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Action of *Ipomoeia eriocarpa* Extract on Carbuncles and Cellulities

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Keywords: : Ipomoeia eriocarpa , phytochemical analysis, antibacterial activity, formulated as ointment.

ABSTRACT

Ipomoeia eriocarpa belongs to the Convolvulaceae family and has a reputation as a folk medicine in the treatment of carbuncles or cellulties which shows antibacterial activity although there is no scientific evidence till date. The dried and powdered leaves of I. eriocarpa were extracted with ethanol by Soxhlet method and preliminary phytochemical analysis of extract was carried out. The extract were screened for antibacterial activity. The extract of I. eriocarpa have shown significant antibacterial activity against carbuncles or cellulities in which most carbuncles are caused by the Staphylococcus aureus. The purpose of the study was to formulate and evaluate the antibacterial herbal ointment from extract of leaves of I. eriocarpa. Our study shows that I.eriocarpa has potential as an antibacterial agent when formulated as ointment for topical use. Thus, the present study concludes that the formulated formulation of the plant extract are safe and efficient carriers with potent antibacterial activity.

INTRODUCTION

CARBUNCLES

A carbuncle is a red, swollen, and painful cluster of boils that are connected to each other under the skin. A boil (or furuncle) is an infection of a hair follicle that has a small collection of pus (called an abscess) under the skin.A hairy area of the body such as the back or nape of the neck. But a carbuncle also can develop in other areas of the body such as the buttocks, thighs, groin, and armpits.

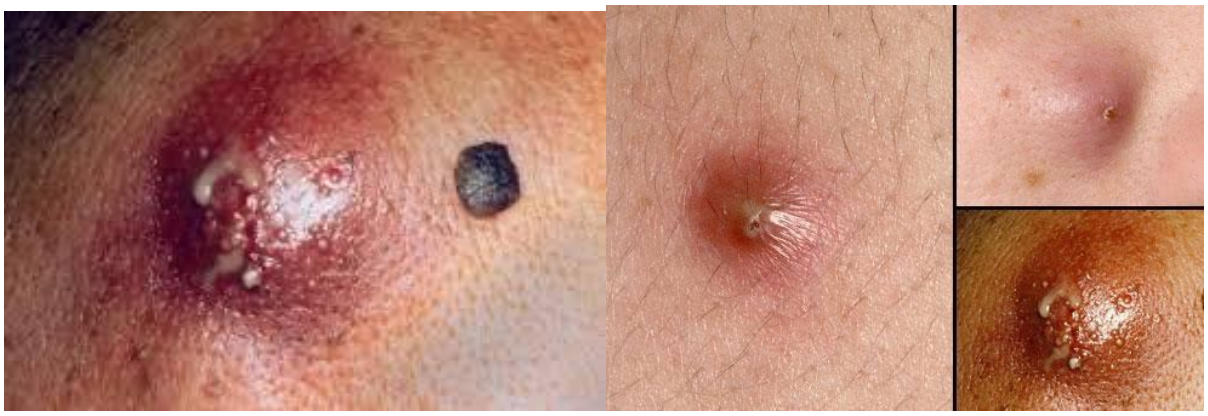

Fig.1 carbuncles

Filled with pus -- a mixture of old and white blood cells, bacteria, and dead skin cells -- carbuncles must drain before they're able to heal. Carbuncles are more likely than boils to leave scars.

Most carbuncles are caused by *Staphylococcus aureus* bacteria, which inhabit the skin surface, throat, and nasal passages. These bacteria can cause infection by entering the skin through a hair follicle, small scrape, or puncture, although sometimes there is no obvious point of entry.

Risk Factors for Carbuncles

- Chronic skin conditions, which damage the skin's protective barrier
- Diabetes
- Kidney disease

- Liver disease
- Any condition or treatment that weakens the immune system
- Older age
- Obesity
- Poor hygiene

Symptoms of Carbuncles

- fever,
- fatigue, and
- feeling of general sickness.
- Swelling may occur in nearby tissue and lymph nodes, especially lymph nodes in the neck, armpit, or groin.

Complications of Carbuncles

Sometimes, carbuncles are caused by methicillin-resistant *Staphylococcus aureus* (MRSA) bacteria, and require treatment with potent prescription antibiotics if the lesions are not drained properly.

In rare cases, bacteria from a carbuncle can escape into the bloodstream and cause serious complications, including sepsis and infections in other parts of the body such as the lung, bones, joints, heart, blood, and central nervous system.

IPOMOEIA ERIOCARPA

Fig.2 Ipomoeia eriocarpa

Ipomoea eriocarpa is a summer annual or perennial broadleaf plant belonging to the Convolvulaceae family. This plant is distributed throughout the African and South American tropical regions, tropical Asia and Northern Australia. They are slender twining herb of grassland, waste spaces and a weed of cultivation. The plant is traditionally used as a vegetable in India for its tender leaves and stems. The seeds are nutritious and a good source of carbohydrates and proteins. The plant has many unspecified medicinal use in India .The oil extract of plant is used treatment of headache, rheumatism, leprosy, epilepsy, ulcers and fevers.

1. Scientific investigation of Ipomoea eriocarpa recently demonstrated cerebroprotective .

2. Antioxidant

3. Antimicrobial

4. Antibacterial

5. Anti-inflammatory

6. Antisecretory

7. Antinociceptive

8. Antipyretic

9. Toxicity

10. Antihelmintic and insecticidal activity

Botany

Flowering class: Dicot Habit: ClimberCreepers, stem hispid. Leaves to 6 x 3.5 cm, ovate, entire, acuminate, cordate at base, finely hirsute; petiole to 2 cm long. Flowers in axillary sessile or peduncled cymes; bracts and bracteoles minute, hairy; sepals outer 3 larger, 6 mm long, ovate, acuminate, inner 2 smaller, all hispid; corolla 1 cm long, campanulate, pale pink, hairy; filaments glandular hairy at base; ovary densely hairy. Capsule 6 x 6 mm, globose, densely hispid; seeds triangular, glabrous.

- Habit: Twining Herb
- Habit: A slender twiner, to 4m.

Flowering and fruiting: October-January

- **Flower:-**In subsessilecapitate cluster, aggregated, very small; pink with a deeper throat. Flowering from December-February.
- **Fruit:-**A capsule**,** epicarpa pubescent below, thin; seeds minutely pitted. Fruiting January onwards.
- **Field tips :-**Branchlets hirsute with long and short hairs. Flowers very small.
- **Leaf Arrangement :-** Alternate distichous
- **Leaf Type :-**Simple
- **Leaf Shape :-** Oblong
- **Leaf Apex :-** Acute-apiculate
- **Leaf Base :-** Hastate or cordate
- **Leaf Margin :-** Entire

OINTMENT

An oil-based topical formulation with a semi-solid texture and a greasy appearance that can be applied to the skin is called an ointment. As per the ointment meaning, the therapeutic substances are dispersed in the medium. The medium generally has 80% oil and 20% water. As you can easily understand that the water medium is mixed evenly with the oil medium to prepare a thick suspension.

This formulation is prepared in such a way that it can deliver a thick and viscous application. The viscosity of an ointment preparation ensures that the medicines in it will be properly absorbed through the skin. In fact, ointments are also used to cure infections. The availability of the therapeutic substances in the application of ointment is much higher and suitable for skin diseases.

Fig.3 Ointment

PLANT PROFILE

Fig 4. Plant profile

Taxonomy

Table no .1 Taxonomy

Kingdom	Plantae
Phylum	Tracheophyta
Class	Magnoliopsida
Order	Solanales
Family	Convolvulaceae
Genus	Ipomoea
Species	Ipomoea eriocarpa R. Br

INGREDIENTS AND ITSROLES

Table no 2. Ingridients and its role

Sr No	Ingredients	Role
1	Ipomoeiaeriocarpa (extract)	Antibacterial , Antimicrobial ,Anti-inflammatory
2	Iodine	Counter irritant
3	Methyl salicylate	Anti-inflammatory
4	Arachis oil (Vegetable oil)	Source of unsaturated acid
5	Yellow Soft Paraffin	Ointment Base

MATERIALS AND INSTRUMENTS

Table no.3 chemicals

Sr No	Chemicals
1	Iodine
2	Methyl salicylate
3	Arachis oil
4	Yellow soft paraffin
5	Distilled water
6	Alpha naphthol
7	Conc. Sulphuric acid
8	Dragondroffs reagent
9	Copper sulphate
10	Acetic anhydride
11	Ferric chloride
12	Sodium picrate
13	Lead acetate
14	Sodium picrate
15	Lead acetate
16	Peptone
17	Agar
18	Beef extract
19	Sodium chloride
20	Dimethyl sulfoxide

INSTRUMENTS

Table no 4 instruments

Sr NO	Instruments
1	Analytical balance
2	Hot air oven
3	Digital autoclave
4	B.O.D incubator
5	Ph meter
6	Brookfield viscometer

EXPERIMENTAL WORK

EXTRACTION OF PLANTS

STEPS:

1. COLLECTION OF PLANT

The leaves of I. eriocarpa were collected from Gondia (Vidharbh) Maharashtra, India. The plant was identified as I. eriocarpa at the department of botany, Dhote Bandhu College ,Gondia, Maharashtra. The voucher specimen of the plant was deposited at the college for further reference.

2. PREPRATION OF EXTRACTION USING SOXHLET APPARATUS

Assembly

1. The source material containing the compound to be extracted is placed inside the thimble.
2. The thimble is loaded into the main chamber of the Soxhlet extractor.
3. The extraction solvent to be used is placed in a distillation flask.
4. The flask is placed on the heating element.
5. The Soxhlet extractor is placed atop the flask.

6. A reflux condenser is placed atop the extractor.

AS PER OUR PROCEDURE:

Dried powder of the leaves of I. eriocarpa were subjected to continuous hot extraction in a SOXHLET APPARATUS using ethanol as a solvent. The solvent was removed by distillation under reduced pressure, which produced a greenish sticky residue. The concentrated crude extract was stored at 4 degree celcius in a refridgerator and used for the further studies.

Fig no . 5 plant extract

Phytochemical screening of different qualitative chemical tests

It can be performed for establishing profile of ethanol and aqueous extract for its chemical composition. The following tests were performed on extracts to detect various phyto constituents present in them.

Detection of carbohydrate

Molish Test : To 2 ml of filtrate, two drops of alcoholic solution of alpha naphthol are added, the mixture is shaken well and 1 ml of concentrated sulphuric acid is added slowly along the sides ofthe tube and allowed to stand. A violet ring indicates the presence of carbohydrates.

Detection of alkaloids

Dragondroff's test : To a few ml of filtrate, 1 or 2 ml of dragondroff's reagent are added. A prominent yellow precipitate indicates the test as positive.

Detection of saponin Foam test :The extract (50 mg) is diluted with distilled water and made up 20ml. the suspension is shaken in graduated cylinder for 15 min, A 2 cm layer of foam indicates the presence of saponins.

Detection of protein

Biuret test : An aliquot of2 ml filtrate is treated with one drop of 2% copper sulphate solution. To this, 1ml ethanol (95%) is added, followed by excess of potassium hydroxide pellets. Pink colour in the ethanolic layer indicates the presence of proteins.

Detection of steroids and triterpenoid

Libermann-Burchard test : The extract (50mg) is dissolved in 2ml acetic anhydride. To this, one or two drops of concentrated sulphuric acid are added slowlyalong the sides ofthe test tube. An arrayofcolour changes shows the presence of phytosterols.

Detection of glycosides

Killer killani test : To the test solution few drops of ferric chloride solution and concentrated sulphuric acid was added.

Baljet test : Sodium picrate was added to the test solution.

Detection of tannin

Ferric chloride solution tes**t:** To 1ml of the extract, ferric chloride solution was added.

APPEARANCE

Table no.6 appearance

	Test Performed	Observation	Inference
	TESTS FOR REDUCING SUGARS		
1. a	CARBOHYDRATE Molish Test	Violet ring formed at the junction of two liquids	Carbohydrate was present
2	TESTS FOR PROTEINS Biuret test (General test):	Not produce blue colour	Protein was absent
3	TEST FOR FATS AND OILS Solubility Test:	Soluble in ethanol	Soluble in ethanol
4	TEST FOR ALKALOID`S Dragendroffs test :	formation of orange brown colouredppt	Alkaloids was presents

5	TEST FOR TANNINS 5% FeCl3 solution:	Formation of dark blue colour	Tannis was present
6	TEST FOR CARDIAC GLYCOSIDES Balijets test:	Change occur from Yellow to Orange Colour	Glycocides was present
7	SAPONINS Foam test	Not persistent form formation	Saponins was absent
8	FLAVONOIDS Lead acetate test	Yellow Coloured PPT was not formed	Flavonoids Was absent
9	TERPENOIDS Libbermann-Burchard test	No observation	terpenoidsWas Absent

PREPRATION OF OINTMENT

Chemicals: Iodine, Plant extract, Methyl Salicylate, Oleic acid, Arachis oil, yellow Soft paraffin.

Apparatus: Weighing balance, Beaker, stirrer, glass, Mortor and pestle.

Process:

1. Clean all the glassware and dry them properly.

2. A weight iodine and triturate in glass mortor.

3. Place triturated iodine to glass stopper bottle containing arachis oil.

4. Heat above mixture on water bath at 50 C until colour changes from

Brown to greenish black.

5. Meet separately yellow soft paraffin and mix into abovemixture with continuous stirring.

6. Add required quantity of methyl salicylate and plant extract with continuous stirring to above mentioned iodine Ointment at room temperature and mix it well.

7. Transfer ointment into wide mouth amber or greenish coloured glass

Container and use the plastic cap label and submit

EVALUATION TEST

1) Determination of pH

The pH meter was calibrated employing a customary solution. About 0.5 g of the ointment was weighed and dissolved in 50 ml of water and its pH was measured.

2) Homogeneity

The formulation was tested for homogeneity by visual appearance and touch.

3) Appearance

The looks of the ointment was judged by its color, roughness, and graded.

4) After feel:

Emolliency, slipperiness, and also the quantity of residue left after the appliance of a collection amount of ointment was checked.

5) Type of smear

After the appliance of the ointment, the kind of film or smear formed on the skin was checked.

6) Washability

The ease of removal of the ointment applied was examined by washing the applied dispense with water.

7) Viscosity

The viscosity of the formulation was determined by Brookfield Viscometer.

RESULT:

Table no .7 Evaluation

Parameters	**F1**	**F2**	**F3**	**F4**
Emulsiontype	o/w	o/w	o/w	o/w
pH	6.9	6.2	6.27	6.5
Homogeneity	Homogenous	Homogenous	Homogenous	Homogenous
Appearance	Semi-solidcream	Semi-solidcream	Semi-solidcream	Semi-solidcream
Afterfeel	Emollientand Slipperiness	Emollientand Slipperiness	Emollientand Slipperiness	Emollientand Slipperiness
Typeofsmear	Non-greasy	Non-greasy	Non-greasy	Non-greasy
Washability	Easilywashable	Easilywashable	Easilywashable	Easilywashable
Viscosity	18557	6749	13467	15057
Color	Creamyred	Creamyred	Creamyred	Creamyred

ANTIMICROBIAL ACTIVITY

Cup plate of cylinder plate method

This method relies on the diffusion of an antibiotic from a verticle cavity or a cylinder through the solidified agar layer in a petri plate. The growth of test microorganism in observe to be inhibited in a circular area or zone around the cavity containing anti biotic solution.

Steps involved in cup plate method are given below,

1. A liquefied assay medium (43-45c) is inoculated by the suspension of test microorganism.

2. This inoculated test culture medium poured and spread on sterile petri or preprepared agar plates.

3. Standard and test antibiotic solution of known concentration are prepared in appropriate solutions, which are then added to sterile cavities prepared on solid medium.

4. Uniform volume of sodium should be added to each cavity to fill them sufficiently if papers discs are used, they should sterilize first, then dipped in standard or test solution and finally placed on medium surface.

5. The plates are allowed to stand at room temperature or at 4c for 1-2 hours. This is the period of pre Incubation diffusion which minimises the effect of variation time between the applications of different solutions.

6. All plates are then incubated at temperature 32-35 C for 18-24 hours.

7. The diameters or areas of circular inhibition zone produce by standard and test anti biotic solution are accurately measured.

Action of extract on S aureus

Fig.no. 6 effect of extract

Action of ointment on S aureus

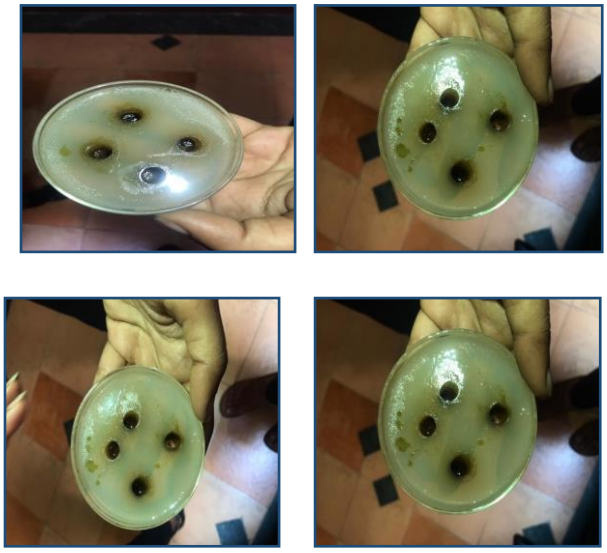

Fig no.7 effect of ointment

RESULT:

Sr.No	Test Culture	Positive control 0.1mlfor(1mg/ml)	Leaf extract of ipomoeia eriocarpa	Zoneofinhibitionin(mm)		
				DMSO	Positivecontrol	Plantextract
1	S.aureus	Streptomycin	0.2 gmextract	-	1.4cm	0.7cm
2	S.aureus	Streptomycin	0.7gmextract	-	1.4cm	0.9cm
3	S.aureus	Streptomycin	0.27 gmextract	-	1.4cm	1cm
4	S.aureus	Streptomycin	0.8 gmcream	-	1.4cm	0.5cm

DISCUSSION:

The preliminary phytochemical analysis of extract was carried out. The extract were screened for antibacterial activity. As per formulated ointment therapeutic substances are dispersed in the medium. The medium generally has 80% oil and 20% water. The pH of the formulated ointment was found to be in range 8-9 which is slightly and recommended pH for the skin. The ointment were easy to remove after application by washing with lukewarm water. The formulations were able to produce uniform distribution of extracts in the ointment. There were no changes in term of colour of the ointment even it was kept for a long period of time. After feel test showed that the ointment were emollient and slipperiness. Even though there is no change in a color reaction is observed when it was kept for a longer time in a room temperature which indicates the stability of the product.

The ethanolic extract of Ipomoeia eriocarpa leaves showed the antibacterial activity against staphylococcus aureus as seen by the zone of inhibition ranges from 0.5 to 1.1 cm.

CONCLUSION

A carbuncle is a red, swollen, and painful cluster of boils that are connected to each other under the skin.

Most carbuncles are caused by Staphylococcus aureus bacteria, which inhabit the skin surface, throat, and nasal passages. These bacteria can cause infection by entering the skin through a hair follicle, small scrape, or puncture, although sometimes there is no obvious point of entry. Ipomoeia eriocarpa has a reputation as a folk medicine in the treatment of carbuncles or cellulties which shows antibacterial activity. Herbal formulation are considered as safer and having lesser side effects than any other formulations. Basically, it having a property to act against the bacteria which prevent from the infection. The purpose is that to formulate and evaluate the antibacterial herbal ointment from extract of leaves of I. eriocarpa and has potential as an antibacterial agent when formulated as ointment for topical use. The characteristics of ointment in terms of comfortable, spreadability, easily removable etc. The results proved that the formulation also having the antibacterial property. So our study can suggest the further investigation and in vivo studies will help in developing this formulation as marketed product.

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REFERENCES:

1. Madhava C.K., Ipomoea eriocarpa: Chittoor medicinal plants, Tirupati: Himalaya Book Publications, 2005.
2. Pharmaceutical Chemistry Division, School of Advanced sciences, VIT University, Vellore- 632014, Tamil Nadu, India
3. Harrisons Principles of Internal Medicine 19th edition.
4. Katzung BG, Masters SB, Trevor AJ. *Basic and Clinical Pharmacology 12thedition.*
5. Weller R, Hunter H, Mann MW. *Clinical Dermatology*
6. https://rjpponline.org/Home.aspx
7. Text book of Pharmacognosy by C .K . Kokate , Purohit,Gokhale (2007),37th Edition, Nirali Prakashan, New Delhi.
8. Jigna Parekh, Darshana Jadeja, Sumitra chanda, efficacy of aqueous and methanolic extracts of some medicinal plants for potential antibacterial activity Turk J Biol,2005.

9. World Health Organization. 2016. *Global guidelines for the prevention of surgical site infection*. World Health Organization, Geneva, Switzerland.
10. Turner NA, Sharma-Kuinkel BK, Maskarinec SA, Eichenberger EM, Shah PP, Carugati M, Holland TL, Fowler VG, Jr. 2019. Methicillin-resistant *Staphylococcus aureus*: an overview of basic and clinical research. *Nat Rev Microbiol* 17:203–218.
11. The dictionary of Indian Raw Materials and Industrial Products the wealth of India Vol. V : H-K council of scientific and industrial Research New Delhi.
12. THE OCCURRENCE AND GROWTH OF STAPHYLOCOCCI ON PACKED BACON, WITH SPECIAL REFERENCE TO *STAPHYLOCOCCUS AUREUS* BP Eddy, M Ingram *Journal of Applied Bacteriology 25 (2), 237-247, 1962*
13. Phytochemical analysis, anti-arthritic and anti-diabetic activities of the leaf extracts of Ipomoea eriocarpa Moonjit Das, Himaja Malipeddi *Int J Pharm Technol Res 8, 843-7, 2015*
14. ANTIMICROBIAL AND ANTIOXIDANT POTENTIAL OF LEAVES, BARK AND INFLORESCENCE OF IPOMOEA ERIOCARPA Muhammad Ajaib, Faiza Shafi, Shakeela Iqbal, Khizar Hayat Bhatti, Muhammad Faheem Siddiqui *FUUAST Journal of Biology 11 (1), 1-8, 2021*
15. Preparation and characterization of some herbal ointment formulations with evaluation of antimicrobial property Pulak Majumder, Susmita Majumder *Indian Journal of Research in Pharmacy and Biotechnology 1 (3), 385, 2013*
16. a Review on: Ointment and Ointment Bases Rajveer Bhaskar, Monica Ola, Prakash H Patil, Kalpesh S Nawandar *Rajveer et Al. World Journal of Pharmaceutical Research 5 (9), 335, 2016*
17. Preparation and characterization of some herbal ointment formulations with evaluation of antimicrobial property Pulak Majumder, Susmita Majumder *Indian Journal of Research in Pharmacy and Biotechnology 1 (3), 385, 2013*
18. Antibacterial activity of some Indian medicinal plants A Prusti *Ethnobotanical leaflets 2008 (1), 27, 2008*
19. Antibacterial activity of some Indian medicinal plants 42 Daljit Singh Arora, Gurinder Jeet Kaur *Journal of natural medicines 61, 313-317, 2007*
20. a Review on: Ointment and Ointment Bases Rajveer Bhaskar, Monica Ola, Prakash H Patil, Kalpesh S Nawandar *Rajveer et Al. World Journal of Pharmaceutical Research 5 (9), 335, 2016*