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**GUDUCHI SATWA: A POTENTIAL STARCHY PRODUCT OF *T.cordifolia* WITH
KRIMIGHNA (ANTIMICROBIAL) ACTIVITY**

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ABSTRACT

Water extractable solid substance or a starchy product from the stem of *Tinosporacordifolia* (wild.) Miers is commonly known as *Amrita Sarkara* or *GuduchiSatwa* in *Ayurvedic* practice. The study was investigated for anti microbial activity against medically important bacterial and fungal strains. The antimicrobial activity was determined in the extract using disc diffusion method. The Chloroform extract of *GuduchiSatwa* tested against two gram positive *S.aureous*, *S.pyogens*, two gram negative *E.coli*, *P.aerugenosa* human pathogenic bacteria and two fungal strains *C.albicans*, *A.niger* respectively. Zone of inhibition of extracts were compared with that of standards antibiotic like *Ciprofloxacin* for anti bacterial activity and *Nystain* for anti fungal activity.

KEYWORDS

GuduchiSatwa, *T.cordifolia*, Starchy product, *Krimighna* and Antimicrobial.

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INTRODUCTION

Tinospora cordifolia (wild.) Miers is one of such herbs which is most commonly practiced and is prescribed for various disorders for its curative as well as preventive role. Commonly it is known as *Guduchi* or *Amrita* in general practice of *Ayurveda*. It is used as a rejuvenator and having the properties to pacify *daha* (burning), *meha* (urinary disorders including diabetes), *kasa* (cough), *pandu* (anemia), *kamala* (jaundice), *kustha* (leprosy/skin disorders), *vatarakta* (gout), *jwara* (fever), *krimi* (infection/worm) and *vaman* (vomiting) etc¹.

The ancient Indian scholars were aware of the existence of microorganism or bacteria as well as

causation of disease since Vedic period. There are many references pertaining to Jivanuvada (bacteriology) in ancient literature such as Rigveda, Atharvaveda, Mahabharata etc which indicates familiarity of the subject in those days. In Atharvaveda, various words are used for Krimi which have their own specific meanings viz- Krimi (Which nourishes by raw flesh), Rakshasa (Which drinks blood) Yatudhana (Which causes pain) Pisaca (Which eats raw flesh) Apsara (Which swims in water), Gandharva (Which makes noise). Nearly hundred types of organisms have been described there, some are said to be Drista (macroscopic) and others are Adrista (microscopic). Sankramaka or Aupasargika (Infectious diseases) diseases are Bhutopasarga, which indicates the invasion of bacteria. The terms Prasangat, Gatrasansarsat etc denotes the mode of spread of infective organism²⁻³. Hence, the term “krimi” (worm) includes all the pathogenic and non-pathogenic organisms covering a wide range of infection and infestation caused by a host of agent ranging from viruses to worms. The Indian medicinal system strongly advocates the use of Guduchi satwa or Amrita sarakara cures the diseases gout, anemia, fever, vomiting, jaundice, diabetes, anorexia, tuberculosis, cough, hiccup, piles, burning micturation, leucorrhoea and menorrhagia⁴. Most of the vaidyas are prescribed as a medicine in amlapitta (acidity)⁵. In the view of medicinal importance of Guduchi as well as Guduchi Satwa their remains adequate scope for depth research to find out the antimicrobial activity (krimighna effect) against gram positive bacteria *S.aureus*, *S.pyogens* and gram negative bacteria *E.coli*, *P.aeruginosa* and fungal organisms like *A.niger* and *C.albicans*. The different chemical constituents of plants are responsible for a number of inducible defense mechanism against pathogens. Scientific experiments on the antimicrobial properties of plant components playing a vital role in the field of research and documentation to their implementation in health care. The use of current microbiological techniques demonstrates that medicinal plants normally exhibit significant

strength against human bacterial and fungal pathogens.

MATERIAL AND METHODS

The fresh and healthy stems of *T. cordifolia*, creeping over general trees [other than the tree of Neem (*Azadirachataindica*)] were collected in April-May 2011 from the campus of CAMC and various areas of Rajnandgaon district, Chhatishgarh, India. These long stems were washed thoroughly with tap water and cut into 3-4 cm, crushed completely to convert into slimy paste and 4 times of drinkable water was added in a wide aluminum vessel. The total mixture kept for soaking overnight. Next morning this mass was macerated throughout in water till sliminess of the pulp was reduced almost. After completion of filtered process with four folded cotton cloth, the liquid kept aside undisturbed for 5 hours for settlement. The supernatant liquid was decanted carefully. White sediments settled at the bottom was collected into a tray and dried under sun rays and the product is called *GuduchiSatwa* used for the further study⁶.

Extraction

Fifty grams of the dried powdered sample of the *GuduchiSatwa* was soaked separately with 300 ml of chloroform in glass bottles (500 ml) until complete extraction of the sample. At the end of 7th day, the extract was filtered through Whatman No.1 filter paper and the filtrates were concentrated at room temperature in order to reduce the volume. The semi solid extracts were stored in pre-weighed beakers. They were kept in refrigerator at 4⁰ C. Each of the extract was individually reconstituted using minimal amount of the extracting solvent prior to use⁷⁻⁸.

Antibacterial activity assay

S. aureus, *S.pyogenes*, *E.coli*, *P. aeruginosa* and fungal strains *A. niger*, *C albicans* were chosen based on their clinical and pharmacological importance. The procured bacterial strains of Institute of Microbial technology, Chandigarh were used for evaluating antimicrobial activity. The bacterial strains were cultured on nutrient agar at

37°C for 24 hr. The cultured was sub cultured regularly and stored at 4°C.

All the cultures are revived on selective media broth and for specific each culture, the revived inoculation condition were given. The gram negative and gram positive were pre cultured in nutrient broth over night in rotatory shaker at room temperature and centrifuged for 5 min. The fungal inoculums were prepared from potato dextrose agar medium. Then these cultured were used for anti microbial assay⁹⁻¹¹. The in vitro antibacterial activities of the test samples were carried out by disc diffusion method. Dried and sterilized Whatman No. 1 filter paper 6mm diameter were impregnated with 100µl of various ranges of concentrations 25%, 50%, 75%, 100% were placed on nutrient agar medium uniformly seeded with the test bacteria. The disc of the standard drug Ciprofloxacin of known size 5µg/disc was used as positive control. These plates were then kept at low temp 4°C for 24hr to allow maximum diffusion of test samples and then incubated at 37°C for 24 hr to allow maximum growth of micro organism. The test materials having antibacterial activity inhibited the growth of the bacteria and a clear, distinct zone of inhibition was visualized surrounding the disc. The antibacterial activity of the test agents was determined by measuring the zone of inhibition in millimeter. The antifungal activity was tested by disc diffusion method. The potato dextrose agar plates were inoculated with each fungal culture. The filter paper disc of 6mm diameter impregnated with varying concentrations of plant product extracts. The activity was determined after 72 h of incubation at 28°C. The diameters of the inhibition zones were measured in mm.

RESULTS

In the present study antibacterial activities of *GuduchiSatwa* crude extracts showed the zone of inhibition around the disc are summarized in Table No.1, Figure No.1 and 2. For the antibacterial and anti fungal activity, different concentration such as 25%, 50%, 75%, 100% crude extract has been used.

Ciprofloxacin acted as positive control. The 25% concentration shows the maximum zone of inhibition against *P.aeruginosa* 8mm and 7mm each for *E. coli*, *S.aureous* and *S.pyogenes*. The 50% concentration exhibited zone of inhibition against *P.aeruginosa* is 10mm, 8mm each for *E.coli*, *S.pyogenes* and 9mm for *S.aureous*. The 75% concentration showed the highest zone of inhibition against *P.aeruginosa* is 12mm followed by 10mm each for *E.coli*, *S.pyogenes* and 11mm for *S.aureous*. In 100% concentration, the highest zone of inhibition to *P. aeruginosa* was 13mm and 12 mm each for *E.coli*, *S.aureous* and *S.pyogenes*.

For antifungal activity 25% concentration of the extract of *GuduchiSatwa* showed the highest zone of inhibition against *A.niger* is 10mm and followed by 9mm for *C.albicans*. The 50% and 75% concentration exhibited zone of inhibition against *A.niger* is 12mm, 14mm and 11mm, 13mm for *C.albicans* respectively. In 100% concentration the highest zone of inhibition was observed against *C.albican* is 15mm and followed by 14 mm for *A.niger*.

DISCUSSION

For a long period of time, plants have been a valuable source of natural products for maintaining human health. Historically, plants have provided good source of anti-infective agents. Berberine, quinine and other phytochemicals remains highly effective instrument in the fight against microbial infections. The broadness of the term '*krimi*' found as a property of the *Guduchi* in Indian classics is refers to all the pathogenic and non-pathogenic organisms of human life. Under the consideration of *krimi* as bacterial and fungal organism, the potential of *GuduchiSatwa* was investigated for their antimicrobial activity. In the present work, chloroform extracts obtained from *GuduchiSatwa* shown remarkable activity against most of the tested bacterial and fungal strains.

Table No.1: Antibacterial activity measured by ZOI in mm of Chloroform extract of GuduchiSatwa

S.No	Organisms		Chloroform extract of <i>GuduchiSatwa</i> (Concentration in %)				Standard drug as Positive control (<i>Ciprofloxacin</i> for bacterial and <i>Nystatin</i> for fungal)
			25%	50%	75%	100%	
1	Gram ‘-ve’ Bacterial strains	<i>E.coli</i>	7	8	10	12	17
		<i>P.aerugenosa</i>	8	10	12	13	17
2	Gram ‘+ve’ Bacterial strains	<i>S.aureus</i>	7	9	11	12	15
		<i>S.pyogenes</i>	7	8	10	12	15
3	Fungal strains	<i>C.albicans</i>	9	11	13	15	19
		<i>A.niger</i>	10	12	14	14	19

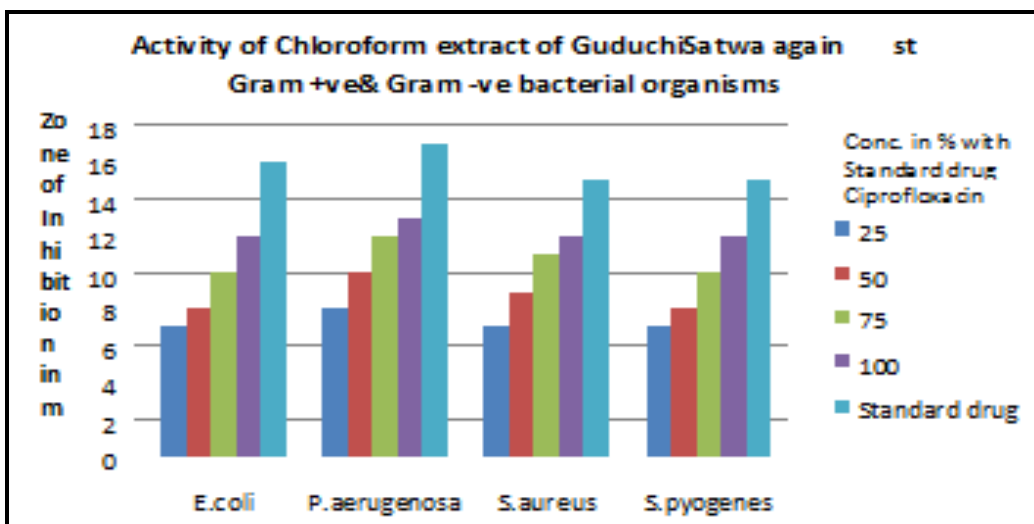


Figure No.1: Antimicrobial activity of GuduchiSatwa

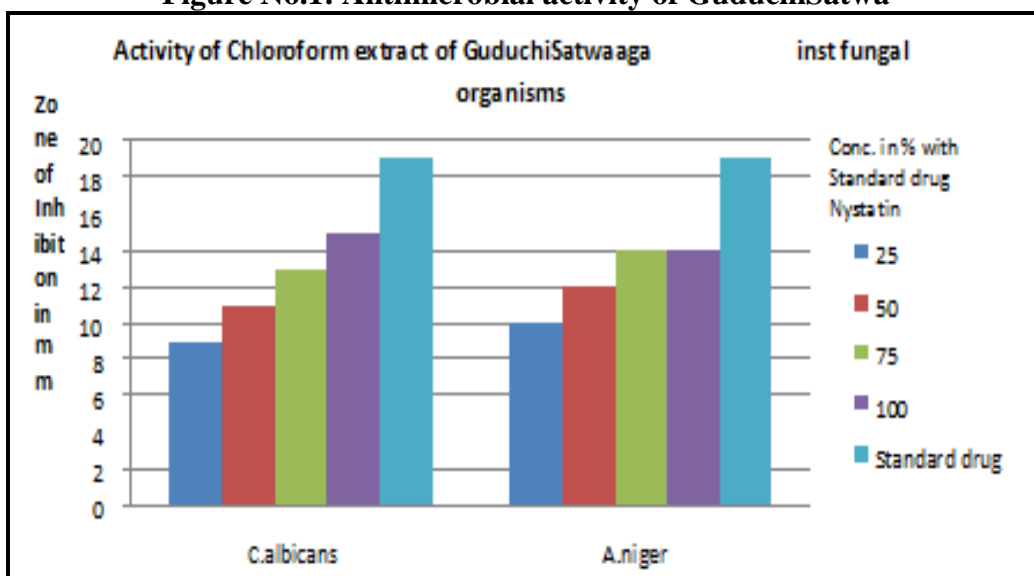


Figure No.2: Antifungal Activity of GuduchiSatwa

CONCLUSION

As the study was aimed to focus the antimicrobial properties of *GuduchiSatwa* on gram positive, gram negative and fungal organisms, the current investigations on the chloroform extraction was found to be active on some isolated microorganism and fungi as compared to standard drug. This study has justified on the *Ayurvedic* prescription of *GuduchiSatwa* on various diseases rendered by *Krimi* i.e bacterial or fungal human pathogens. However further studies on clinical trials are needed to better evaluate the potential effectiveness of the drug.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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