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STUDY OF ANTIBACTERIAL ACTIVITY OF THE SEEDS OF PSORALEACORYLIFOLIA

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ABSTRACT

The antibacterial activity of ethanol, petroleum ether and chloroform extract of the seeds of PsoraleaCorylifoliawere studied against Escherichia coli and Bacillus licheniformisby agar well diffusion method. Results obtained showed that the growth of both Escherichia coliand Bacillus licheniformiswere inhibited by all the three extracts of dried seed extracts of PsoraleaCorylifolia. The antibacterial activity of these extracts against selected bacterial stains depends on the type of solvent used for extraction. The present study revealed that seed extracts of PsoraleaCorylifolia can be exploited for new potent antibacterial agents.

I. INTRODUCTION

India has a rich culture of medicinal herbs and species, which includes about more than 2000 species and has a vast geographical area with high potential ability for Ayurvedic, unani, siddha traditional medicine but only very few have been studied chemically and pharmacologically for their potential medicinal value [1]. Medicinal plants are the nature's gift to human beings to make disease free healthy life. It plays a vital role to preserve human health. India is the country where the medicinal plants sector is a part of time honoured tradition that is respected even today [2].

Medicinal plants are assuming greater importance in the primary health care of individual and communities in many developing countries. There has been an increases of demands in international trade because of being effective in nature so it is used as alternative to allopathic medicines. Medicinal plants are believed to be much safer and proved elixirs in treatments on various aligments [3].

Plants have been used for medicinal purpose long before recorded history. Primitive men observed and appreciated the great diversity of plants available to them. Much of the medicinal use of plants seems to be developed through the observation on wild animals. As time went on, each tribe added the medicinal power of the herbs in their area to its knowledge base. Researchers methodically collect information on herbs and developed well- defined herbal pharmacopeia [4,5].

Natural products have been proven to be the richest source of medicinal compounds. Screening the marine flora and fauna, soil sample, fungi and microbes is conducted either to discover a new drug or a lead structure. A lead is a prototype compound for a biological activity. For example, for biological activity, a natural product lead structure is subjected to chemical modification to arrive at the therapeutically important molecular fragment, the pharmacophore. Only a few natural product are directly used as drugs, but in many cases the chemical modification of the lead structure give a more potent analogs [6].

Many phytomedicines sold in market today are as whole extracts and it is believed that the synergistic interactions between the constituents are responsible for the therapeutic efficiency. [7]

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The Indian holy books vedas mention treatment with the plants, which are abundant in the country. Numerous spice plants used even today originate from India like nutmeg, pepper, clove etc [8].

Herb has various meanings, but in simplest form, it is utilized for the treatment of various diseases, often of a chronic nature, or to attain or maintain a condition of improved health. Herbal medicine, sometimes referred to as Herbalism or Botanical Medicine, is the use of herbs for their therapeutic or medicinal value [9].

Traditional use of medicine is recognized as a way to learn about potential future medicines. Researchers have identified number of compounds used in mainstream medicine which were derived from "ethnomedical" plants sources. Plants are used medicinally in different countries and are a source of many potent and powerful drugs [10,11].

Herbs generally include the flowers, fruits, seeds barks and roots typically of tropical plants [12]. The herbs available in most species come in several different forms- teas, syrups, oils, tinctures and dry extracts [13].The world health organisation estimated that 4 billion people, 80 percent of the world population, presently used the herbal medicine for some aspect of health care. Herbal medicine is a common element in Ayurveda, homeopathic and naturopathy [14].

*PsoraleaCorylifolia*is widely described in Ayurveda as one of the medicinal herbs. *PsoraleaCorylifolia*is usedin the treatment of many diseases and in many medicinal formulations [15]. *PsoraleaCorylifolia* has its own ethnomedical importance and has both curative and nutritive values [16]. *PsoraleaCorylifolia*is described in Shakavarga [17] (Sanskrit name for a group of medicinal plants), by the two ayurvedist, charaka[18] and vridhhavagbhatta [19]. *PsoraleaCorylifolia*is used as single drug and in compound formulation. *PsoraleaCorylifolia*is used in various Ayurvedic treatments as in kustha (skin disorders); Keshya and Tvachya (Hair and Skin treatment); Krimi (as a germicidal); Shwasa and Kasa (Bronchial Ashthama and Cough); Pandu (Anaemia) and Shotha (Oedema). The most amazing aspect of *PsoraleaCorylifolia*is that every part of it is useful. Seeds, roots, stems, leaves and blooms, all are used to treat a variety of skin problems, infections and others diseases. *PsoraleaCorylifolia*has been tried extensively not by the practitioners of the Indian medicine but also by the followers of the western system [20].

II. MATERIALS AND METHODS

Collection and Identification of Plant Material: The seeds of *PsoraleaCorylifolia* were purchased from the local herb shop of Patiala district. The plant was identified, confirmed and authenticated.

Sample Preparation: The seeds of *PsoraleaCorylifolia* were thoroughly washed and dried at room temperature (~25° C). The dried sample was then grinded into fine powder using an electric grinder.

Extract Preparation: The extracts of the seeds of *PsoraleaCorylifolia* were prepared in ethanol, chloroform and petroleum ether, 35g of finely grinded, dried seed powder was extracted using soxhlet apparatus, using 150ml of solvent and the extract was done for about 36 hrs. at 25+2°C. Solvent was removed under reduced pressure and the residues were collected and stored and further dried in vacuum desiccator over anhydrous calcium chloride to get a dry solid of extract for further study.

Phytochemical Analysis: The crude extracts were analysed for the presence of alkaloids, flavonoids, amino acids and proteins, saponins, terpenoids, carbohydrates, steroids and cardio glycosides.

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Procurement of Microorganisms:*Bacillus licheniformis* and *E.coli* species were collected from department of Biotechnology and the pure cultures of bacteria were maintained on nutrient agar slants for their vegetative growth. The cultures were maintained in incubator for use and regularly checked for contamination, and the periodic transfers were made aseptically.

Culture of Test Microbes: For the cultivation of bacterial, Nutrient Agar Medium (Beef extract - 1.0 g, Yeast extract - 2.0 g, Peptone - 5.0 g, NaCl- 5.0 g, Agar - 15.0 g, distilled water 1 L) were prepared and sterilized at 15 lbs pressure and 121°C temperature for 25-30 min. Agar rest plates were prepared by pouring approximately 15ml of Nutrient Agar medium into the Petri dish under aseptic conditions.

Agar Well Diffusion Method: The antibacterial activity of the ethanol, chloroform and petroleum ether extract of seeds of *PsoraleaCorylifolia* were tested by agar well diffusion method. The antibacterial assay was assessed using simple agar well diffusion methodwere holes(diches) were prepared on the agar plate by using a sterilized cork borer. The ditches were filled with suitable amount of extract dilutions prepared to check antibacterial activity. Pure solvents were used as control whereas gentamycin(standard) was used as reference for bacterial species. The plates were incubated at 37°C for 24 hrs. The zones of inhibition were measured in millimeters (mm), using verniercaliper. The zone size was recorded and all the cultures were discarded by autoclaving.

Table 1: The observation of the Phytochemical tests of different extracts of the Seed Extracts of Psoralea Corylifolia.

Test	Petroleum ether Extract	Ethanol Extract	Chloroform Extract
Alkaloids Meyer's reagent (Cream precipitates)	-	-	-
Flavanoid Dilute sodium hydroxide and dilute hydrochloride acid (Appearance of Yellow color)	-	-	+
Cardio glycosides Ferric Chloride test (Dark Blue or Bluish Black product)	+	+	+
Amino acid and proteins Ninhydrin reagent (Violet Colour)	-	-	-
Saponins Distilled water (Creamy mass of small bubbles)	-	-	+
Terpenoids Trichloroacetetic acid (Yellow to red colour precipitate)	+	+	+

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Carbohydrates Molish Reagent (Reddish violet colour)	-	+	+
Steriods Chloroform and Sulphuric acid (Colour change to red)	+	+	+

Where "+"= "presence" and "–" = "absence"

Table 2: The zones of inhibition with different extracts of the Seed Extracts of Psoralea Corylifolia.

Test organism	Solvent extract	Zone of inhibition	Control
Bacillus licheniformis	Ethanol	24 mm	—
	Chloroform	13 mm	—
	Petroleum ether Extract	11 mm	—
	Standard (Gentamycin)	20 mm	—
Escherichia coli (E. Coli)	Ethanol	15 mm	—
	Chloroform	13 mm	—
	Petroleum ether Extract	10 mm	—
	Standard (Gentamycin)	24 mm	—

III. RESULTS AND DISCUSSION

The ethanol, Chloroform and petroleum ether extract of seedextracts of *PsoraleaCorylifolia* were tested for alkaloids, flavonoids, amino acids and proteins , saponins, terpenoids, carbohydrates, steroids and cardio glycosides and results are reported in Table 1 and the results of zones of inhibition of these extracts with their 100% concentration and standard (gentamycin) against the tested bacterial stains *Bacillus licheniformis* and *E.coli* are reported in Table 2.

Zone of inhibition of solvent control were found to be nil and of standard (gentamycin) the zone of inhibition for *Bacillus licheniformis* and *E.coli* were 20mm and 24mm respectively. The zones of inhibition observed for the difference extracts of seeds of *PsoraleaCorylifolia* (Table 2) are at 100% concentration.The growth of both *Bacillus licheniformis* and *E.coli* were inhibited to a good extent by the ethanol extract of seed extracts of *PsoraleaCorylifolia*.

Thus, the further extraction of bioactive compounds in *PsoraleaCorylifolia*can be used in the preparation of drugs of different kinds. The assessments of various effects of such compounds on the animal and human health are required for future studies.

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IV. CONCLUSION

The present study reveals that all the seed extracts of *PsoraleaCorylifolia*have potent antibacterialactivity. It has further confirmed that the seed extract could be used for the treatment of various diseases. The extracts of *PsoraleaCorylifolia*havepotent antibacterial activity when compared with conventionally used drugs and the results obtained were compared with the standard (Gentamycin). The drug may be further explored for its phytochemical profile to identify the active constituents present which are responsible for their antibacterial activity.

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