



Antibacterial Activity of the plant extract of *Symphytum officinale* L. against selected Pathogenic Bacteria

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ABSTRACT

Comfrey is promoted in Ayurvedic and other herbal systems, with claims for benefit in disorders such as peptic ulcer. Comfrey also has been commonly used as a topical anti inflammatory healing agent. The present study was carried out antibacterial activity of *Symphytum officinale* L. By Streak plate method using different solvent such as ethanol, methanol, ethyl acetate and chloroform. Both gram positive and gram negative bacterial strains were found to be sensitivity to the leaf extracts of all the solvents except chloroform at higher concentration (75% and 100%).

Keywords: *Symphytum officinale* L.; Leaf extracts; Antibacterial activity; Streak plate method.

INTRODUCTION

Herbal medicine involves the use of plants for medicinal purposes. The term "Herb" includes leaves, stems, flowers, fruits, seeds, roots, rhizomes and bark. There can be little doubt that the use of plants for healing purposes is the most ancient form of medicine known. The quest for plants with medicinal properties continues to receive attention as scientists are in need of plants, particularly of ethno botanical significance for a complete range of biological activities, which ranges from antibiotic to anticancerous. (Cohen, M.L.) Several plants and herb species used traditionally have potential antimicrobial and antiviral properties (Shelef, 1983; Zaika, 1988) and this has raised the optimism of scientists about the future of phyto-antimicrobial agents. (Das *et al.*, 1999).

Therefore, actions must be taken to reduce this problem, for example, to control the use of antibiotic, develop research to better understand the genetic mechanisms of resistance, and to continue studies to develop new drugs, either synthetic or natural. The ultimate goal is to offer appropriate and efficient antimicrobial drugs to the patient. (Santos, P.R.V. *et al.*, 1995)

Medicinal plants are important source of traditional and synthetic medicines containing different types of organic compounds having therapeutic properties.

Approximately 80% of people in developing countries still rely on traditional medicines for their primary health care. This usually involves the use of plant extracts (Vieira and Skorupa 1993). Many medicinal plant species are disappearing at an alarming rate, as a result of rapid agricultural and urban development, deforestation and indiscriminate collection. Many studies have confirmed that pharmaceutical companies are also responsible for inefficient, imperfect, informal and opportunistic marketing of medicinal plants.

MATERIALS AND METHODS

Collection of plant

The plant materials were collected from the Tiruchirappalli District, Tamil Nadu, India.

Extraction of plant material

The shade dried plant materials were weighed and taken in the Soxhlet apparatus with the particular solvent. The extraction was done for 72 hours. The extract was then condensed and kept in separate vessel. The above procedure was carried out simultaneously using other solvents.

Micro organisms used

The microorganisms used in this study were collected from Doctor's Diagnostic laboratories, Tiruchirappalli District, Tamil Nadu, India. The bacterial strains consist of *Staphylococcus aureus*, *Bacillus subtilis*, *Pseudomonas aeruginosa*, *Salmonella typhi*, *Escherichia coli* and *Proteus vulgaris*. The bacterial strains were maintained in nutrient broth (Hi-media laboratories Pvt. Ltd., Mumbai). The strains were sub cultured bimonthly and

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Table 1: Effect of the different Leaf extract of *Symphytum officinale* L. Against various Bacteria by streak plate method

Microorganisms	Growth Rate in Different Concentration									
	Ethanollic Extract (%)					Methanolic Extract (%)				
	C	25	50	75	100	C	25	50	75	100
<i>Staphylococcus aureus</i>	+++	+++	+++	++	++	+++	+++	+++	+++	+++
<i>Bacillus subtilis</i>	+++	+++	+++	++	++	+++	+++	+++	++	++
<i>Pseudomonas aeruginosa</i>	+++	+++	+++	++	+	+++	+++	+++	++	++
<i>Salmonella typhi</i>	+++	+++	+++	++	+++	+++	+++	+++	+++	+++
<i>Escherichia coli</i>	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
<i>Proteus vulgaris</i>	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
Microorganisms	Growth Rate in Different Concentration									
	Chloroform Extract (%)					Ethyl Acetate (%)				
	C	25	50	75	100	C	25	50	75	100
<i>Staphylococcus aureus</i>	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
<i>Bacillus subtilis</i>	+++	+++	+++	++	+++	+++	+++	+++	+++	+++
<i>Pseudomonas aeruginosa</i>	+++	+++	+++	+++	+++	+++	+++	+++	++	++
<i>Salmonella typhi</i>	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
<i>Escherichia coli</i>	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
<i>Proteus vulgaris</i>	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++

C: Control; +++: Excessive growth (no inhibition); ++: Moderate growth (partial inhibition); +: Poor growth (strong inhibition); -: No Growth (complete inhibition).

the cultured strains were allowed to grow for one week and stored at 5°C for further analysis.

Evaluation of Antibacterial activity

Nutrient agar medium was prepared and 8ml of the molten agar medium and 2ml of the plant extract were mixed thoroughly and the mixture was poured into a sterile Petri dish under aseptic condition it was cooled at room temperature. After cooling, the bacterial culture was taken (24hr old) and using an inoculation needle, the bacterial culture was applied on the surface of the agar medium in the form of parallel strokes (Streaks). For each bacterium triplicates were used. The plates were incubated at 37°C for 24hr. After 5hr and 24hr, the results were rated as strength inhibition (if no growth of the test bacterium) partial inhibition (if less growth of the bacterium) control plates without the plant extract were also maintained for reference.

Statistical analysis

Data were expressed as Mean standard deviation. The data obtained were subjected to ANOVA test to determine whether there was significant difference between extract used and also between the lengths of incubation.

RESULT AND DISCUSSION

The effect of ethanol, methanol, chloroform & ethyl acetate extract of *Symphytum officinale* L. Leaves were investigated by streak plate method for antibacterial activities against six bacterial strains. These include both gram – positive and gram negative. The result shows that the ethanol, ethyl acetate and methanol extracts of leaves of *Symphytum officinale* L. Possess

measurable antibacterial activities against all the bacterial strains testes, while chloroform extracts of the plant did not produce any measurable antibacterial activity.

Antibacterial activity

The effect of various extract of leaves on the sensitivity of six selected bacteria by streak plate method has been shown in Table 1. The result shows different concentration of the leaves extract and sensitivity the bacterial strains. The data proved, the concentration increases the degrees of sensitivity also increases.

The sensitivity of the bacteria to the various concentration of the extract has been denoted as complete inhibition (-), strong inhibition (+), partial inhibition (++) and no inhibition (+++). The control plates of most of the bacteria were found to be '+++’ and experimental plates of higher concentration were found to be ‘-’.The absence of growth indicates the complete or strong inhibitory action of the plant extract. The ethanol, methanol and ethyl acetate solvent extracts exhibit antibacterial activity was identified by the magnitude of presence or absence of growth. In the control plates of each solvent extract, the growth of the bacteria was found to be excessive, degree of sensitivity increased with the gradual increase in the concentration of the extract. Therefore higher concentration of 75% & 100% completely inhibit the growth of the bacteria. It is evident from table 1. Both gram positive and gram negative bacterial strains were found to be sensitivity to the leaf extracts of all the solvents except chloroform at higher concentration (75% & 100 %). (Senthil kumar., & Satish., 2002).

CONCLUSION

It is appropriate to say that although several antibacterial drugs are available at present; their use is limited by a number of factors such as low potency, poor solubility, drug toxicity and emergence of drug resistant strains. Medicinal plants usually constitute an important source of new and biologically active compounds.

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