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ANTI-BACTERIAL & ANTI-FUNGAL ACTIVITY OF POLYHERBAL GEL.

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Abstract: In the previous number of decades there has been a new growth at intervals the sphere of seasoner medication. In written material, most of the medication got at intervals the fashion of powder, kasaya (decoction form) or bhasma. the assorted extracts of assorted parts of plants showed promising medication activity. at intervals the gift study a trial was created to formulate seasoner gel containing succulent, arishth and love apple seed extract. the assorted concentration of polymers were taken for the formulation of gel. Gel was additional subjected to analysis of Physical properties like color, clarity, pH, consistency, Spreadability and body. The analysis for bactericide and Antifungal activity was done victimization cup plate technique . HPMC in concentration of 2-3% showed the consistency and body required for topical administration. Zone of inhibition was found in between 14-24 for S. aureus, 17.5-22 for E.coli. 15-25 for A. niger and A. varis. The gel showed promising bactericide and Antifungal activity against different strains used for the study. The gel was stable at temperature.

Key words: Aloe vera, Azadirachta indica, Curcuma longa, Tomato seeds, S.aurius, Zone of Inhibition, etc.

INTRODUCTION: Plants are naturally God gifted for the synthesis of medicinal compound and provide a great help in a new discovery in the area of chemical diversity because of the unknown availability either as a standardized extract or as a pure compound. Plants are the oldest source of pharmacologically active compounds and have provided human kind with many medicinally useful compounds from centuries. Today more than two thirds of the world's population relays on plant derived drugs. The origin of many effective drugs is found in the traditional medicinal practices and in view of this it is very important to undertake studies pertaining to screening of the medicinal plants for their proclaimed biological activity. Numerous studies have been conducted with the extracts of various plants, screening antimicrobial activity as well as for the discovery of new, antimicrobial compounds. As like Aloe Vera, Turmeric, Neem and Tomato seeds has antimicrobial and antifungal properties. To formulate and evaluate the antimicrobial and antifungal activities of poly herbal gel this study had been proceed. Numerous studies have been conducted with the extracts of various plants, screening antimicrobial activity as well as for the discovery of new, antimicrobial compounds. Aloe vera (family- Liliaceae) is a stem less plant and evergreen. Aloe vera juice is of great medicinal importance and traditionally used as antiinflammatory agent and in cosmetic industry. It can be useful in the treatment of

Burns, Heat rashes, Allergy, Eczema, Psoriasis, Dermatitis as well as balnea, vaginal yeast infection. If Aloe vera juice is consumed directly or with any other type of liquid it gives relief from many kinds of stomach ailments like irritable bowel, reflux, Crohn's disease, indigestion and heartburn. Azadirachta indica (Family-Meliaceae) known as Neem is well known in india for its medicinal properties. Its leaves possess broad spectrum of activity against Gram +ve and Gram – ve bacteria including M.tuberculosis, Vibrio cholera . Curcuma longa (Family-Zingiberaceae) is a rhizomatous plant known as Turmeric. It is one of the spice. It is used for the treatment of wounds, cuts, burns, galactose induced cataract formation, ulcer etc. It is also used in protection against vascular dementia due to antioxidant activity. Both curcumin and the oil fraction suppress growth of several microbes like Streptococcus, Staphylococcus, Lactobacillus. A.flavus, P.digitatum, A.parasiticus, etc.

Symptoms of Skin Infections: Many skin infections include rashes, swelling, redness, pain, pus, and itching.

Diagnosis: To diagnose a skin infection, health care providers will do a physical exam and ask about your symptoms. You may have lab tests, such as a skin culture. This is a test to identify what type of infection you have, using a sample from your skin. Your provider may take the sample by swabbing or scraping your skin, or removing a small piece of skin (biopsy). Sometimes providers use other tests, such as blood tests.

Treatment: The treatment depends on the type of infection and how serious it is. Some infections will go away on their own. When you do need treatment, it may include a cream or lotion to put on the skin. Other possible treatments include medicines and a procedure to drain pus.

Table no. 1 Common Bacterial Diseases.

Sr. no.	Diseases	Description
1.	Carbuncle	A network of furuncles connected by sinus tracts
2.	Cellulitis	Painful, erythematous infection of deep skin with poorly demarcated borders
3.	Erysipelas	Fiery red, painful infection of superficial skin with sharply demarcated borders
4.	Folliculitis	Papular or pustular inflammation of hair follicles
5.	Furuncle	Painful, firm or fluctuant abscess originating from a hair follicle
6.	Impetigo	Large vesicles and/or honey-crusted sores

Bacteria and Fungus can causes skin infections:

BACTERIA: The majority of bacterial infections are caused by the Gram-positive bacteria Staphylococcus and Streptococcus species.

FUNGUS: Candida species.

Table no. 2 Conventional treatment of Bacterial diseases.

SR.NO.	DRUGS	DESCRIPTION
1	Antibacterials:	like bactroban or cleocin
2	Anthralin	drithocrema, micanol and others
3	Antifungal agents	Lamisil, lotrimin and nizoral
4	Benzoyl peroxide	Creams and other products
5	Coal tar	Topical therapy
6	Corticosteroids	Foams, Lotions, Creams, etc.
7	Retinoids	Creams and Gels
8	Salicylic acid	lotions, gels, soaps

Drugs used in formulation of polyherbal gel

Aloe Vera is an evergreen perennial, plant that originates from the Arabian Peninsula, but grows wild in tropical, semi-tropical, and arid climates around the world. It is cultivated for agricultural and medicinal uses. It is found in many consumer products including beverages, skin lotion, cosmetics, ointments, or in the form of gel for minor burns and sunburns.

BOTANICAL NAME : Aloe barbadensis miller. FAMILY: Liliaceae.

AZADIRACHTA INDICA: Azadirachta indica (A. indica) belongs to the botanic family Meliaceae, commonly known as Neem. It is used in traditional medicine as a source of many therapeutic agents. A. indica (leaf, bark, and seeds) are known to contain antibacterial and antifungal activities against different pathogenic microorganisms; in addition to antiviral activity against vaccinia, chikungunya, measles, and Coxsackie B virus .

Botanical name: - Azadirachta Indica Family: Mahogany

CURCUMA LONGA: The tuberous rhizomes or underground stems of Curcuma longa. Uses: Turmeric is used as an herbal medicine for Rheumatoid arthritis, chronic anterior uveitis, conjunctivitis, skin cancer, wound healing, UTI infections, liver ailments, etc.

Botanical name: Curcuma longa Family: Zingiberaceae

SOLANUM LYCOPERSICUM: Solanum Lycopersicon, popularly known as tomato, originated in South America and now is used and cultivated in various parts of the world. This product is cultivated in warm climate regions, but can also be planted inside a greenhouse during winter. Tomatoes are full of vitamins and antioxidants essential to a healthy body 1)

Binomial Name: - Solanum Lycopersicum Family: - Solanaceae

Fig no. 1 Herbal drugs used in formulation

1. Aloe vera 2. Neem 3. Turmeric 4. Tomato



MATERIAL AND METHODS:

2.1. Plant Material: Plant material used for this study was collected from college Botanical Garden, Ahmednagar, India.

2.2. Preparation of plant extract: The Aloe vera leaf was cut at the base of the plant, lower leaf was sliced opened peeling the outer portion of skin and pericarp and juice was collected. The neem leaves were also dried and powder was percolated with 250 ml of 80% ethanol. Seeds of tomato were dried and were powdered. The powder was extracted using methanol.

2.3. Formulation of Gel: The formulation of Aloe vera gel with different concentrations (1%, 2%, and 3%) of Carbopol 934 and HPMC was prepared. The volume of plain Aloe vera juice was kept constant in each formulation. Weighed quantity of each of neem leaves extract and tomato seed extract was mixed with Aloe vera juice before adding the polymer. The Antibacterial and Antifungal activity of individual extract and mixture was also studied.

2.4. Determination of clarity and colour : It was done with naked eyes against white background.

2.5: Determination of Odour: It was done by mixing gel in water and taking the smell.

2.6: Determination of Viscosity: Viscosities of the formulated gels were determined using Brookfield Viscometer. Spindle no. 7 and spindle speed 60 rpm at 25° C were used for gels, the corresponding dial reading on the viscometer was noted. Then the spindle was successively lowered .The dial reading was multiplied by the factor given in the Viscometer catalog.

2.7. Determination of the pH: The pH of formulated gels was determined using pH meter (EQ621). About 2 gm of formulation was dispersed in 20 ml of distilled water. The electrode was immersed in gel solution and readings were recorded on pH meter.

2.8: Determination of Spreadability: Spreadability of formulations was determined by an apparatus suggested by Multimer et al. which was fabricated in laboratory and used for study. The apparatus consist of a wooden block, with a fixed glass slide and movable glass slide with one end tied to weight pan rolled on the pulley, which was in horizontal level with fixed slide.

2.9: Determination of Antibacterial and Antifungal activity:

2.9.1. Test Microorganism: Bacteria: E.coli, S.aureus, Pseudomonas, B.subtilis.

Fungi: A.varis, A.niger, P.notatum.

2.9.2. Preparation of Inoculums: For evaluation of antifungal activity, 24 hours fresh culture of fungi and bacteria were suspended in sterile water to obtain a uniform suspension of microorganism.

2.9.3. Determination of zone of inhibition: Antifungal and Antibacterial activity was checked by agar well diffusion method. In this method a previously liquefied medium was inoculated with 0.2 ml of Fungal and Bacterial suspension having a uniform turbidity at temperature of 40 0C. 20 ml of culture medium was poured into the sterile petri dish having a internal diameter of 8.5 cm. Care was taken for the uniform thickness of the layer of medium in different plates. After complete solidification of liquefied inoculated medium, the wells were made aseptically with cork borer having 6mm diameter. In each of these plate gel solution was palced carefully. Plates were kept for pre diffusion for 30 mins. After it normalized to room temperature; the plates were incubated at 37°C for 24 hrs in case of bacteria and at 27°C for 48 hrs in case of fungi. After incubation period was over, the zone of inhibition was measured with help of Hi-antibiotic zone scale.

RESULT AND DISCUSSION: All the extract showed activity against the microbial strains used [Table 6]. In case of tomato seed extract, less antibacterial activity was observed as compared to other but it showed good antifungal activity. Neem leaves extract showed excellent activity against both fungus and bacteria. Aloe vera showed more antifungal activity than tomato seed extract. The gel formulated also showed good activity against both fungi and bacteria. The gel having carbopol showed good viscosity but lacked consistency [Table 3]. All formulations were turbid [Table 1]. All the formulations had characteristic odour [Table 2]. Spreadability was observed best in Aloe vera with HPMC 3% [Table 5]. The pH required was also in limits in case of HPMC 2-3% [Table 4]. pH of carbopol was more on acidic side. Based on the physical evaluations, formulation with HPMC 2-3% exhibited good physical properties and was found to be best choice for preparing gels.

Table no. 3 Clarity And Colour different gels.

Formulation	Concentration		
	1%	2%	3%
Aloe vera	Green/Turbid		
HPMC	Green/Turbid	Green/Turbid	
Carbopol	Green/Turbid	Green/Turbid	Green/Turbid

Table no. 4 Odour of different gels

Formulation	Concentration		
	1%	2%	3%
Aloe vera	Characteristic		
HPMC	Characteristic	Light	Very light
Carbopol	Characteristic	Characteristic	Light

Table no. 5 Viscosity (poise) of different gels.

Formulation	Concentration		
	1%	2%	3%
Aloe vera	2.51		
HPMC	12.59	17.10	20.13
Carbopol	3.162	7.02	8.12

Table no. 6 pH of different gels

Formulation	Concentration		
	1%	2%	3%
Aloe vera	5.5-6.5		
HPMC	5.4-6.1	5.5-6.4	6.2-6.7
Carbopol	3.1-3.5	3-4	3.1-4

Table no. 7 Spread ability of different gels

Formulation	Concentration		
	1%	2%	3%
Aloe vera	FAIR		
HPMC	FAIR	GOOD	BEST
Carbopol	FAIR	GOOD	GOOD

Table no. 8 Antibacterial and antifungal activity of different extract and gels.

SR NO	OINTMENT	Zone of inhibition (mm)			
		E.coli	S.aureus	B.substilis	A.niger
1	Aloe vera extract	18	25	21	23
2	Neem extract	15	21	27	22
3	Tomato seeds extract	21	15	13	24
4	Gel(HPMC)	21	22	23	20
5	Standard	36	31	28	28

CONCLUSION: Polyherbal gel will prepare by the combination of aloevera, neem & tomato extract using the analytical grade polymer of lab scale to provide the soothing effect and the physical observation of the gel was observe fulfill all the necessary criteria like ph, viscosity and Antibacterial and Antifungal activity against the bacteria E.Coli and A Niger. General GEL containing Aloe vera, Neem and Turmeric was formulated. All the gel exhibited broad spectrum anti-bacterial and anti-fungal activity against all the tested microorganisms. It was found that bacteria are more sensitive as compared to fungi to all of the gel.

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