

**PHYTOCHEMICAL SCREENING AND ANTIBACTERIAL ACTIVITY OF
CARDIOSPERMUM HELICACABUM L. EXTRACT AGAINST SOME CLINICAL
PATHOGENS*****Prabakar R., Arunkumar. S. and Rajasekaran. R.**

PG and Research Department of Microbiology, Marudupandiyar College, Thanjavur – 613 403, Tamilnadu, India.

***Corresponding Author: Prabakar R.**

PG and Research Department of Microbiology, Marudupandiyar College, Thanjavur – 613 403, Tamilnadu, India.

Article Received on 01/05/2017

Article Revised on 22/05/2017

Article Accepted on 11/06/2017

ABSTRACT

In the present study was carried out on phytochemical screening and antibacterial activity of *Cardiospermum helicacabum* L. leaves and stems extract against some clinical pathogens. Phytochemical compounds were carried out on the different extract the powdered specimens using standard procedures. Soxhlet apparatus were used for the extracting antibacterial active compounds from the plant leaves and stem powered. In this investigation tannin, flavonoids and terpenoids showed positive results in *Cardiospermum helicacabum* L. leaves and stem aqueous extract and ethanol extract showed positive results in terpenoids, saponins, steroids, and carbohydrates. The discs were prepared and immersed various solvents extract prepared discs. Obtained pathogenic bacteria pure cultures were inoculated nutrient broth respectively. Antimicrobial susceptibility test was determined by Bauer *et al.*, 1966 method. Antimicrobial activity against were analyzed against *Bacillus subtilis* *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella pneumonia* *Pseudomonas aeruginosa*. Ethanol and methanol extract was most effective followed by other aqueous extract. *Staphylococcus aureus* was more sensitive for ethanol and methanol extract of leaves and stem of the tested plants. The crude extract as well as the isolated compounds found to be active in this study could be useful for the development of new antibacterial drugs.

KEYWORDS: Phytochemical screening, Antibacterial activity, *Cardiospermum helicacabum* L.**INTRODUCTION**

Herbal medicine, also known as botanical medicine or phytomedicine refers to the use of any part of plant medicinal purposes about 25% these medicinal plants are known to be useful for the cure for gastrointestinal disorders ranging for peptic ulcer and abdominal cramps to diarrhea and dysentery (Hill, 1952). Traditional medicines are used by about 60 percent of the worlds, population. These are not only used for primary health care not just rural areas in developing concentrates. In the Indian systems of medicine, is steadily growing with approximately 40 percent of population reporting use of herb to treat medical illnesses within the past year public academic and government interest in traditional medicines and growing exponentials due to the increased incidence of the adverse drug reactions and economic burden of the medicinal modern system.

In Southern - Western Ghats of India (Tamil Nadu) an ethno botanical survey was carried out to collect information on the use of medicinal plants. The *Cardiospermum helicacabum* L. leaves and stem are used in traditional certain in India as remedy against cough, intestinal disorder and bacterial infection.

Numbers of studies have been conducted in different countries to prove such efficiency. In the present study carried on phytochemical constituents and antimicrobial activity of *Cardiospermum helicacabum* L. leaves and stem.

MATERILAS AND METHOD

The *Cardiospermum helicacabum* L. plant material were collected from Thanjavur District, Tamil Nadu. India in January 2016. The collected plant materials (leaves and stem) were air-dried. After dried sample was ground in a grinding machine made for the laboratory. Exposure direct sunlight was avoided to prevent the loss of active components. These powdered materials were used for further analysis. A soxhlet apparatus were used for the extracting antimicrobial active compounds from the plant materials (leaves and stem).

Chemical tests were carried out on the aqueous, acetone and methanol extracts and on the powdered specimens were using standard procedures to identify the constituents are described by Sofowara (1993); Treas and Evans (1989).

Disc diffusion method (Bauer *et al.*, 1966) was adopted for evaluation of antimicrobial activity of *Cardiospermum helicacabum* L. Plant part. Muller Hinton Agar was prepared and autoclaved at 121°C pressure for 20 minutes and cooled to sterile petriplates and allowed for solidification. The plates with media were seeded with the respective microbial suspension using swab. The various solvents extract prepared discs individually were placed on the each petriplates and also placed on the each petriplates and also placed control and standard (Ampicillin) discs. The plates were incubated at 37°C for 24hrs for bacteria. After incubation period the diameter of the zone formed around the paper disc were measured and expressed in mm. The results obtained in the present investigation were subject to statistical analysis like Mean (\bar{x}) and Standard Deviation (SD) by Zar (1984).

RESULTS

The analysis of Tannin compounds brownish green colour developed to indicate the presence of tannin aqueous extract. Similarly based on the presence or absence of colour change indicate positive and negative results. In these investigation flavonoids, saponins, and carbohydrate, showed positive results in *Cardiospermum helicacabum* L. plant leaves aqueous extract and acetone extract showed positive results in Tannin and saponins. Similarly phytochemical compounds investigated in *Cardiospermum helicacabum* L. plant leaves methanolic

extracts. The methanolic extracts showed positive result in Tannin, flavonoids and saponins (Table – 1). *Cardiospermum helicacabum* L. plant stem phytochemical constituents were qualitatively analyzed (Table – 2). In the present study saponins, Phlobatannins and carbohydrate were positive results in *Cardiospermum helicacabum* L. plant stem aqueous, acetone and methanol extract. Tannin was present in acetone and methanolic extracts.

In this investigation aqueous, acetone and methanol extracts from the leaves and stem of *Cardiospermum helicacabum* L. exhibit antibacterial activity against *Bacillus subtilis*, *Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* (Fig. – 1).

The results clearly showed that plant extracts were specific in action against the growth of bacteria. Acetone and methanol extract was most effective followed by aqueous extracts. *Staphylococcus aureus* was more sensitive for *Cardiospermum helicacabum* L. acetone and methanol extracts of leaves of the tested plants. Aqueous extracts show no inhibition against the tested organism compared to acetone and methanol extracts. The *Staphylococcus aureus* (16±1.4; 18±1.0 mm in diameter) exhibit relatively higher zone of inhibition compared then other test organisms (Fig.– 2).

Table 1: Qualitative analysis of Phytochemical Compounds in *Cardiospermum helicacabum* L. Leaves extracts.

S. No.	Phytochemical Compounds	Observation			
		Control	Aqueous	Acetone	Methanol
1	Tannins	-	-	+	+
2	Flavonoids	-	+	-	+
3	Terpenoids	-	-	-	-
4	Sapoinis	-	+	+	+
5	Phlobatannins	-	-	-	-
6	Steroids	-	-	-	-
7	Carbohydrates	-	+	-	-
8	Glycosides	-	-	-	-
9	Cournarins	-	-	-	-
10	Proteins	-	-	-	-
11	Emodins	-	-	-	-
12	Anthraquinones	-	-	-	-
13	Anthocyanins	-	-	-	-
14	Leucoantho cyaninsturns	-	-	-	-

+ indicate present; - indicate absent

Table 2: Qualitative analysis of Phytochemical Compounds in *Cardiospermum helicacabum* L. Stem extracts.

S. No.	Phytochemical Compounds	Observation			
		Control	Aqueous	Acetone	Methanol
1	Tannins	-	-	+	+
2	Flavonoids	-	+	-	-
3	Terpenoids	-	-	-	-
4	Sapoin	-	+	+	+
5	Phlobatannins	-	+	+	+
6	Steroids	-	-	-	-
7	Carbohydrates	-	+	+	+
8	Glycosides	-	-	-	-
9	Coumarins	-	-	-	-
10	Proteins	-	-	-	-
11	Emodins	-	-	-	-
12	Anthraquinones	-	-	-	-
13	Anthocyanins	-	-	-	-
14	Leucoanthocyanins	-	-	-	-

+ indicate present; - indicate absent

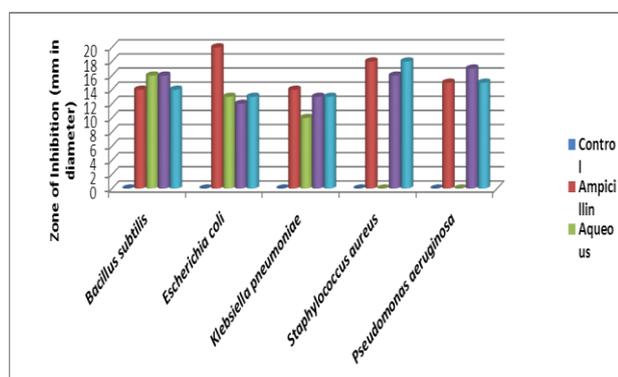


Fig. 1: Antibacterial activity of *Cardiospermum helicacabum* L. Leaves extracts.

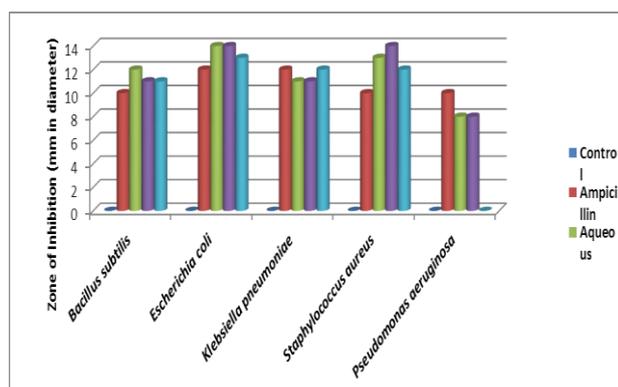


Fig. 2: Antibacterial activity of *Cardiospermum helicacabum* L. stem extracts.

DISCUSSION

Health is the real wealth of nation. Nature has provided all necessary things for survival. Medicinal plants are nature's best gift to cure a number of diseases for men and women. Nowadays using antibiotics to subside infection produces adverse toxicity to host organs tissue and cells. The toxicity produced by the antimicrobial agents can be cured or prevented or antagonize with herbs. Herbal molecules are sage will overcome the

resistance produced by the pathogens since they are in combined form or in pooled form of more than one molecules in the protoplasm of the plant cell.

In this investigation terpenoids, steroids, flavonoids, tannins, and phlobatannins, cardioac glycosides were present. Many of them are known to have different therapeutic. Tannins possess antibacterial, antiviral, molluscicidal and antitumoral properties (Scalbert, 1991). While steroids, also present in *Cardiospermum helicacabum* L. is recognized to have anticancer, antiviral and antihemorrhagic properties (Hegde *et al.*, 2009).

In this investigation aqueous extract was most effective followed by acetone and methanol extracts. *Staphylococcus aureus* was more sensitive for *Cardiospermum helicacabum* L. all leaves extracts. Methanol extracts was low inhibition against the tested organism compared to aqueous extracts. Similarly supported by Singh, (1986) has been studied Ethanol and aqueous extracts of *Acalypha indica*, *Abutilon indicum*, *Cassia auriculata*, *Eclipta alba*, *Mentha arvensis* and *Phyllanthus niruri* against *Bacillus subtilis* revealed that ethanolic root extract seem to be more active compared to aqueous extract.

The *Staphylococcus aureus* (16±1.4; 18±1.0 mm in diameter) exhibit relatively higher zone of inhibition followed by acetone and methanol extract extracts and then compared then other test organisms. The present study has shown a spectrum of antibacterial activities, which provides a support to some traditional uses of these few medicinal plants.

CONCLUSION

From this study it is clear that *Cardiospermum helicacabum* L. indeed exhibits an antimicrobial activity. More research needs to be done to unravel the inhibitory effect of this plant. Since this herb had been used for

ages traditionally and effectively, it is presumed that side effects should be less. Use of herbs by Indian (south) community is a well known fact; there is a treasure of herbs that we use daily in our food or in other forms customarily, even without knowing their medicinal benefits. Such use of plant material has always been a tradition, mostly community based that is passed on from one generation to another. In general, lesser known or used herbs and plant materials have to be researched further to study their medicinal properties especially their antibiotic nature. This will enable the use of our own local, rich plant heritage as effective medicines with probably fewer side effects.

ACKNOWLEDGEMENTS

The authors are thankful to PG and Research Department of Microbiology, Marudupandiyar College and Speciality Lab and Research, Thanjavur, Tamilnadu, India for providing the necessary facilities for this study.

REFERENCES

1. Bauer, A.W., Kirby, W.M.M., Sherris and Tenckhoff, M., Antibiotic susceptibility testing by a standard single disc method. *Amer. J. Clin. Pathol*, 1996; 36: 493-496.
2. Hegde, K. and Joshi, A.B., Hepatoprotective effect of *Carissa carandas* Linn root extract against CCl₄ and paracetamol induced hepatic oxidative stress. *Indian J. Exp. Biol*, 2009; 47(8): 660-7.
3. Hill, A.F., "*Economic Botany. A textbook of useful plants and plant products*" 2nd Ed., McGraw-Hill Book Company Inc, New York, USA, 1952; 456-462.
4. Scalbert, A., Antimicrobial properties of tannin. *Phytochem.*, 1991; 30: 3875-3883.
5. Singh, Y.N., Traditional medicine in Fiji. Some herbal folk cures used by Fiji Indians. *J. Ethnopharmacol.*, 1986; 15: 57-58.
6. Sofowara, A., Medicinal plants and Traditional medicine in Africa. Spectrum Books Ltd, Ibadan, Nigeria, 1993; 289.
7. Trease, G.E and Evans, W.C., Textbook of Pharmacognosy. 14th ed. W.B. Sanders, London, 1989.
8. Zar. J.H., *In: Biostatistical Analysis*, Englewood Cliffs, N.J.: Prentice hall, Inc, 1984.