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# Phytochemical and Antibacterial Screening of *Croton bonplandianum* Leaf Extracts



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## ABSTRACT

The present study is focused on the preliminary phytochemical and antibacterial evaluation of leaves of an important medicinal plant *Croton bonplandianum* (Euphorbiaceae). The aqueous and methanolic extracts of powdered drugs of leaves of the plants were analyzed phytochemically. Alkaloids, phenolics, flavonoids, anthraquinones, coumarins and glycosides were present while tannins were absent in all extracts. Aqueous extracts of leaves showed moderate antibacterial activity against all tested organisms. Methanolic extracts showed significantly high antibacterial activity against all tested microbes.

## INTRODUCTION

Medicinal plants are widely used for the treatment of various ailments all over the world. According to WHO, about 80% of the world population depends on plant based herbal drugs (Fransworth, 1997 and Chopra et al., 1995). Therefore, it is important to investigate the traditional medicinal plants to identify and isolate the herbal remedies against both microbial and non-microbial diseases. Natural compounds make the base of the modern therapeutic system as plant chemicals have specific bioactivity that can be used against specific disease or stress conditions (Koche et al., 2010). Phytochemical, especially secondary metabolites consist of alkaloids, phenolics, terpenes, phenolics, flavonoids, glycosides, saponins and steroids. Plant derived products showed antibacterial potential against plant and animal pathogens. The present paper deals with the phytochemical and antibacterial activity of aqueous and methanolic extract of leaf, stem and root of *Croton bonplandianum*.

## MATERIALS AND METHODS

The plant material was collected from Dr. P. D. K. V. Agricultural campus, Akola (MS) India. The plant was identified taxonomically and valucher specimen is deposited in herbarium of Department of Botany, Shri Shivaji College, Akola (MS) India. The shade dried plant material was powdered and aqueous and methanolic extracts of leaf powder were prepared. The phytochemical analysis of the extracts was done using the method of Harborne (1984) and Krishnaiah et al (2009).

100mg/ml of each extract was taken for the antimicrobial testing. The antimicrobial activity of the extracts was tested against *Escherichia coli*, *Klebsiella pneumoniae* and *Staphylococcus aureus* using disc diffusion method (Elizabeth, 2005).

## RESULTS AND DISCUSSION

The preliminary phytochemical analysis of *C. bonplandianum* is presented in the table-1. The methanolic extracts were found more suitable to extract the phytochemicals. The methanolic leaf extracts showed the presence of alkaloids, phenolics, flavonoids, anthraquinones and glycosides while aqueous leaf extract reveals presence of only alkaloids, anthraquinones, and coumarins. The methanolic stem extracts showed presence of alkaloids, phenolics and glycoside while that

of aqueous extracts showed positive tests of alkaloids and coumarins. Both root extracts were positive to alkaloid test. Tannins and saponins were absent in all the tested extracts (table-1).

**Table-1: Phytochemical analysis of leaves extract of *C. bonplandianum***

| Phytoconstituents | Leaves          |                    |
|-------------------|-----------------|--------------------|
|                   | Aqueous extract | Methanolic extract |
| Alkaloids         | +               | +                  |
| Phenolics         | -               | +                  |
| Flavonoids        | -               | +                  |
| Anthraquinones    | +               | +                  |
| Coumarins         | +               | -                  |
| Glycosides        | -               | +                  |
| Tannins           | -               | +                  |
| Saponin           | -               | -                  |

The antibacterial activity of leaf extracts of *C. bonplandianum* was tested against *Escherichia coli*, *Klebsiella pneumoniae* and *Staphylococcus aureus* using disc diffusion method and zone of inhibition was detected in mm. The chloramphenicol (30mg/ml) was used as positive control for the analysis. All the positive results indicate moderate antibacterial activity against microbes tested. Aqueous leaf extracts showed moderate inhibition (05-08mm) against all tested microbes. The methanolic leaf extract was found to inhibit the growth of *E. coli* and *S. aureus* but not *K. pneumoniae* (table-2).

The antibacterial activity of medicinal plants is due to the presence of secondary metabolites. The present study showed that the activity may be due to alkaloids, coumarins and glycosides (table-1 and 2). Several authors have reported the bactericidal activity of medicinal plant extracts (Nair et al., 2005; Saxena et al., 2008; Mahesh and Satish, 2008 and Shirsat et al., 2014). Our results are similar to the previously reported work. However, the present work needs further detailed phytochemical and pharmacological studies to use the plant extract in formulation of reliable drug composition.

**Table-2: Antibacterial activity of *C. bonplandianum***

| Bacteria                     | (Zone of inhibition in mm) |            |                    |
|------------------------------|----------------------------|------------|--------------------|
|                              | Leaf Extract               |            | Chloramphenacol    |
|                              | Aqueous                    | Methanolic | Standard (30mg/ml) |
| <i>Escherichia coli</i>      | 05                         | 07         | 20                 |
| <i>Klebsiella pneumoniae</i> | 08                         | 09         | 18                 |
| <i>Staphylococcus aureus</i> | 05                         | 06         | 20                 |

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