Pharmacological Properties of *Trianthema portulacastrum* L and its Therapeutic Potential as Complementary Medicine

Kumeshini Sukalingam¹*, Kumar Ganesan¹, Kumar Ponnusamy² and SV. Venugopal¹

¹Faculty of Medicine, International Medical School, Management and Science University, Shah Alam- 40100, Selangor, Malaysia.
²Faculty of Medicine, Vinayaka Mission’s Medical College, Karaikal- 609 609, Pondicherry (Union Territory), Tamil Nadu, India.

ABSTRACT

*Trianthema portulacastrum* L. (Aizoaceae) (TP) is commonly distributed in tropical America, South East Asia and Africa. A terrestrial annual prostrate herb grows wild in open field and roadside during September - November. In Indigenous system the plant is used as medicine having analgesic, laxative cathartic and stomachic properties. Also used as emmenagogue, diuretic and for the treatment of Jaundice, blood disease anemia, inflammation, night blindness and dropsy. Alkaloid trianthemine and the steroid ecdysterone are important chemical constituents. The aim of this review is to provide broad information on the conventional uses, phytochemistry, pharmacological actions and toxicity study of TP to explore their curative potential and future research opportunities. All the related information of TP was collected through MEDLINE/PUBMED. The substantiation presented in this review has showed that TP has great potential to be integrated into conventional medical practice for the healing of various dreaded diseases such as diabetes, cancer, inflammation, hepatotoxic and other disease complications. Prospect research on TP would offer much knowledge about pharmacological uses and socio-economic impact.

Keywords: *Trianthema portulacastrum*, Pharmacology, Phytochemistry, Toxicity.

1. INTRODUCTION

*Trianthema portulacastrum* (TP) commonly known as Bishkhapra is an annual indigenous prostrate herb found in South Africa that is widely distributed in South East, West Asia, and Tropical America. In India and in neighbouring countries, it is most common weeds during summer season found in road sides and also grown in the major field crops such as sugarcane, pulses, rice, cotton, oilseeds and maize. It is often found on clay soils and muddy coastal zones of the sea up to 200m altitude¹. Its infestation in cotton, maize and direct seeded rice especially in rainy season is a matter of great concern and could reduce crop yields by 32-60%².

2. BOTANICAL DESCRIPTION

*Trianthema* is a genus of Aizoaceae belonging to flowering plants in the ice plant family. Members of the this genus are annuals or perennials succulent herb, up to 40cm long, generally characterized by smooth-margined leaves, unequal, fleshy, opposite, Stem procumbent, rounded, solid, hairy and succulent repeatedly branched, glabrous with
a firm tap root or finely pubescent. It has five perianth segmented flowers, single, axillaries, regular, bisexual, the lower part hidden by the sheath and a fruit with a winged lid. Two species of *T. portulacastrum* widely occur in India. The red biotypes usually grows larger and its stem with long internodes and green bracts and pods and white sepals. The red type is spread plentiful over throughout the places, but the green biotype appears in advance in the season³.

### 2.1. Regional Names

**Bengali:** Gadabani, Kulphasag, Godabani, Swetpunarnava  
**Hindi:** Sabuni, Svetsabuni, Salsabuni, Vishakhapara  
**Kannada:** Bili komme, Muchchugoni  
**Malayalam:** Tavilama, Talutama  
**Marathi:** Pundhari-ghentuli  
**Nepali:** Seto punarnava  
**Oriya:** Luduru sag  
**Sanskrit:** Dhanapatra, Chiratika, Dirghapatrika  
**Telugu:** Ghelijehru, Ambatimadu, Jalliju,  
**English:** Giant pigweed, Desert Horse Purslane, Horse-Purslane  
**Punjabi:** Bishkapra, itis.

### 3. ETHNOPHARMACOLOGICAL AND TRADITIONAL USE

The dried plant is reportedly used against throat troubles and anti-fungal agent⁴. The plant is aperitif, analgesic, stomachic, laxative, alternative; cures "Kapha," bronchitis, "Vata," piles and ascites, itching, dimness of sight, and night blindness. The root applied to the eye cures corneal ulcers, itching, dimness of sight, and night blindness. The root is cathartic, abortifacient and diuretic, alterative; cures "Kapha," bronchitis, amenorrhea, dropsy and uteradria. Plant is considered lithotriptic for the kidney and bladder. Also used as diuretic. The powdered root is used as a cathartic in Philippine Islands⁵.

### 4. PHYTOCHEMISTRY

TP has a potential source of organic and inorganic matter such as Crude Protein, calcium, phosphorus, nitrogen, magnesium, iron, copper, zinc, potassium, manganese, Carotene, nicotinic acid, ascorbic acid⁶, ⁷. TP contains steroids, flavonoids, fats, triterpenes, carbohydrates, tannins glycosides, phenolic compounds and alkaloids⁸, ⁹. The principal constituents of TP are ecdysterone, triantheme, trianthenol, 3,4-dimethoxycinnamic acid, 5,2'-dihydroxy-7-methoxy-6,8-dimethylflavone, leptomorol and long chain alcohols like stigmasterol, β-sitosterol, and their β-glucopyranosides, 5-hydroxy-2-methoxybenzaldehyde, p-methoxybenzoic acid, and beta cyanin. 3-acetyl aleuritolic acid, 5-hydroxy-2-methoxy benzaldehyde, p-methoxy benzoic acid, and p-propoxy benzoic acid. Trianthanol, a tetramericenol has been isolated from the chloroform extract and established by high resolution Mass spectroscopy and Nuclear Magnetic Resonance techniques as 15-hydroxymethyl-2,6,10,18,22,26,30-heptamethylene-17-hentriacontene (Trianthanol)⁴. Also hydrocarbons from the surface wax of the fresh leaves of plant have been isolated and characterized and their relative distribution determined through gas liquid chromatography studies.⁴

### 5. PHARMACOLOGICAL ACTION

World Health Organization (WHO) has recommended that traditional health and folk medicine systems are proved to be more effective in health problems worldwide. *T. portulacastrum* Linn. is a herb used in Ayurvedic medicine. Different parts of TP are traditionally used as analgesic, laxative, and treatment of blood disease, jaundice, inflammation, and night blindness. Laboratory investigations on extracts of the plant have demonstrated significant pharmacological activities, such as antioxidant, hepatoprotective, anti diabetic, anticarcinogenic, antifertility, antibacterial,
antifungal and larvicidal properties listed in Table-1.

6. CONCLUSION
The supportive information presented in this review has showed that Trianthema portulacastrum L. has great potential to be incorporated into conventional medical practice for the healing and management of various metabolic syndromes, hepatotoxic, diabetes, cancer and other disease complications. Development and research on TP through modern pharmaceutical technologies and analytical protocols is essential to promise its quality, safety and efficacy. It is anticipated that this review will provide some valuable information for ongoing explorations of this fascinating species and its phytochemicals. Future research on TP would not only offer knowledge of popular herbal medicine, but also give a clear socio-economic impact in turning a common weed into beneficial nutraceutical and pharmaceutical products.

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