



Formulation And Evaluation of Anti-Microbial Polyherbal Gel

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ABSTRACT: The majority of the population in developing countries uses plants or plant preparations in their basic health care. Many plant species have been proved to have antimicrobial activity. Lots of the antibiotics had been at the beginning derived from micro-organisms even as the chemotherapeutic agents are from vegetation. Together with other dosage varieties, natural drugs are additionally formulated within the type of gel. A gel is a viscous semisolid preparation used topically on a variety of body surfaces. Thus, the main objective of the present study is to formulate and evaluate a polyherbal gel with antimicrobial activity. Gel were formulated using hydroalcoholic extracts (by continuous hot percolation-soxhlation) of *Anacardium occidentale*, *Achyranthes aspera* and *Aegle marmelos* and were evaluated for its physicochemical properties. The hydroalcoholic extracts of the chosen plants were taken in specific ratio randomly and the antimicrobial tests of the combinations had been applied. Gel were all set making use of special concentrations of the extracts. Formulations had been then tested for its physicochemical properties like Clogging, texture, pH, spreadability, extrudability and gave satisfactory results. Probably the most powerful mixture used to be then determined via evaluating the results of the zone of inhibition given through distinct extract ratios on *S. Mutant*, *Proteus mirabilis*, and *Candida A*. The entire formulations confirmed predominant recreation against selected species. The formulations are found to be very efficacious in all the parameters which has conducted and also found enhance antimicrobial property. Overall result of this study reveals that this is an effective polyherbal antimicrobial gel.

Keywords: Antimicrobial activity; *Anacardium occidentale*, *Achyranthes aspera* and *Aegle marmelos*. Spreadability, Extrudability

I. INTRODUCTION

Herbal medication, also called botanical treatment or phytomedicine, refers to the use of any plant's seeds, berries, roots, leaves, bark, or flowers for medicinal purposes. Herbal drug treatments are in general used to furnish first-line and common health provider. Medicinal plants and herbal drugs account for a giant percent of the pharmaceutical market. The matter of proper identification and appropriate quality that is lack of adulteration, sophistication, or substitution, is an extremely important one in the field of herbal medicine. Many of today's widely used herbs were once the subject of official monographs in The United States Pharmacopoeia (USP) and The National Formulary (NF). These monographs established legal standards of identity and, subject to the limitations of the methods of the period, quality of the vegetable drugs. If the chemical identity of the constituent is known, it or a marker compound indicative of can usually be isolated and quantified by appropriate physical or chemical methods [1]. The concept of standardized extracts definitely provides a solid platform for scientific validation of herbals. Plant materials and herbal remedies derived from them represent a substantial proportion of global drug market and internationally recognized guidelines for quality assessment are necessary. For pharmaceutical purposes, the quality of the medicinal plant material must be as high as that of other medicinal preparations. However, it is impossible to assay for a specific chemical entity when the bioactive ingredient is not known. In practice, assay procedures are not carried for those medicinal plant materials where there are known active ingredients [2]. Therefore the study was aimed to evaluation of polyherbal formulation of gel, *Anacardium occidentale*, *Achyranthes aspera* and *Aegle marmelos*.

Plant profile

Anacardium occidentale

The cashew tree (*Anacardium occidentale*) is a tropical evergreen tree that produces the cashew seed and the cashew apple. The cashew seed, often simply called a cashew, is widely consumed. It is eaten on its

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own, used in recipes, or processed into cashew cheese or cashew butter. The cashew apple is a light reddish to yellow fruit, whose pulp can be processed into a sweet, astringent fruit drink or distilled into liquor.

The shell of the cashew seed yields derivatives that can be used in many applications from lubricants to paints.(4)

Medicinal Uses:

Bark of cashew is reported to have antihypertensive and blood glucose lowering potential. The kernel yields oil which can serve as mechanical and chemical antidote for irritant poisons. Cashew apple and its juice exhibit anti-scorbutic property. Juice of cashew apple is also used as Diuretic, in treatment of kidney diseases, and Cholera. The shell oil is used as mild purgative, for expulsion of hookworms, for cracks in feet, warts, corns, leprous sores. The resinous juice of seed is used in treatment of mental disorders, sexual debility and as a sequel to small pox.(5)

Achyranthes aspera

Achyranthes aspera (common names: chaff-flower, prickly chaff flower, devil's horsewhip, Sanskrit: apamarga) is a species of plant in the Amaranthaceae family. It is distributed throughout the tropical world. It can be found in many places growing as an introduced species and a common weed. It is an invasive species in some areas, including many Pacific Islands environments.(6)

Vernacular Names

English name – Prickly Chaff flower

Hindi Name-Chirachinta, Chirchira; Chingchingi, Chirchita, Latjira, Onga

Telugu Name- Antisha; Apamargamu; Uttaraene

Malayalam Name- Katalati, Kadaladi

Marathi Name- Aghada, Pandhara-aghada

Tamil Name – Shirukadaladi, Nayuruvi

Medicinal Uses

Apamarga root paste is applied externally to relieve pain, in scorpion bite, Apamargakshara is used in making an oil – Apamargakshara tail – used as ear drops for ear disorders.

It has pungent, astringent, diuretic, alterative, antiperiodic and purgative properties. Plant is used in piles, skin eruptions, ophthalmia, dysentery, eye and liver complaints, rheumatism, scabies, bronchial affections and in leprosy. Leaves useful in gonorrhoea. Roots in cancer, stomach troubles and bladder stones. Seeds are useful in renal dropsy, bronchial affections and in leprosy. Branches and roots are useful as tooth brushes.(7)

Aegle marmelos

Bael known botanically as Aegle marmelos finds its mention in various relord Shiva and that place is known as Bilkeshwar temple. Bilva is a medium sized tree having white fragrant flowers. At the end of spring season its leaves start falliigious and Ayurvedic texts of India. It is also known by the name of bilva. Its leaves are used for worshipping Lord Shiva. It is believed that Parvatiji worshiped under the Bilva tree for three thousand years in Haridwar to get married to Lng and in summer there are new leaves and flowers on it. The uniqueness of bael fruit lies that it is used in its raw form i.e. it is detached from the tree before it is ripened. Shiva Purana says that a person who serves and feed milk, ghee and cereals to a hungry devotee of Lord Shiva on roots of its tree, he never faces poverty in his life.(8)

Medicinal Uses

In Ayurvedictexts Aeglemarmelosl tree has been held in high esteem owing to its medicinal value. Though many inferences has come to surface from the researches done in this field.

1. Bael 's fruit serves as stool binding. In fact it is used in condition like diarrhea, dysentery etc.
2. Powder of bael leaves has anti diabetic effect.
3. Juice of bael leaves with black pepper i.e. kali marich taken three times a day is helpful in jaundice.
4. Syrup made of pulp of bael fruit, with tamarind is useful in burning sensation on skin, diarrhea, yellow coloration of skin, nausea etc.
5. When there is pain and redness in eyes, poultice of bael leaves applied on eyes gives good result.
6. Muarraba of bael gives appreciable result in diarrhea, especially when there is bleeding .
7. Bael's pulp used with jaggery gives results in blood disorders.
8. In excessive bleeding and problem of leucorrhoea, juice of bael leaves with cumin seed (jeera)and milk(9)

II. MATERIALS AND METHODS

Plant material

Anacardium occidentale, Achyranthes aspera and Aeglemarmelos were collected in November 2016, from the Vindhya herbal garden, Bhopal, Madhya Pradesh. The plant material was authenticated by Dr. Zia ul Hassan, Assistant professor, Department of Botany, Saifia College of Science & Education, Bhopal and voucher specimen was deposited as Herbarium at the Department of Botany. The collected plant materials were air-dried in darkness at room temperature (20°C). Dried plant parts were cut up and stored in tight-seal dark containers until needed.

Preparation of plant extracts

Plant extracts were prepared according to a standard protocol. Prepared plant material (10 g) was transferred to dark-coloured flasks and mixed with 200 ml of solvents with different polarities and petroleum extract, hydroalcoholic extract and aqueous extracts were stored at room temperature. After 24 h, infusions were filtered through Whatman No. 1 filter paper and residue was re-extracted with equal volume of solvents. After 48 h, the process was repeated. Combined supernatants were evaporated to dryness under vacuum at 40 °C using Rotary evaporator. The obtained extracts were kept in sterile sample tubes and stored in a refrigerator at 4°C.

Antimicrobial activity procedure

Anti-microbial activity is a process of killing or inhibiting the growth of microbes. Antimicrobial agent either kills (bactericidal) three microbes or inhibits the growth (bacteriostatic) of microbes. The standard bacterial test organisms were sub cultured freshly prepared nutrient agar and the extracted samples were inoculated into the culture using paper cup plate method. (10)

Methodology

The hydroalcoholic extracts of following plants were taken in different ratios were carried out for anti-microbial activity using cup plate method. Nutrient agar medium was prepared, sterilized and used as growth medium for bacterial culture. 25 ml of sterilized medium was poured into each petri plates, covered semi half and allowed it to solidify. Then the test microorganisms like S. Mutant, Proteus mirabilis, and Candida A, were inoculated into the petri plates using sterile cotton swabs. Then different formulations was poured inside the plates were incubated at 37°C overnight for observation. The presence of zone of inhibition was noted after 24 hrs. The susceptibility of the test to the tested plant extracts was determined by observing the zone of inhibition around each well.

III. RESULTS AND DISCUSSION

The antimicrobial activity of different polyherbal formulations can be formulated from the hydroalcoholic extracts of Anacardium occidentale, Achyranthes aspera and Aegle marmelos of different proportions along with their physical parameters are shown in Table 1.

Anti-microbial activity

The zone of inhibition (mm) measured of different extraction ratios on S. Mutant, Proteus mirabilis, and Candida A, were noted. This tests were carried out by cup plate method. Cup plate method was employed to evaluate the antibacterial efficacy of the extract combination. The diameter of the borer used was 6 millimeter. The zone of inhibition of all poly herbal formulation was shown in table 2, among that F5 shown the best antimicrobial activity.

Physicochemical parameters	F1	F2	F3	F4	F5	F6
Colour	Brown	Brown	Brown	Brown	Brown	Brown
Odour	Characteristics	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic
pH	7.1	7.2	7.2	7.1	7.3	7.0
Spreadability	13.33	13.06	13.06	13.05	12.00	12.54
Extrudability	average	average	average	average	average	average
Storage(4°C,24°C,37°C)	stable	stable	stable	stable	stable	stable

Table 1: Physicochemical Evaluation of formulated formulations

Diameter of zone inhibition (mm)			
Ointments	S.Mutans	Proteus mirabilis	Candida A
F1	10.41	9.66	11.27
F2	11.72	10.81	11.33
F3	12.75	14.43	11.5
F4	14.73	16.87	15.87
F5	15.89	23.54	20.76

F6	14.67	21.56	17.54
Control	nil	nil	nil

Table 2: Antimicrobial activity of polyherbal formulated gel

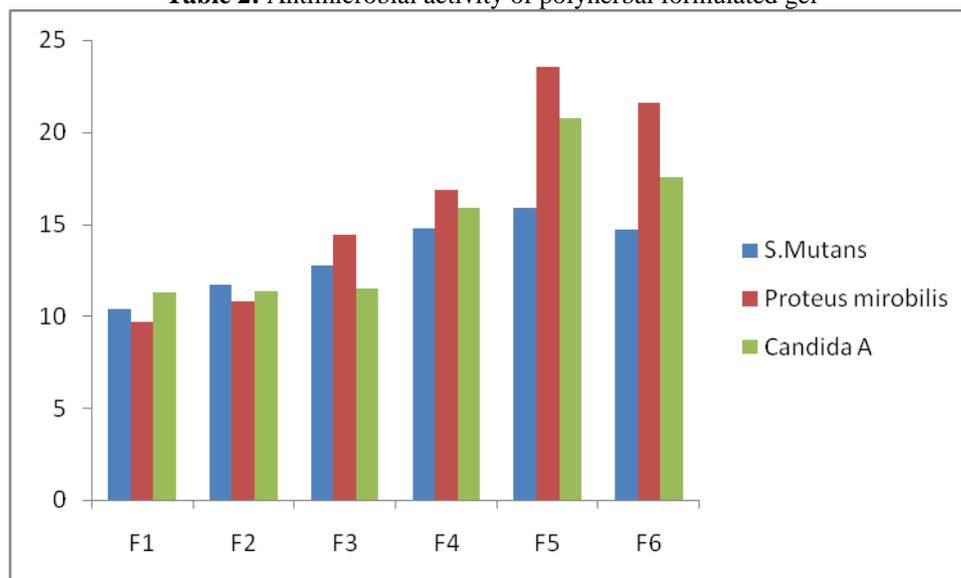


Figure 1: Anti-microbial activity of formulated gel.

IV. CONCLUSION

Literatures revealed that the selected 3 herbs (*Anacardium occidentale*, *Achyranthes aspera* and *Aegle marmelos*) are having antimicrobial activity. Hence an attempt was made to prepare 6 different formulations on the basis of different percentage and converted it into gel. The formulations were then evaluated for its physicochemical parameters and compared antimicrobial activity. On comparing the results, the zone of inhibition for *S. Mutans*, *Proteus mirabilis*, and *Candida A*, F5 formulation shown the best antimicrobial activity among all.

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