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Review Article

Formulation of Antimicrobial Gel using extract of Euphorbia Hirta Linn

Anjula Patidar*[1], Suhana Khan[2]

[1]*Department of Pharmacology Asst. Professor of Charak Institute of Pharmacy, Mandleshwar, Madhya Pradesh*
[2]*M. Pharm Student. Charak Institute of Pharmacy, Mandleshwar, Madhya Pradesh.*

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ABSTRACT

Euphorbia hirta linn. (Family – Euphorbiaceae) used of the different parts of several medicinal plants to cure specific diseases has been in practice from ancient times. The fresh plant of Euphorbia hirta was collected in campus of CIP college of mandleshwar, district Khargone, state M.P. (India). Euphorbia hirta belongs to the family Euphorbiaceae. The Preparation of the extracts using soxhelet extractor. The solvents used were ethanol. Phytochemical scranning of plant extracts such as alkaloids, tannins, steroids, flavonoids, saponins are present. Prepation of gel using 200 mg/100g Extract. Prepared gel are evaluated deferent parameters such as pH measurement, Viscosity study, Spreadability, Homogeneity

INTRODUCTION

Introduction of Euphorbia hirta linn.

In India, used of the different parts of several medicinal plants to cure specific diseases has been in practice from ancient times. The indigenous system of medicine namely Ayurveda, Siddha, and Unani, has been in existence for several centuries. Some drugs from Ayurveda approaches modern diseases, had already reached the market place. In modern medicines, plants occupy a very important place as the raw material for some important drugs. Synthetic drugs are effective in controlling different diseases but these synthetic drugs are out of reach of millions of people and have various side effects. It is estimated that around 70,000 plant species have been used for medicinal purposes. The herbs provide the starting material for the synthesis of conventional drugs. India and Nepal around 700. This review intends to provide an overview of the chemical constituents and pharmacological action of Euphorbia hirta[1]

Plant Description

Table no 1 : Plant Description

Synonym	E. pilulifera Linn. ,Chamaesyce pilulifera Linn.
Family	Euphorbiaceae
English EE	Bearing spurge ,asthma herb,snakeweed
Hindi	Dudhi
Gujarat	Dudeli
Marathi	Dudnali Govardhan

***Corresponding Author:** Anjula Patidar
Address: *Department of Pharmacology Asst. Professor of Charak Institute of Pharmacy, Mandleshwar, Madhya Pradesh*
Email : anjulapatidar15feb2016@gmail.com

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Synonym	E.pilulifera Linn. ,Chamaesyce pilulifera Linn.

Scientific classification

Table no 2: Scientific classification

Kingdome	Plantae,Angiosperms,Eudicots,Rosids
Order	Malpighiales
Genus	Euphorbia
Species	E.hirta

It is a slender- stemmed, annual hairy plant with many branches from the base to top, spreading up to 40 cm in height, reddish or purplish in color. Leaves are opposite, elliptic-oblong to oblonglanceolate, acute or sub-acute, dark green above; pale beneath, 1- 2.5 cm long, blotched with purple in the middle, and toothed at the edge. The fruits are yellow, three-celled, hairy, keeled capsules, 1-2 mm in diameter, containing three brown, four-sided, angular, wrinkled seeds.[1]

Therapeutic Application of Euphorbia hirta Linn.

E. hirta is used in the treatment of gastrointestinal disorders (e.g. diarrhea, dysentery, intestinal parasitosis), bronchial and respiratory diseases (e.g. asthma, bronchitis, hay fever), and in conjunctivitis. Hypotensive and tonic properties are also reported in E. hirta. The aqueous extract exhibits anxiolytic, analgesic, antipyretic, and anti-inflammatory activities. The stem sap is used in the treatment of eyelid styes and a leaf poultice is used on swelling and boils. Extracts of E. hirta have been found to show anticancer activity. The aqueous extract ofthe herb strongly reduced the release of prostaglandins I2, E2 , and D2. The aqueous extract also inhibits aflatoxin contamination in rice, wheat, maize, and mustard crops. Methanolic extract of leaves have antifungal and antibacterial activities. The leaves pounded with turmeric and coconut oil are warmed and rubbed on itchy soles. The latex of E. hirta is applied on lower eyelids, like surma to cure eye sores. The root exudates exhibit nematicidal activity against juveniles of meloidogyne incognita. Decoction of dry herbs is used for skin diseases. Decoction of fresh herbs is used as gargle for the treatment of thrush. Root decoction is also beneficial for nursing mothers deficient in milk. Roots are also used forsnake bites. The polyphenolic extract of E. hirta has antiamoebic and antispasmodic activities. Quercitrin, a flavanoid glycoside, isolated from the herb showed an antidiarrheal activity. It is reported to have a relaxation effect on respiration. The alcoholic extract of whole plant shows hypoglycemic activity in rats. [2]

Fig no.1: Euphorbia hirta plant

Traditional Uses

- Gastro intestinal disorders (diarrhea, dysentery, intestinal parasitosis, bowel complaints, digestive problems).
- respiratory diseases (cough, cold, asthma, bronchitis, hay fever, emphysema).
- Urinary apparatus (diuretic, kidney stones).
- Genital apparatus (metrorrhagic, agalactosis, gonorrhoea, urethritis).
- Various ocular ailments (conjunctivitis, corneal ulcer).
- Skin and mucous membranes problems (guinea worm, scabies, tinea, trush, aphtha) and tumour.
- Prevent pathogen infection.
- Treatment of ulcers.[3]

Chemical constituents

Phytochemical screening of Euphorbia hirta leaf extract revealed the presence of reducing sugars, terpenoids, alkaloids, steroids, tannins, proteins,

fats, oils, gums, mucilages, glycoside, saponin, coumarin, cardiac glycosides, anthroquinones, flavanoids and phenolic compounds. Afzelin, quercitrin and myricitrin, rutin, quercitin, euphorbin-A, euphorbin-B, euphorbin-C, euphorbin-D, 2,4,6-tri-O-galloyl-β-d-glucose, 1,3,4,6- tetra-O-galloyl-β-d-glucose, kaempferol, gallic acid, and protocatechuic acid were isolated from the aerial parts of Euphorbia hirta .Six compounds have been isolated from the leaves of Euphorbia hirta and identified as gallic acid, quercitrin, myricitriu, 3,4-di-O-galloylquinic acid, 2,4,6-tri-O-galloyl-D-glucose and 1,2,3,4, 6-penta-O-galloyl-beta-D-glucose .Euphorbins A-E, euphorbianin, leucocyanidol, camphol and triterpenes: α-amyrin, 24-methylencycloartenol and β-sitosterol were isolated from Euphorbia hirta . Seven phenolic compounds [(-)-epigallocatechin gallate 16.25- 29.52 mg/100 g dw,(-)-epicatechin gallate 16.72-41.87 mg/100 g dw, luteolin-7-O-glucoside 5.24- 98.83 mg/100 g dw , isoquercitrin 12.30-51.87 mg/100 g dw, syringic 51.14-68.00 mg/100 g dw, chlorogenic 48.68-79.67 mg/100 g dw and caffeic acids 0.66-1.22 mg/100 g dw] , and six sterols [β-sitosterol-D-glucoside 19.08- 45.76 mg/100 g dw, β-sitosterol 1.20-3.56 mg/100 g dw, cholesterol 0.41-3.36 mg/100 g dw, brassicasterol 10.09-32.57mg/100 g dw, campesterol undetected -0.51 mg/100 g dw, stigmasterol 11.69-19.66 mg/100 g dw] were isolated from Euphorbia hirta .The total phenolic and flavonoids content of different parts (leaves, stems, flowers and roots) of Euphorbia hirta were determined. Leaves extract had the highest total phenolic content [(206.17±1.95) mg GAE/g], followed by flowers, roots and stems extracts which contained (117.08±3.10) mg GAE/g, (83.15±1.19) mg GAE/g, and (65.70±1.72) mg GAE/g, respectively. The leaves also had the highest total flavonoids content value [(37.970±0.003) mg CEQ/g], followed by flowers, roots and stems extracts which contained (35.200±0.002), (24.350±0.006), and (24.120±0.004) mg CEQ/g, respectively . Ten compounds were identified from the methanolic leaf extract of Euphorbia hirta including methyl 14-methylpentadecanoate, palmitic acid, 5-methyl-1,3-oxazolidin-2-one; 2-amino-3-sulfanylpropanoic acid, S-methyl-L-cysteine, chloromorpholin-4-ium, 2,3,5-trimethyl-1 H-pyrrole; niacin or nicotinic acid, 4-amino-4-oxobut-2-enoic acid and 17-carboxyheptadec-9-en-1- ylium .Triterpenoids: α-amyrin, β-amyrin, taraxerone, taxerol, β-amyrin acetate, taraxerone, 11α, 12α-oxidotaraxerol, and tannins were identified in Euphorbia hirta . The mineral contents of dried leaves sample were Ca: 1.1% , P: 0.3%, Fe: 0.03%, Mg: 0.5%, Mn: 0.01%, Zn: 0.01% and Cu: 0.002%.[4]

Other pharmacological activity of Euphorbia hirta Linn.

- **Antibacterial activity**
  The ethanolic extract of E. hirta inhibited the growth of the Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, and Bacillus subtili and aqueous and chloroform leaf extracts of E. hirta possess an antibacterial activity against Klebsiella pneumonia. The extract is noncytotoxic and antibacterial.
- **Antimalarial activity**
  The bioassay-guided fractionation of the methanolic extract of aerial parts of E. hirta, monitored against P. falciparum parasites, yielded a main active chromatographic fraction showing 90% growth inhibition of P. falciparum at a concentration of 5 µg/m.
- **Anti-inflammatory activity**
  The n-hexane extract of aerial parts of E. hirta showed antiinfl ammatory effects in the model of phorbol acetate-induced ear infl ammation in mice. It exhibited a dose-dependent effect.[2]
- **Galactogenic effect**

The powdered . E.hirta showed a galactogenic activity in guinea pigs before puberty by increasing the development of the mammary glands and induction of secretion .[5]

- **Antiasthmatic activity**
  E. hirta is reported to have an antiasthmatic activity due to the relaxation effect on the bronchial tubes and a depressant action on respiration.
- Effect on urine output and electrolytes Ethanolic and aqueous leaf extracts of E. hirta signifi cantly induced diuresis in rats. The diuretic effect of the ethanol extract was signifi cant at 6 h (for 100 mg/kg) and at 24 h (for 50 mg/kg). The water extract induced a signifi cant increase in urine Na+, K+ and HCO3- loss. The ethanol extract (100 mg/ ml) caused a signifi cant decrease in the K+ loss whereas the water extract increased its excretion. The HCO3- urine output following the injection of both extracts was tremendously enhanced.
- **Antidiarrheal activity**
  The antidiarrheal effect of the herb decoction was studied in mice. It demonstrated an activity in models of diarrhea induced by castor oil, arachidonic acid, and prostaglandin E2. [Quercitrin, a flavanoid glycoside isolated from E. hirta, showed an antidiarrheal activity, at a dose of 50 mg/kg, against castor oil and prostaglandin E2 -induced diarrhea in mice.
- **Antioxidant activity**
  The aqueous extract of E. hirta L. showed an antioxidant 0effect and a free radical scavenging activity in various in vitro models like total antioxidant and total ferric reducing power determination, assay for free radical-scavenging activity using ABTS, DPPH, and hydroxyl radical scavenging assays. It showed maximum antioxidants and free radical scavenging.
- The free radical scavenging effect on DPPH and hydroxyl was found as 68.80 ± 5.21 and 73.36 ± 5.21%, respectively.
- **Antifertility activity**
  E. hirta at a dose of 50 mg/kg reduced the sperm motility and density of cauda epididymal and testis sperm suspension signifi cantly, leading to 100% infertility.[5]
- **Antiamoebic activity**
  The polyphenolic extract of E. hirta inhibited the growth of Entamoeba histolytica with a minimum active concentration of less than 10 µg|ml.
- **Antifungal activity**
  An ethanolic extract of E. hirta showed an antifungal activity against plant pathogens Colletotrichum capsici, Fusarium pallidoroseum, Botryodiplodia theobromae, Phomopsis caricae-papayae, and Aspergillus niger using the paper disc diffusion technique.[5]
- **Wound healing activity**
  The ethanolic extract of whole plant of E. hirta possesses significant wound healing activity. The histopathological study, W.B.C. count and haemostatic activity were carried out to support its wound healing activity. The ethanolic extract of E. hirta has promoted wound healing activity and probable mechanism may the promotion of collagen biosynthesis which further supports for increase in tensile strength of the granulloma tissue. This evidence supports the use of E. hirta in the management of wounds.[2]
- **Anti-tumour activity**
  Aerial parts of the plant, Euphorbia hirta were extracted with ethanol, chloroform and petroleum ether. All the extracts showed positive result for tannin, saponin, alkaloids and flavonoids. Chloroform, ethanol extract enhanced mean survival time and reduced solid tumor mass tumour bearing mice. This

antitumour activity due to presence of flavonoid.[6]

- **Effect on CNS**
  evaluated lyophilized aqueous extract of Euphorbia hirta L. (Eh) for benzodiazepine-like properties, hypnotic, neuroleptic and antidepressant properties. The result showed that aqueous extract does not seem to possess benzodiazepine like properties hypotonic , neuroleptic effect.[3]
- **Anti-thrombocytopenic activity-** Antithrombocytopenic effect of lyophilized decoction of Euphorbia hirta Linn was studied by Jovencio G Apostol in Sprague-Dawley rats. Ethanol induction induced thrombocytopenia within 7days in rats. Platelet count, bleeding time and clotting time were assayed in four groups of rats. A significant increased platelet count decreased bleeding and clotting time observed after Euphorbia hirta treatment. Histopathological studies showed a decreased liver sinusoidal dilation in Euphorbia hirta treated groups. Euphorbia hirta decoction, thus, acts as potential antithr ombocytopenic.
- **Sedative and Anxiolytic activity**
  Lyophilized aqueous extract of Euphorbia hirta L. (Euphorbiaceae) has been evaluated for behavioral effects in mice. Sedativecould be confirmed with high doses (100 mg of dried plant/kg, and more), by a decrease of behavioral parameters measured in non-familiar environment tests, whereas anticonflict effects appeared at lower doses (12.5 and 25 mg of dried plant/kg), by an enhancement of behavioral parameters measured in the staircase test and in the light/dark choice situation test. These findings validate the traditional use of E. hirta as a sedative and reveal original anxiolytic properties.
- **Aflatoxin inhibition activity**
  An aqueous extract significantly inhibited aflatoxin production on rice, wheat, maize and groundnut.
- **Larvicidal activity**
  synthesised sliver nanoparticles (AgNPs) Euphorbia hirta leaf extract concentration range of AgNps (3.125, 6.25, 12.5,25 and 50PPm) and methanol crude extract (50,100,150, 200 and 250PPm) were tested against malarial vector Anopheles stephensi. The synthesized AgNps exhibited a highest larval mortality against first to fourth instar larvae and pupae. Methanol extract exhibited a lowest larval mortality than the synthesized silver nanoparticles can be potential mosquito larvicidal agents .[5]

Introduction of microbes:-

Pathogens, including viruses, bacteria, rickettsia, fungi, protozoans, and nematodes, are commonly isolated from insect and other invertebrate hosts. Their natural occurrence in invertebrate populations contributes to the regulation of injurious pests of humans and their crops, households and domestic animals. These entomopathogens have potential for biological (i.e., microbial) control programs (Steinhaus, 1956), and many of them have been exploited for insect pest control through inoculative, inundative and augmentative releases Spectacular successes have been reported for a few entomopathogens as classical biological control agents such as the Oryctes virus against the coconut palm rhinoceros beetle in the South Pacific, a nucleopoly- hedrovirus against the European pine sawfly in Canada and the nematode, Beddingia (=Deladenus) siricidicola against siricid woodwasps in Australia and several countries in South America and in South Africa However, many classical biological control introductions of pathogens have resulted in establishment, but not necessarily in pest control . In some instances, fortuitous or accidental introduction of a pathogen has also resulted in

excellent biological control of a pest. These include a nucleopolyhedrovirus against the European spruce sawfly the fungus, Entomophaga nzairnaiga, against the gypsy moth and the microsporidium, Nosema (=Perezia) pyrausta, against the European corn borer .Aside from natural infections and their intro- duction as classical biological control agents, entomopathogens have been commonly used as inundative agents for the suppression of pests. A number of them have been registered and/or are commercially available for use against pest species. The first commercial entomopathogens were the milky disease bacteria, Paenibacillus (=Bacillus) popilliae and P. lentimorbus, that were registered in 1948 and used primarily in augmentative releases to suppress populations of the Japanese beetle in the USA . Microbial control took a significant step forward in the USA with the registration and commercial- ization of the bacterium, Bacillus thuringiensis (Bt), in 1961. Large scale production of Bt on artificial media, application with conventional sprayers, safety, and selectivity for lepidopterous pests were its major positive attribute. Despite these advantages, the initial Bt isolate (e.g., subsp. thuringiensis) used in commercial products was not very efficacious against the targeted lepidopterous pests. Fortunately, Bt subsp. kurstaki commer- cialized in the early 1970s, followed by other Bt subspecies (e.g., aizawai, tenebrionis, and israelensis), showed marked improvement in potency and host range to increase their utility in microbial control programs. Although the major share of the microbial control market goes to Bt-based products, a variety of other microbial control agents (MCAs) are commer- cially produced. Thus, viruses, other bacteria, fungi, and nematodes have one or more species available for microbial control of insect pests and other invertebrates in many different countries.

Advantages of use of microbes in food industry

- The growth of microbes is very fast and they do not need much space as the conventional ways require.
- The protein content of microbe's cells is very high. They have a protein content that is about 40–50% in bacteria and 20–40% in algae.
- They are also helpful in recycling the waste materials and therefore, clean up the waste products.
- They have high yielding ability.
- They are less effected by the environmental factors, such as climate does not affect them.
- The microbe's proteins contain all the essential amino acids
- Their growth can be obtained on a wide range of cheap, Agricultural
- waste products and industrial by-products, that is, methanol, ethanol, other petroleum products, sugar, molasses, waste from paper mills, etc.
- Some microorganisms, mainly yeasts, have high content of vitamins.

Used in vaccine production

A vaccine totally comprises biological productions from an agent that is disease causing microorganisms or resembles with disease causing microorganisms and have ability to provide immunity against that particular disease, from the causal organism, of which the biological preparation was actually made. These biological preparations are mostly obtained from the killed or weekend form of microbes or may be made from surface protein or toxins of disease-causing organism. The vaccination mostly does not have any kind of adverse reactions and by making sure the routine vaccination program, health department has protected millions of children from great number of opportunistic infections and diseases that has resulted in a lot of mortalities in past.[7]

Classification of microbes

classification arranged in a hierarchical structure. Typically, this is organized by supertype–subtype relationships, also called generalization–specialization relationships, or, less formally, parent–child relationships. In such an inheritance relationship, the sub- type by definition has the same properties, behaviors, and constraints as the supertype plus one or more additional properties, behaviors, or constraints. Bacterial taxonomy is divisible into three parts: It has two functions: the first is to describe as completely as possible the basic taxonomic units, or species; the second, to devise an appropriate way of arranging and cataloging these units. The notion of species consists of assemblage of individuals that share a high degree of phenotypic similarity, coupled with an appreciable dissimilarity from other assemblage of the same general kind. Every assemblage of individuals shows some degree of internal phenotypic diversity because of genetic variation. Ideally, species should be characterized by complete description of their phenotypes and genotypes There are rules for nomenclature but none for classification or identification. Both classification and identification depend on characterization of the bacterium, but each makes different use of the individual feature. The aim of "identification" is to equate the properties of a pure culture with those of a well-characterized and accepted species. When identification in this sense cannot be accomplished, the aim of identification must shift to characterization of a new species, that is, to a new description In classification, equal weight is given to each independent character; some as important, others less so. Systematics is the study of multiple items, units, or individuals with the aim of finding common factors and differences; lines of cleavage are made so that the like fall on the same side of the dividing line, and the unlike on the other. Biological systematics bears the special name taxonomy, and the subject can be subdivided into three sections:

1. **Classification.**

The orderly arrangement of units into groups of larger units. A simple analogy can be found in a pack of cards; the individual cards can first be sorted by color, then into suits. Within each suit the cards can be arranged in a numerical sequence, and the face cards placed in some order of seniority.

2. **Nomenclature.**

The naming of the units defined and delineated by the classifica- tion. In the example of cards, the face cards are given names and more than one name, for example, jack or knave, may be given to the same card.

3. **Identification.**

It can be done through various methods either by physical methods or by methods based on phylogeny. [8]

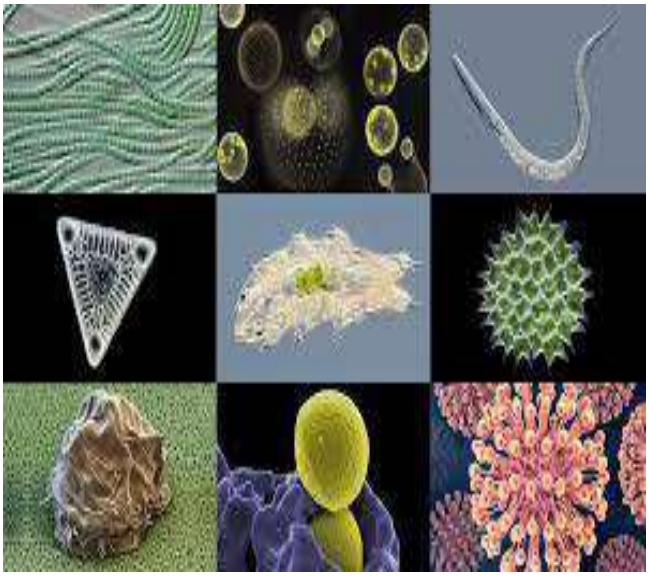

Fig no. 2: Microbes

MATERIAL AND METHOD

- **Collection of plant :**

The fresh plant of Euphorbia hirta was collected in campus of CIP college of mandleshwar, district Khargone , state M.P. (India).Euphorbia hirta belongs to the family Euphorbiaceae.

Preparation of the extracts

- After collection of plants, they were washed by running tap water and every part of the plant

was separated into roots, stem, bud, leaves and shadow dried for 25-30 days .

- After proper drying, they were made to powder separately. 100g of each powder sample was taken and soaked in 500 ml of solvent (55 – 60 C) in soxhelet extractor and kept for extraction about 8 cycles in 15 to 18 hours . The solvents used were ethanol.
- After extraction powder sample, the crude extract was collected, evaporated to dryness, extracts were concentrated using vaccum evaporater and stored properly in moisture free container. The methods were adopted for the preparations of dilutions of crude extract for antimicrobial assay. [9]

Phytochemical scranning of plant

The concentrated extracts of selected plant was subjected to different chemical tests for the detection of different phytoconstituents using standard methods.

1. Test for saponins

Crude extract when mixed with 5ml distilled water in a test tube then it was shaken briskly. The formation of stable foam which indicate the presence of saponins.

2. Test for flavonoids

Crude extract when mixed with 10ml distilled water, 5ml of dilute ammonia solution were added to a portion of the aqueous filtrate solution then added 1ml concentrated sulphuric acid. Indication of yellow color shows the presence of flavanoids.

3. Test for steroids

The crude extract of selected plant was dissolved in 0.5mL dichloromethane to prepare a dilute solution and then 0.5 mL of acetic anhydride was added followed by four drops of concentrated sulphuric acid. A blue-green colouration indicated the presence of steroids.

4. Test for tannins

Curde extract of plant was mixed with small amount of water and heated on water bath. The mixture was filtered and ferric chloride was added drop by drop to the filtrate. A dark green appear which indicates the presence of tannins.

5. Test for Alkaloids

Crude extract was dissolved with 2ml of 1% HCL and heated gently .Wagners and Mayers reagents were added to the mixture . Turbidity of the resulting precipitate was taken as confirmation for the presence of alkaloids.

6. Test for carbohydrate

Both Felhing A and Felhing B solution were mixed in equal volume. These reagents are added in crude extract and smoothly boiled. A brick red precipitate is appeared at the bottom of the test tube and indicate the presence of reducing sugar.[10]

Table no. 3 Preliminary phytochemical analysis of Euphorbia hirta leaves extract.

Phytoconstituents	Ethanol
Saponins	
a. Foam of froth test	+
b. Haemolytic test	+
Flavanoid	
a. Shinoda Test	+
b. Alkaline Test	+
c. Zinc hydrochloride Test	+
d. Ferric Chloride Test	+
Steroids	
a. Salkowski's reaction	+
b. Libermann-Burchard's test	+
c. Hesse's reaction	+
d. Sulfur-powder test	+
Tannins	
a. Vanilline hydrochloride Test	+
b. Phenazone Test	+
c. Ferric chloride Test	+
d. Lead acetate Test	+
	+
Alkaloids	
a. Mayer's Test	+
b. Wagner's Test	+
c. Hager's Test	+
d. Dragendroff's Test	+

Carbohydrate	
a. Molish Test	+
b. Anthrone Test	+
c. Fehlings Test	+
d. Benedict's Test	+
e. Barfoed's Test	+

Gel:

The word ''gel'' is derived from ''gelatin,'' and both ''gel'' and ''jelly'' can be drawn back to the Latin gelu for ''frost'' and gel are, meaning ''freeze'' or ''congeal.'' This origin indicates the essential idea of a liquid setting to a solid-like material that does not flow, but is elastic and retains some liquid characteristics. Use of the term ''gel'' as a classification originated during the late 1800s as chemists attempted to classify semisolid substances according to their phenomenological characteristics rather than their molecular compositions. At that time, analytical methods needed to determine chemical structures were lacking. [11] Gels are homogeneous, semisolid preparations usually consisting of solutions or dispersions of one or more medicaments in suitable hydrophilic or hydrophobic bases. As per the definition of U.S.P. Gels as a semisolid system consisting of dispersion made up of either small inorganic particle or large organic molecule enclosing and interpenetrated by liquid. The inorganic particles form a three-dimensional "house of cards" structure. [12]

Preparation of gel:

1 g of Carbopol 934 was dispersed in 50 ml of distilled water with continuous stirring. 5 ml of distilled water was taken and required quantity of methyl paraben and propyl paraben were dissolved by heating on water bath. Cool the solution, then to that added Propylene glycol 400. 200mg\100 extract of euphorbia hirta was mixed to the above mixture and volume made up to 100 ml by adding remaining distilled water. Finally full mixed ingredients were mixed properly to the Carbopol 934 gel with continuous stirring and triethanolamine was added drop wise to the formulation for adjustment of required skin pH (6.8-7) and to obtain the gel at required consistency. The same method was followed for preparation of control sample without adding any leaves extract.[13]

Formula of gel

Table no.4 : Formula of gel

Formulation	Ingredients	Quantity
Control	Carbapol 934	1gm
	Methyl paraben (0.5%)	0.2ml
	Propyl paraben (0.2%)	0.1ml
	Propylene glycol 400(5%)	5ml
	Triethanolamine (q.s)	1.2ml
	Extract preparation	200mg/100g
	Distilled water	Upto 100ml

Evaluation parameters of gel:

1. **Measurement of pH:**

The pH was determined by using a digital pH meter. Dissolve 1g of gel in 100 ml of distilled water and stored for 2h. done the measurement of pH in triplicate and calculate the average values.

2. **Viscosity study:**

It is carried out by using Brookfield viscometer. Rotated the gels at 0.3, 0.6 and 1.5 RPM. Note down the corresponding dial reading at each speed. The viscosity was obtained by dial reading × factor given in the Brookfield viscometer catalogues.

3. **Spreadability:**

It indicates the extent of the area to which gel readily spreads on application to the skin or affected part. The therapeutic potency also depends upon spreading value. The time in sec taken by two slides to slip off from gel which is placed in between the slides under the direction of certain load is expressed as spreadability. Lesser the time taken for the separation of two slides, better the spreadability. The following formula is used to calculate the spreadability: Spreadability (S) = M × L / T Where, M = weight tied to upper

slide L = length of glass slides T = time take to separate the slides.

4. Homogeneity:

Set the gel in container and then it was tested for homogeneity by visual inspection. They were tested for their appearance and presence of any aggregates.[10]

RESULT:

The antimicrobial activity of Euphorbia Hirta Linn. May be due to chemicals such as alkaloids, tannins, steroids, flavonoids, saponins are present These compounds are responsible for antimicrobial activity of Euphorbia Hirta linn.the effective topical dose of Euphorbia Hirta linn. Is 200mg/100g.

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Set the gel in container and then it was tested for homogeneity by visual inspection. They were tested for their appearance and presence of any aggregates.[10]

CONCLUSION:

Euphorbia hirta is believed to possess the strong antibacterial activity than Euphorbia thymifolia due to presence of tannin, alkaloids and flavonoids which have been studied . Tannins have important role such as stable and potent antioxidants . Most of the organisms used in the research study were causative agents of diarrhea and dysentery, while Euphorbia hirta and Euphorbia thymifolia inhibit the growth of these microbes, so both plants can be used for the treatment of diarrhea and dysentery. Moreover, this study can be used as a tool for the isolation of pure antimicrobial from the plant and more works need to be done with the view of their use for in-vivo studies. Results presented in this study confirmed that extracts of E.hirta hold potential antimicrobial effects against wide array of pathogenic microorganisms and therefore can be used as a safe, reliable and economical natural antimicrobial source for therapeutic reasons. This finding may also be useful in food industry as the plant extracts can be used as food preservatives protected against food borne pathogens

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