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Trianthema decandra L. - An Uncultivated Green Leafy Vegetable

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Abstract

The uncultivated or wild green leafy vegetables refers to those wild plants which are neither cultivated nor domesticated and can be available naturally. Wild edible plants are still eaten by many sections of the population. In addition to being resilient and adaptive, these vegetables also demand low-cost plantation and harvesting. *Trianthema decandra* is an invasive weed of cultivated fields and wastelands. The whole plant is used to treat various health problems like skin diseases, fever, tooth problems and wound healing. The roots are also used for eye problems like dimness of sight and night blindness, ulcers, itching and bacterial infections. Many evidences demonstrated that medicinal plants have the potential to be used in various complementary, traditional and alternate systems of treatment of human and non-human diseases. To provide more scientific evidence, much research has to be done in this area.

1. Introduction

Globally, medicinal plants attracted lot of attention in the present research. Many evidences demonstrated that medicinal plants have the potential to be used in various complementary, traditional and alternate systems of treatment of human and non-human diseases (Radfar et al., 2011). *Trianthema decandra* belongs to Aizoaceae family indigenous to South Africa. As it is an invasive weed of cultivated fields and wastelands, widely distributed in North India, many tropical and subtropical areas like west Asia, tropical America and Africa (Kaur and Aggarwal, 2017). The plant leaves are eaten during food shortage. The whole plant is used to treat various health problems like skin diseases, fever, tooth problems and wound healing in the traditional medicine. The roots of the plant used in the treatment of ulcers, night blindness, itching and other bacterial infections (Geethalakshmi et al., 2010).

2. Botanical Information

Trianthema decandra L. is a prostrate, glabrous, succulent medicinal herb available throughout India. The *Trianthema* genus consists of 20 species but only few plants were phytochemically reported. *Trianthema* genus is an annual or perennial plant characterized

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by fleshy, opposite, unequal, smooth-margined leaves, flowers with five perianth segments, flowers subtended by a pair of bracts, prostrate growth form, superior fruit a circumscissile capsule with a winged lid; and stamens 5 or 10 (Geethalakshmi et al., 2010).

2.1. Taxonomical classification

Kingdom	Plantae (Plants)
Sub-kingdom	Tracheobionta (Vascular plants)
Division	Magnoliophyta (Flowering plants)
Superdivision	Spermatophyta (Seed plants)
Class	Magnoliopsida (Dicotyledons)
Subclass	Caryophyllidae
Order	Caryophyllales (Herbaceous and fleshy)
Family	Aizoaceae (Fig-marigold family)
Genus	*Trianthema* L.
Species	*Trianthema decandra* L.

Prakash et al. (2019)

2.2. Vernacular names

Hindi	Gadabani
Telugu	Tella galijeru
Sanskrit	Punarnavi
Bengali	Gadabani
Kannada	Phasartani
Tamil	Vellaisharunnai

Prakash et al. (2019)

2.3. Nutritional composition

Nutrient	Nutrient composition/100g
Moisture	85.2%
Energy	38 Kcal
Protein	2.9 g
Fat	0.4 g
Carbohydrates	5.8 g
Fiber	1.9 g
Ash	3.8 g
Vitamin A	113 RE-µg
Beta carotene	680 µg
Calcium	219 mg
Iron	20.7 mg
Phosphorus	45 mg

Prakash et al. (2019)

3. Phytochemistry

Phytochemical screening of *Trianthema decandra L.* identified the presence of Saponins, Terpenoids, Carbohydrates, Glycosides, Flavonoides, Alkaloids, Steroids . Essential oils were also extracted from the methanolic leaf extracts of *Trianthema decandra L.* by gas chromatography. There are about 23 compounds representing 99.98% of oil were identified.

4. Pharmacological Properties of *Trianthema decandra L.*

4.1. Anticataract Activity

Both in vivo and in vitro studies reported the anticataract activity of *Trianthema decandra* L. against Galactose induced Cataract. Pharmacological and biochemical evaluation of the plant may be helpful in the better management of secondary complications of diabetes (Parmar et al., 2019).

4.2. Antidiabetic activity

Trianthema decandra L. showed nontoxic inhibitory effect on the α-amylase and α-glucosidase activity in the digestive tract of humans. Antidiabetic potential of the plant could be useful to develop medicinal preparations for diabetic and related symptoms (Geethalakshmi et al., 2010).

4.3. Cytotoxic activity

Hydro alcoholic fraction of *Trianthema decandra L.* was evaluated for cytotoxic activity against breast, cervical and liver cancers. The plant showed significant effect against breast cancer than cervical and liver cancers (Gajjala et al., 2019).

4.4. Hepatoprotective activity

It was found that roots extracts of *Trianthema decandra* exhibited liver protection against carbon tetrachloride at the doses of 100 200mg/kg (Sengottuvelu and Srinivasan, 2008).

4.5. Antibacterial Activity

The methanolic extract of *Trianthema decandra* roots was evaluated for antibacterial activity against *Staphylococcus aureus, Bacillus subtilli, Pseudomonas aeruginosa, Escherichia coli* and *Proteus vulgaris* at dose of 100µg/disc by using disc diffusion method .

4.6. Antiulcer Activity

The antiulcer, antisecretory and cytoprotective properties of different extracts of roots of *Trianthema decandra* was

studied on rats for its ability to inhibit gastric secretion and to protect the gastric mucosa against injuries caused by pyloric ligation, swim stress, acetic acid and by cytodestructive agent ethanol. Only ethyl acetate extract and crude powder showed significant antiulcer and antisecretory effects in pyloric ligation, swim stress models (Jagannathan, 2012).

4.7. Antioxidant activity

Among the different extracts, ethyl acetate and methanolic extracts of roots and leaves of *Trianthema decandra* exhibited highest antioxidant activity. When compared to roots, leaves showed more antioxidant activity.

5. Consumption

Like other commercial green leafy vegetable, this plant is also used as leafy vegetable. It is consumed with the combination of tomato, tamarind, garlic and pulses (Reddy et al., 2006).

Figure 1: *Trianthema decandra*

Figure 2: Recipes prepared with *Trianthema decandra*

6. Conclusion

Wild greens are good sources of nutrients like carbohydrates, β-carotene, ascorbic acid, folic acid, riboflavin, calcium, iron, zinc, copper, manganese, phosphorus and antinutrients. Throughout the world, wild and semi cultivated species are of important research area of nutritional and phyto-therapic research due to their nutraceutical and antioxidant values. *Trianthema decandra* is one of the seasonal, uncultivated green leafy vegetable with good nutritional and pharmacological properties.

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