Research Article

Anti-bacterial Activity of Polyherbals Formulation Containing *Curcuma aromatica*

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ABSTRACT

The hexane extract of *Curcuma aromatica*, a plant belonging to the family Zingiberaceae was tested on 2 bacterial strains. The other herbal plants are *Acorus calamus, Nigella sativa, Hedchiyum spicatum, Chrysopogon zizanioides, Coleus vettiveroides* are used as minimum amount. The polyherbal paste is formed by trituration method. The paste is dissolved in di methyl sulfoxide (DMSO). The Antibacterial studies by well plate method was carried out against organisms such as *Staphylococcus aureus* and *Proteus vulgaris* at a concentration of 2 %. Among these organisms Gram negative bacteria *Proteus Vulgaris* showed a maximum zone of inhibition at a concentration of 2%. Since the Polyherbals having various constituents like sesquiterpenoids, so the antibacterial activity may be due to the presence of the above principles.

Keywords: *Curcuma aromatica*, *Acorus Calamus, Nigella Sativa, Hedchiyum spicatum, Chrysopogon zizanioides-, Coleus vettiveroides*, polyherbal paste, Antibacterial activity, *Staphylococcus aureus, Proteus vulgaris.*

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INTRODUCTION

On combining several herbs in a specific proportion, the resultant formulation will give a better therapeutic effect and reduce the toxicity[1]. Synergistic interactions between the compounds of individual or mixtures of herbs are a great part of their therapeutic efficacy[2]. Phytochemical analysis of *Curcuma aromatica* revealed the presence of major phytochemicals like flavonoids, tannin, saponin, and terpenoids in both the species[3]. Resistance to antibiotics is a serious problem worldwide. In particular the multiple drug resistance among *Staphylococcus aureus* is of great concern. The increasing worldwide prevalence of infectious diseases has created an urge to look for new drugs from plants. The plant chosen in this study is *Curcuma aromatica* Salisb, used in cosmetic formulations and traditional medicinal applications[4,5] as an antiinflammatory agent, to promote blood circulation, to remove blood stasis and for the treatment of cancer[6]. The monoterpenoids [7], sesquiterpenoids [8-10] and curcuminoids [10,11] of *C. aromatica* have been reported to possess antimicrobial [12,13], antifungal, antioxidant and antitumour activities [14,15]. Reports indicate that they also possess antiinflammatory, antioxidant, antifertility, antimicrobial and anticancer activities[16].Hence the present study is on the antibacterial activity of *C. aromatica* and on its phytochemical composition.

MATERIALS AND METHODS

The *C. aromatica* were cleaned, shade dried and bladed. Powdered sample (80 g) was extracted with hexane since it a suitable nonpolar solvent for resolving sesquiterpenes in the Curcuma sample. The extraction was done for 12 h in a Soxhlet extractor. The extract was filtered and solvent was evaporated, and semisolid obtained was weighed. The sample gave a yield of 14.36 g and was viscous in nature. The extractive value determined for hexane was found to be 9.575%. The residue was dissolved in 5 ml of dimethyl sulphoxide (DMSO), and stored at 4° for further use.

One Gram-positive strain and one negative strain *S. aureus* ATCC 25923, and *Proteus Vulgaris* ATCC 25922 were used. All the strains were procured from the Microbiology Department, Sankaralingam Bhuvaneswari college of pharmacy, Tamil Nadu, India. Sterile discs of ciproflaxacin and starch agar medium. The antimicrobial activities of the plant extract were determined by the well plate method following the general recommendation of CLSI (formerly called as NCCLS[17].

Formulation of Polyherbal Paste

Polyherbal powder which contains several medicinal drugs possess therapeutic values are formulated into topical paste by trituration method.

Procedure

In trituration method, the polyherbal powder and other solid excipient are passed through sieve no.120. Fatty bases are melted on a water bath. Required amount of

powder is taken in a mortar, triturated with little melted base until smooth and gradually rest of the base is added. Four different formulation are prepared with different concentrations as follows.

Formulation of Polyherbal Paste

Polyherbal drug powder which exerts various therapeutic activities. Liquid Paraffin is a fatty base used to treat itchy, irritating dry skin problems such as eczema and dermatitis. Bees wax is an Humectant. Ideal for sloughing away dead skin cells. Glycerin which moisturizes the skin.

Formulation

S.NO	Ingredients	Quantity in Gm
1.	Polyherbal Drug	0.5 gm
2.	Liquid Paraffin	5.5 gm
3.	Bees wax	3 gm
4.	Glycerin	3 gm

The Polyherbal drug which is passed through sieve no.120 for its uniformity. Required amount of drug which is taken in a mortar. And pour the sufficient amount of glycerine to the mortar. Required amount bees wax and liquid Paraffin is taken in a china dish and it is melted on a water bath. Powder in the mortar triturated with little melted base until smooth and gradually rest of the base is added.

Antibacterial activity[18,19]

Micro Organisms

Clinical strains which are used for the antibacterial studies such as *staphylococcus aureus* and *Proteus Vulgaris.* They are sub cultured by starch agar and stored at 4°C. Active culture for experiments were prepared by transferring 1 loop ful of cells from starch agar which are incubated without agitation for 24 hours at 37°C.

Preparation of Known Concentration of Extract

DMSO extract were taken for Antibacterial studies. The paste formulation was dissolved in DMSO. It was prepared in known concentration.

Standard Drug

The standard drug Ciprofloxacin were dissolved in DMSO. The drug were prepared in Concentration 10 mcg/ml.

Sterlization

Before starting the experimental work, the glassware were sterilized at 160°C for 2 hours. The medium was sterilized at autoclave. Before experiment the aseptic room was fumigated by using formaldehyde and potassium permanganate to prevent the growth of micro organism.

Well Plate Method

Procedure

Petri dish plates were previously sterilized, Starch agar was transferred into the petri dish plates and allowed for solidification. The plates were swabbed uniformly 24 hours culture of bacterial strains. The well was prepared by pipette needle. The concentration of extract sample, standard were poured into the respective well accordingly. Then the plates were incubated at 37°C for 24 hours. After zone of inhibition formed by the standards and extract were measured.

Table 1: Anti-Bacterial Effect (Zone of Inhibition) of Standard against the Organism were Measured for (20 mg/ ml)

Name of the Organism	Concentration	Zone of inhibition (mm)
Staphylococcus Aureus	20 mg/ ml	35 mm
Proteus vulgaris	20 mg/ ml	32 mm

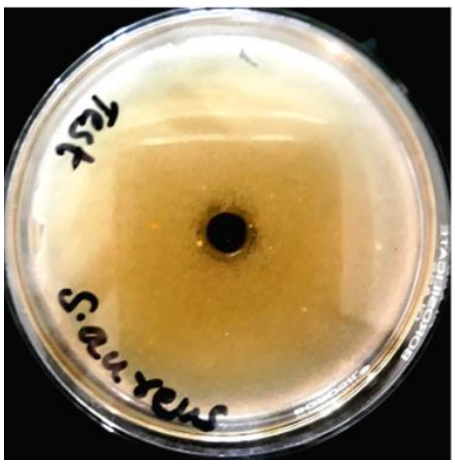
Table 2: Anti Bacterial Effect (Zone of Inhibition) of Test Sample against the Organism were Measured for (20 mg/ ml)

Name of the Organism	Concentration	Zone of inhibition (mm)
Staphylococcus Aureus	20 mg/ ml	8 mm
Proteus vulgaris	20 mg/ ml	21 mm

Antibacterial effect (zone of inhibition) of standard against *staphylococcus aureus* (gram positive)

Standard drug (Ciprofloxacin)

Antibacterial effect (zone of inhibition) of test sample against *staphylococcus aureus* (gram positive)



Test Sample: Sample dissolved in DMSO (2%)

Antibacterial effect (zone of inhibition) of standard against *proteus vulgaris* (gram negative)

STD – Standard drug (Ciprofloxacin)

Antibacterial effect (zone of inhibition) of test sample against *proteus vulgaris* (gram negative)

Test Sample : Sample dissolved in DMSO (2%)

RESULTS AND DISCUSSION

The preliminary phytochemical studies it reveals that the polyherbals contains Alkaloids, terpenes, fixed oils, flavonoids as the phytoconstituents. The formulation of the topical paste from the polyherbal having various pharmacological and therapeutic activities. The paste prepared are also used for cosmetic purpose. The antibacterial studies by well plated method was carried out against organisms such as *Staphylococcus aureus* and *Proteus vulgaris* at a concentration of 2 %. Among these organisms Gram negative bacteria *Proteus Vulgaris* showed a maximum zone of inhibition at a concentration of 2%. Since the polyherbals having various constituents like sesquiterpenoids, so the antibacterial activity may be due to the presence of the above principles. The result confirms that the polyherbals mainly containing *Curcuma aromatica* having wider antibacterial activity. However, the formulation of paste from this polyherbals and subjecting it to the biological activity will definitely give fruitful results. They employed for their action and skin glowing properties. It shows the polyherbals and it formulated to topical paste leads to an effective cosmetic and therapeutic agent.

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