



## PRELIMINARY SCREENING OF PHYTOCHEMICAL CONSTITUENTS OF *TRIANTHEMA PORTULACASTRUM*

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### Abstract

Mostly people depend on plants for their health care needs. The uses of medicinal plants is safe, inexpensive and have less adverse effects. *Trianthema portulacastrum* L. belonging to the family 'Aizoaceae' is a native of South Africa but found in tropical and subtropical countries like India, Sri Lanka, Baluchistan, West Asia, Africa and Tropical America. The plant is mostly used in Indian traditional medicine system. It is used as traditional medicine to cure many oxidative stress related diseases, liver diseases, night blindness, skin disease, blood diseases and inflammation. The present study, was carried out to qualitatively screen the phytochemical constituents present in the leaf extract of two biotypes of "*Trianthema portulacastrum* L." one with white and the other with red coloured flowers. The phytochemical analysis of leaf extract was carried out both in aqueous and ethanol solvents. The results analysis, showed the presence of phytochemical constituents like alkaloids, carbohydrates, Tannins, steroids, saponins, gums, mucilage, phenolic compounds and flavonoids.

**Key Words:** *Trianthema portulacastrum* L., biotypes, phytochemical analysis.

### INTRODUCTION

From the ancient time period onwards, the plant derived medicines are used by mankind. India is one of the most resourceful countries for plant products. In Ayurveda, Siddha, Homeopathy and Folkloric medicine system, beneficial weeds are used for healing human physiological disorders. The plants are considered as one of the most important sources of medicinal products, for therapeutic activity (Susmita podder et al., 2020).

*T. portulacastrum* L. is an annual, terrestrial, succulent, branched, and prostrate herb that produces colored flowers (red or white color). Two forms or biotypes of the plant are found, one is red-flowered variety known as "Rakta Punarnava or Lal Sabuni" and white-flowered one is known as "Shwet Punarnava or Svet Sabuni". The former is more abundant. The flowers are small, solitary, bisexual, pale pink or white in color and have stamens with white filaments. Both types are grown best under partial shade and flourish in neutral to alkaline soil. The roots are thin, slender, fibrous and show lateral branching. The leaves are succulent, green, opposite, oval shaped and unequal in size. The stems are branched, cylindrical, fleshy, angular and prostrate in nature. Fruit is circumscissile capsule like shaped containing 2-8 seeds. The seeds are hairless, kidney-shaped 1.5-2.5 mm long and black in color. The plant is propagated by seeds but the fragments of the stem can be spread by cuttings very easily.

The plant is attributed with analgesic, antipyretic, anti-inflammatory, and stomachic properties and used in treatment of asthma, bronchitis, jaundice and oedema. The plant is used against throat troubles and as an anti-fungal agent. A decoction of the herb is used as a vermifuge and is useful in treating rheumatism. It is considered as an antidote to alcoholic poisoning. The leaves possess diuretic properties (Balamurugan et al., 2009). The plant shows hepatoprotective (Kumar et al., 2004) and antioxidant activity (Sunder et al., 2010). The fleshy nature of leaves makes them suitable for use as a wound-dressing (Gaddeyya et al., 2015).

### MATERIALS AND METHODS

Fresh leaves of *Trianthema portulacastrum* of two different forms were collected from old alwal, Medchal-Malkajgiri district of Telangana state. The leaves of *Trianthema portulacastrum* were separated, dried and grinded using a mortar and pestle and later using a grinder, to obtain the fine mixture.



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## PREPARATION OF EXTRACTS

**Aqueous extract:** 20 gm of leaf sample was suspended in 200 ml of distilled water. Extraction was done at 70°C for 30 minutes, followed by filtering of the extracts using What man filter paper.

**Ethanolic extract:** 95% ethanol was added to 20 gm of leaf sample. Extract was allowed to stand at room temperature after which they were filtered using what man filter paper.

## SCREENING OF PHYTOCHEMICALS

### TEST FOR CARBOHYDRATES

**MOLISH TEST:** Molish reagent was added to 1ml of leaf extract, a little amount of concentrated sulfuric acid was added to it and allowed to form a layer. The mixture was shaken well and allowed to stand for few minutes, and then diluted by adding 5 ml of distilled water. The formation of purple precipitate ring showed the presence of carbohydrate.

### TEST FOR ALKALOIDS

**WAGNERS TEST:** Two drops of wagners reagent was added to 2 ml of extract and mixed well. Appearance of a reddish colour indicates the presence of alkaloids.

### TEST FOR AMINOACIDS

**NINHYDRIN TEST:** To 1 ml of plant extract, add few drops of ninhydrin solution. It turns into purple colour. This indicates the presence of aminoacids.

### TEST FOR GLYCOSIDES

#### BORNTRAGERS TEST: ( ANTHRAQUINONE GLYCOSIDES )

1ml of benzene and 0.5 ml of dilute ammonia solution were added to the plant leaf extract. A reddish pink colour indicates the presence of glycosides.

### TEST FOR TANNINS

**FERRIC CHLORIDE TEST:** To 0.5 ml of plant leaf extract, a few drops of 0.1% ferric chloride solution were added. Formation of brownish green or blue black colour indicates the presence of tannins.

### TEST FOR FLAVONOIDS

**FERRIC CHLORIDE TEST:** To 0.5 ml of plant leaf extract, a few drops of 0.1% ferric chloride solution was added. Formation of green colour indicates the presence of flavonoids.

### TEST FOR STEROIDS AND TRITERPENOIDS

**LIEBERMANN-BURCHARD TEST:** 0.5 ml of plant extract was treated with few drops of acetic anhydride. To this, boiled and cooled conc. sulfuric acid is added along the sides of test tube. It shows brown ring at the function of two layers and the upper layer turns green that shows presence of steroids and formation of deep red colour indicates the presence of triterpenoids.



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## TEST FOR RESINS

0.5 ml of plant extract were treated with a few drops of acetic anhydride solution followed by 1ml of concentric sulfuric acid. Resins gives colouration ranging from orange to yellow.

## TEST FOR PROTEINS

**BIURET TEST:** To 0.5 ml of plant leaf extract 4% NaOH solution and few drops of 1% CuSO<sub>4</sub> solution were added. Violet colour appears. Thus, indicates the presence of proteins.

## TEST FOR SAPONINS

**FOAM TEST:** 1ml of plant leaf extract was shaken vigorously for 30 seconds with little quantity of distilled water. It forms persistence foam which indicates the presence of saponins.

## TEST FOR GUMS AND MUCILAGE

To 1ml of plant leaf extract, 10 ml water and 2 ml of absolute alcohol is added. Presence of white cloudy precipitate.

## TEST FOR PHENOLIC COMPOUNDS

**LEAD ACETATE TEST:** To 0.5ml of plant leaf extract, a few drops 10% lead acetate solution was added. White precipitate indicates the presence phenolic compounds.

## TEST FOR STARCH

**IODINE TEST:** To 0.5 ml plant extract, iodine reagent was added. Appearance of dark blue colour which disappears on heating and reappears on cooling.

## RESULTS AND DISCUSSION

The qualitative phytochemical analysis of crude powder in different solvent extracts was carried out to identify different phytochemical constituents (Harbone, 1998). The presence of specific phytochemicals is indicated with (+) sign and the absence of phytochemicals is indicated with (-) sign (Harborne AJ, 1998).

*Trianthema portulacastrum* (Raktapunarnava) Erra galigeru and (shwet puraenava) Tella galigeru leaves were screened for phytochemical constituents using aqueous and ethanol solvents. Aqueous leaf extract of both forms showed positive results to alkaloids, carbohydrates, Tannins, steroids, saponins, Gums and mucilage, phenolic compounds and flavonoid. Ethanol leaf extract of both forms showed positive results to alkaloids, steroids, Gums and mucilage, phenolic compounds. Similarly, the phytochemical screening of the crude extracts of aqueous methanolic extract revealed the presence of flavonoids, Tri-terpenoids, alkaloids, triple sugar, cardiac glycosides and steroids and the aqueous ethyl acetate extract showed the presence of flavonoids, alkaloids, tannins, steroids, triple sugars and cardiac glycosides and the aqueous chloroformic extract of *T. portulacastrum* showed flavonoids, alkaloids, triple sugars, tannins, steroids, Tri-terpenoids and cardiac glycosides (Selvakumar and Prashanth 2017).



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## AQUEOUS EXTRACTION

| PHYTOCHEMICAL CONSTITUENTS | RED LEAVES | WHITE LEAVES |
|----------------------------|------------|--------------|
| 1. Alkaloids               | +          | +            |
| 2. Triterpenoides          | —          | -            |
| 2. Amino acids             | —          | —            |
| 3. Carbohydrates           | +          | +            |
| 4. Glycosides              | —          | —            |
| 5. Tannins                 | +          | +            |
| 6. Steroids                | +          | +            |
| 7. proteins                | —          | —            |
| 8. Saponins                | +          | +            |
| 9. Gums and mucilage       | +          | +            |
| 10. Starch                 | —          | —            |
| 11. Phenolic compounds     | +          | +            |
| 12. Flavonoids             | +          | +            |
| 13. Resins                 | —          | —            |
| 14. Triterpenoids          | —          | —            |



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## ETHANOLIC EXTRACTION

| PHYTOCHEMICAL CONSTITUENTS | RED LEAVES | WHITE LEAVES |
|----------------------------|------------|--------------|
| 1. Alkaloids               | +          | +            |
| 2.Amino acids              | —          | —            |
| 3.Carbohydrates            | —          | —            |
| 4.Glycosides               | —          | —            |
| 5.Tannins                  | —          | —            |
| 6. Steroids                | +          | +            |
| 7. proteins                | —          | —            |
| 8. Saponins                | —          | —            |
| 9. Gums and mucilage       | +          | +            |
| 10. Starch                 | —          | —            |
| 11. Phenolic compounds     | +          | +            |
| 12. Flavonoids             | —          | —            |
| 13. Resins                 | —          | —            |
| 14. Triterpenoids          | —          | —            |

Therefore, the result showed the presence of pharmaceutically important secondary metabolites in *Trianthema portulacastrum*.

## CONCLUSION

The phytochemical constituents present in two forms of *Trianthema portulacastrum* (white and red coloured flowers) were screened using aqueous and ethanol solvent. The leaf extracts of *Trianthema portulacastrum* showed the presence of secondary metabolites like alkaloids, carbohydrates, Tannins, steroids, saponins, Gums and mucilage, phenolic compounds



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and flavonoids. From the present study, it can be concluded that the plant has vast source of natural phytochemicals that could be used to develop pharmaceutical products against various oxidative stress related diseases.

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