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# *in vitro* Antibacterial Activity of different extracts of Leaves of *Coldenia procumbens*

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**Abstract:** *Coldenia Procumbens* (Family: Boraginaceae) is a potent medicinal plant in the Indian system of medicine. Traditionally the leaves are used to treat rheumatic swellings, immature abscesses, leucorrhoea, menorrhagia, anti-diabetic, and anti-arthritic. Considering the indigenous uses of the plant, the present study deals with the investigation of in vitro antibacterial activity by Agar well diffusion method against different gram-positive (Staphylococcus aureus and Streptococcus pyrogenus), gram-negative(Salmonella typhi and Escherichia coli) bacteria and fungi(Candida albicans). It was observed that, the aqueous extract of leaves of *Coldenia Procumbens* showed the significant antibacterial activity against gram-positive bacteria. No antifungal activity was recorded with aqueous extract.
**Key Words:** *Coldenia Procumbens*, Agar well diffusion method, Antibacterial activity.

## Introduction:

Alternative systems of medicine viz., Ayurveda, and Siddha medicine have become more popular in recent years. Scientist from divergent fields are investigating plants with a new eye for their antimicrobial usefulness and as an alternative source to existing drugs. Plants with their wide variety of chemical constituents offer a promising source of new antimicrobial agents with general as well as specific activity[1].

*Coldenia procumbens* (Family: Boraginaceae) is a flat growing herb usually lying on the ground. Stems reaching 45cm, long shaggy branches often numerous young parts silky with white hairs. *Coldenia Procumbens* is found widely in south India and its leaves are applied to rheumatic swelling. It is used in external application for causing suppuration of boils. In folklore medicine it is used to treat rheumatic swellings, immature abscesses, leucorrhoea, menorrhagia, anti-diabetic, and anti-arthritic and hypotensive[2]. Considering the indigenous uses of the plant, the present investigation was taken up with an objective to evaluate the antibacterial potential against the microorganisms.

## Materials and Methods

### Collection of plant Material:

The plant *Coldenia procumbens* were collected from Ulakaneri, Madurai district, Tamilnadu, and it was authenticated by Dr. D. Stephen, Taxonomist, Department of Botany, American college, Madurai. Leaf portion were collected and after thorough washing, dried under shade with occasional shifting and then powdered with a mechanical grinder and stored in airtight container. The powder obtained was subjected to successive soxhlet extraction with the organic solvents with increasing order.

**Test Microorganisms:**
Four bacterial cultures namely Staphylococcus aureus, Streptococcus pyrogenus, Salmonella typhi, Escherichia coli and one of the fungus cultures Candida albicans were used in this investigation. All the cultures were procured from Bose Clinical Laboratory, Madurai, Tamilnadu, India. The media used for antibacterial test were Muller Hinton Agar.

**Screening for Antibacterial and Antifungal Activity:**
The antibacterial and antifungal activity was carried out by employing 24h cultures of Staphylococcus aureus, Streptococcus pyrogenus, Salmonella typhi, Escherichia coli and Candida albicans. Activity of aqueous and ethanolic extracts of *Coldenia procumbens* was tested separately using Agar well diffusion method[3, 4,5,6,7]. The medium was sterilized by autoclaving at 120°C (15 lb/in$^2$). About 30 ml of the Agar medium with the respective strains of bacteria and fungi was transferred aseptically in to each sterilized Petri plate. The plates were left at room temperature for solidification. A well of 6mm diameter was made using a sterile cork borer. The standard drug and extracts were placed in 6mm diameter well. Antibacterial assay plates were incubated at 37 ± 2°C for 24h, antifungal assay plates were incubated at 28 ± 2°C for 48 h. The standard disc 6mm diameter with Amikacin(50µg/disc) was used as a positive control for antibacterial activity, whereas Clotrimazole(10 µg/disc)was used as positive control for antifungal activity, and diameter of the zone of inhibition was measured. The results are shown in Table. No.1.

## Results and Discussion:

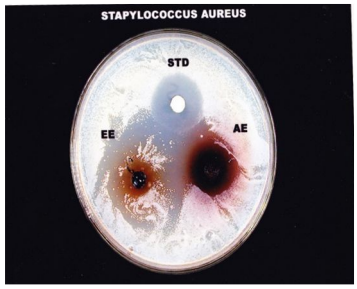
The antibacterial activity of aqueous and ethanolic extracts of leafs of *Coldenia procumbens* were observed using Agar well diffusion method by measuring the diameter of the growth inhibition zone. The results are showed in Table. No.1.
The aqueous extracts of leafs of *Coldenia procumbens* showed a positive significant antibacterial activity against Staphylococcus aureus, and Streptococcus pyrogenus. While moderate degree of activity against salmonella typhi and very less effect against Escherichia coli and no antifungal activity was found against Candida albicans.
The ethanolic extracts of leafs of *Coldenia procumbens* showed a significant antibacterial activity against Staphylococcus aureus, and Streptococcus pyrogenus. While no antibacterial activity was found against salmonella typhi and Escherichia coli, as well as no antifungal activity against Candida albicans.
The standard drug Amikacin(50µg/disc) showed high degree of inhibition against Staphylococcus aureus, Streptococcus pyrogenus, Salmonella typhi, and Escherichia coli, as well as the standard drug Clotrimazole(10 µg/disc) showed high degree of inhibition against Candida albicans.

**Table No: 1 Antibacterial activity of different extracts of leafs of *coldenia procumbens***

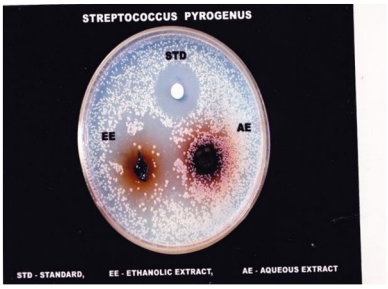
| S.NO | Name of the organisms | Test sample | Activity | Zone of inhibition (mm) |
|---|---|---|---|---|
| 1 | Staphylococcus aureus | S | (+) | 23 |
| | | A | (+) | 22 |
| | | E | (+) | 16 |
| 2 | Streptococcus pyrogenus | S | (+) | 21 |
| | | A | (+) | 13 |
| | | E | (+) | 16 |
| 3 | Salmonella typhi | S | (+) | 17 |
| | | A | (+) | 12 |
| | | E | (-) | - |
| 4 | Escherichia coli | S | (+) | 18 |
| | | A | (+) | 7 |
| | | E | (-) | - |
| 5 | Candida albicans | S | (+) | 25 |
| | | A | (-) | - |
| | | E | (-) | - |

S - Standard drug, A - Aqueous extract, E - Ethanolic extract
(+) Positive and (-) Negative Activity, -: No inhibition.

**Antibacterial activity(Plates) of different extracts of leafs of *Coldenia procumbens***




**PLATENO:1**

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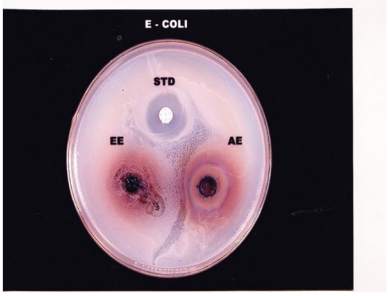


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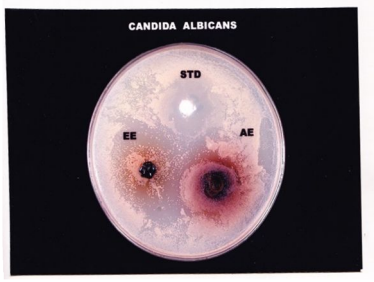
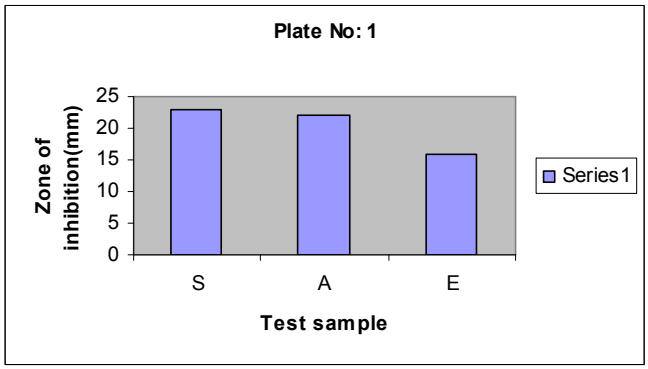
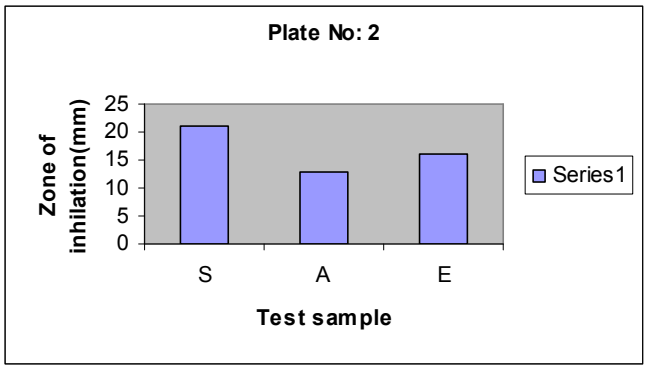
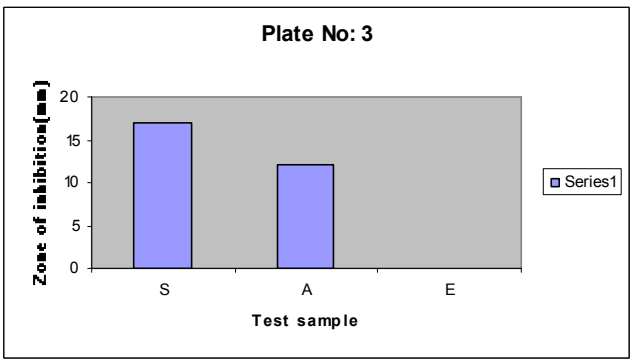


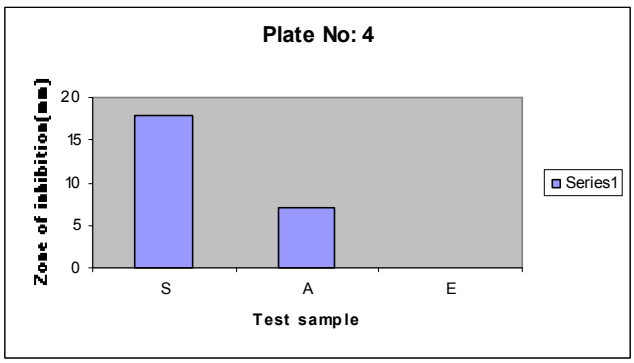

S - Standard drug
A - Aqueous extract
E - Ethanolic extract

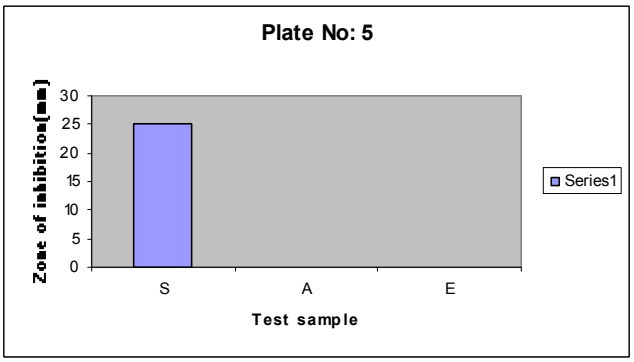
**Antibacterial activity (Graphs) of different extracts of leafs of *Coldenia procumbens***




S - Standard drug
A - Aqueous extract
E - Ethanolic extract

The aqueous extracts showed considerably more antibacterial activity than the Ethanolic extract. This is interesting in that the traditional method of treating a bacterial infections was by administrating a decoction of the plant. Whereas according to our results an aqueous extract is better, hence this may be more beneficial.

From the above results it can be concluded that leafs extracts have great potential as antibacterial compounds against microorganisms and that they can be used in the treatment of infectious diseases caused by resistant microorganisms. *Coldenia procumbens* showed maximum antibacterial activity and so this plant can be used to discover bioactive natural products that may serve as leads for the development of new pharmaceuticals. Thus further work can be carried on the isolation procedure for finding out the exact moiety responsible for the biological activity.

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