyl acetate Extract

CHEMICAL TEST	**ETHYL ACETATE EXTRACT**
1) Test for alkaloids	

Mayer's test	-
Hager's test	-
Wagner's test	+
Dragendorff's test	+
2) Test for phenols	
Ferric chloride test	-
Gelatine test	+
Lead acetate test	+
Decolouration test	+
3) Test for flavonoids	
Aqueous sodium hydroxide test	+
Lead acetate test	-
Ferric chloride test	+
Con.H2SO4 test	+
4) Test for tannins	
Gelatin test	+
Bromine water test	-
5) Test for sterols	
Salkowski's test	+

Tab .5 Phytochemical screening

S.no	**Name of Microorganism**	**Sample code**	**Zone of inhibition (mm)**			
			Standard Clotrimazole (120 µg)	**Negative control**	**T1 (500µg)**	**T2 (1000µg)**
1.	*Candida albicans*	EA	20mm	-ve	-ve	+ve (9mm)

Tab .6 MIC Value of *Artocarpus heterophyllus* Ethyl acetate leaf extract

Parameter	**Observation (2g herbal cream)**
Color	Dark green

Odour	Pleasant
Apperance	Smooth
Dilution	O/W Type
Consistency	Easy spreadable
Homogenicity	Homogenous
Spreadability	Good and uniform
Type of smear	Non greasy

Tab.7 Evaluation of herbal cream

S. No.	**Name of Microorganism**	**Sample code**	**Zone of inhibition (mm)**		
			Negative control	**T1 (500µg)**	**T2 (1000µg)**
1.	*Candida albicans*	AHH cream	-ve	-ve	+ve (10mm)

Tab.8 MIC Value of AHH Cream

Acknowledgements

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Fig.1 *Artocarpus heterophyllus*

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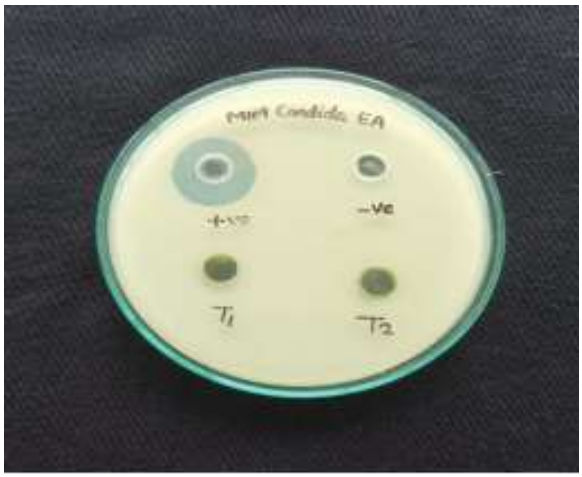

Fig.3 Agar well diffusion method of EA Extract

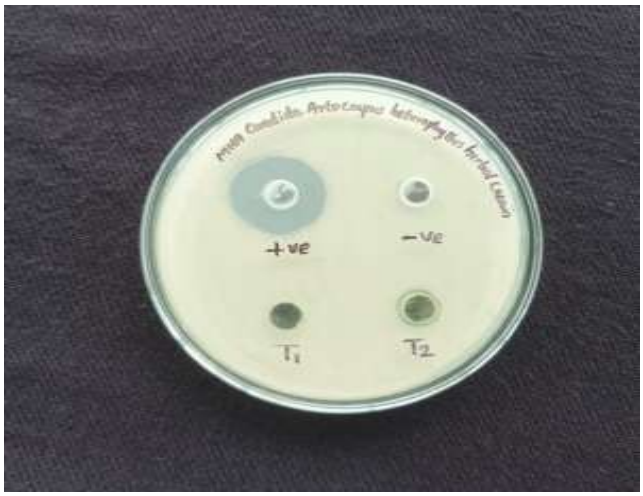

Fig 4 Aar well diffusion method of AHH cream

KINGDOM	Plantae
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Water	q.s

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Hager's test	-
Wagner's test	+
Dragendorff's test	+
2) Test for phenols	
Ferric chloride test	-
Gelatine test	+
Lead acetate test	+
Decolouration test	+
3) Test for flavonoids	
Aqueous sodium hydroxide test	+
Lead acetate test	-
Ferric chloride test	+
Con.H2SO4 test	+
4) Test for tannins	
Gelatin test	+
Bromine water test	-
5) Test for sterols	
alkowski's test	+

Tab .5 Phytochemical screening

S.no	Name of Microorganism	Sample code	Zone of inhibition (mm)			
			Standard Clotrimazole (120 µg)	Negative control	T1 (500µg)	T2 (1000µg)
1.	*Candida albicans*	EA	20mm	-ve	-ve	+ve (9mm)

Tab .6 MIC Value of *Artocarpus heterophyllus* Ethyl acetate leaf extract

Parameter	Observation (2g herbal cream)
Color	Dark green
Odour	Pleasant
Apperance	Smooth
Dilution	O/W Type
Consistency	Easy spreadable
Homogenicity	Homogenous
Spreadability	Good and uniform
Type of smear	Non greasy

Tab.7 Evaluation of herbal cream

S. No.	Name of Microorganism	Sample code	Zone of inhibition (mm)		
			Negative control	T1 (500µg)	T2 (1000µg)
1.	*Candida albicans*	AHH cream	-ve	-ve	+ve (10mm)

Tab.8 MIC Value of AHH Cream