

**TRIUMFETTA RHOMBOIDEA JACQ.- AN OVERVIEW****Charanjeet Singh<sup>1\*</sup>, Manish Gupta<sup>2</sup>, Anil K Gupta<sup>2</sup>, Mukesh Sharma<sup>1</sup>**<sup>1</sup>Research Scholar, Faculty of Pharmaceutical Sciences, Jayoti Vidyapeeth Women's University, Jaipur, Rajasthan, India<sup>2</sup>Jaipur College of Pharmacy, Sitapura, Jaipur, Rajasthan, India**Received: 18-12-2019 / Revised: 10-01-2020 / Accepted: 20-03-2020****Corresponding author: Charanjeet Singh****Conflict of interest: Nil****Abstract**

Plants have been one of the important sources of medicine even since the dawn of human civilization. In spite of tremendous development in the field of allopathy during 20<sup>th</sup> century, plants still remain one of the major sources of drug in the modern as well as traditional system of medicine throughout the world. *Triumfetta rhomboidea* Jacq. (Tiliaceae) is commonly known as Burr bush, a popular Indian medicinal plant, has long been used commonly in Ayurvedic system of medicine. The plant has been found to possess diverse number of pharmacological activities. The present paper gives an account of updated information on its traditional uses, ethnobotany, phytochemistry and its pharmacological activities. The review reveals that wide range of phytochemical constituents have been isolated from the plant and it possesses important activities like Diuretic, analgesic, anti-inflammatory, anti-tumor, antioxidant, antiulcer and antimicrobial have also been reported. These reports are very encouraging and indicate that this plant has great potential to be developed as drug by pharmaceutical industries.

**Keywords:** *Triumfetta rhomboidea*; Burr bush; Pharmacological activities; Ethnobotany; Phytochemistry.

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**INTRODUCTION**

Throughout the ages, humans have relied on Nature for their basic needs for the production of food-stuffs, shelters, clothing, means of transportation, fertilizers, flavours and fragrances, and, not the least, medicines. Plants have formed the basis of sophisticated traditional medicine systems that have been in existence for thousands of years and continue to provide mankind with new remedies. Although some of the therapeutic properties attributed to plants have proven to be erroneous, medicinal plant therapy is based on the empirical

findings of hundreds and thousands of years.[1]

The genus *Triumfetta* comprises certain herb and undershrubs. It contains about eight species which are distributed in the tropics, of which three yield useful fibres<sup>2</sup>. Some common, ethnomedicinally important species of this genus found in India have been listed in Table 1[2-3].

*Triumfetta rhomboidea* Jacq. belonging to family *Tiliaceae* is commonly known as Burr bush or Burweed[4] found throughout tropical & sub-tropical India & Ceylon.[2, 5-6] It is a very common weed growing wild and freely on Matheran Hills. Fruit,

flower and leaves are used in medicine. Mucilaginous, demulcent, astringent properties of the leaves and fruits of certain *Triumfettas* render them useful for injections for inveterate cases of gonorrhea. Bark and fresh leaves are used for diarrhoea. Flowers are rubbed with sugar and water, is given in gonorrhoea to stop the burning caused by urine. The burr-like fruit is believed to promote parturition.[7] In Indian languages it is called as *Chikti* (Hindi), *Bon-agera* (Assamese), *Banokra* (Bengali), *Soh byrthit* (Khasi), *Leehing* (Manipuri), *Jotijotia* (Oriya), *Jhinjharita* (Sanskrit), *Aataiyottippuntu* (Tamil), *Dekki* (Telugu), *Jattoate* (Kannada), *Nichardi* (Marathi).[8] The aim of present review is to highlight the traditional uses, pharmacognostical, phytochemical and pharmacological investigation carried out on the plant so that more pharmacological studies could be conducted to investigate the unexploited potential.

### Taxonomic classification[9]

Kingdom	: Plantae
Superdivision	: Tracheobionta
Superdivision	: Spermatophyta
Division	: Magnoliophyta
Class	: Magnoliopsida
Subclass	: <u>Dilleniidae</u>
Order	: <u>Malvales</u>
Family	: Tiliaceae
Genus	: <u><i>Triumfetta</i></u>
Species	: <i>Triumfetta rhomboidea</i> Jacq.

### Botany

It is a herbaceous perennial, up to 1.5m. tall, distributed throughout tropical and sub-tropical India, ascending to an altitude of 1,200 m. in the Himalayas.

Leaves are 2.8-5.0 X 3-4 cm, ovate, rhomboid or cordate, usually 3-lobed, irregularly serrate, lower ones deeply 3-

lobed; upper ones lobed or entire, acuminate, coarsely serrate with 1 or 2, glandular, swollen lowest leaf serratures, stellate hairy. Flowers are yellow in terminal and leaf opposed cymes. Stigma is 2-denate. Fruits are 5mm. in diameter globose or ovoid, stellate hairy with hooked spines and pea sized. [2, 6, 10]

### Flowering and Fruiting

August-November.[11-12]

### Traditional uses

Traditionally the root is bitter, acrid, tonic, styptic, galactagogue, aphrodisiac, cooling, diuretic and useful in dysentery.[6,11] Pounded roots are given for the treatment of intestinal ulcer and their hot infusion hastens parturition.[2-3] The root is used as diuretic. Zulu women take a hot infusion of the root to facilitate childbirth or to hasten the inception of parturition when it is delayed. In Madagascar the pounded root is applied to boils and to inflamed eyelids.[6] The bark and fresh leaves are used for diarrhoea.[3,6] The leaves, flowers and fruits are mucilaginous, astringent and used in gonorrhoea.[6] Leaves and flowers are used against leprosy.[2-3,6] The pounded leaves and stem are used as a poultice on tumours.[6] Powdered leaf infusion drunk for the treatment of anemia in different regions of East Africa.[3]

### Ethnobotanical study

In the Indian systems of medicine (*Ayurveda*, *Siddha*, and *Unani*) *Triumfetta rhomboidea* is used either as a single drug or in combination with other drugs. Its roots are used mainly as an galactagogue, aphrodisiac and diuretic.[6,11] It is an important medicine for gonorrhoea, urinary trouble dysentery, leucorrhoea, jaundice-hepatitis, diarrhoea, dysentery, asthma and inflammation. *Triumfetta rhomboidea* has been used by different people and ethnic tribes for the treatment of various ailments. Table 2 gives the region-wise ethnomedical uses of

*Triumfetta rhomboidea* and different methods of using it.

### Phytochemical study

A new flavone glycoside, triumboidin was reported from the leaves of *Triumfetta rhomboidea*[13]. The structure of triumboidin isolated from *Triumfetta rhomboidea* as scutellarein 7-O-L-arabinorhamnoside is inconsistent with the spectral data. Its true structure has been established as scutellarein 6-xyloside 7-rhamnoside. <sup>1</sup>H and <sup>13</sup>C NMR and FAB-MS data for scutellarein 7-O- $\alpha$ -L-rhamnoside have also been provided.[14]

A protein from the leaves and a greenish yellow fatty oil 4-hydroxyisoxazole (Triumferol) and triumboidin (scutellarein-7-O-L-rhamnosylarabinoside) along with scutellarein-7-O-L-rhamnoside was isolated from the seeds of *Triumfetta rhomboidea*. [2,13,15]

It was reported that  $\beta$ -sitosterol, friedelin, friedelinol, quercetin, 2,6-dimethoxy-1,4-benzoquinone and rosmarinic acid were isolated from *Triumfetta rhomboidea*[16]

### Pharmacological study

#### Antibacterial activity

The ether and 90 per cent ethanolic extract of leaf showed antibacterial activities against three Gram positive bacteria, *Staphylococcus aureus*[17,18], *Enterococcus faecalis*, *Bacillus cereus* and three Gram negative bacteria *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Escherichia coli*. [18]

#### Diuretic activity

The methanol & petroleum ether extract showed potent diuretic activity. Methanol extract at dose of 100 and 200 mg/kg increases excretion of sodium and potassium ion compared to the control in a dose dependent manner while petroleum ether extract at dose of 200 mg/kg showed significant excretion of sodium in urine. Both the extracts showed significant increased total volume of urine in a dose dependent manner.[19]

### Analgesic & anti-inflammatory activity

Methanolic extract of *Triumfetta rhomboidea* leaf (50-400 mg/kg, i.p.) caused statistically significant inhibition of the egg albumin induced odema in Wistar albino rats & the number of acetic acid induced writhing in mice. Both the effect was dose dependent. It was reported that *Triumfetta rhomboidea* can be recommended for acute inflammatory disorders & diseases associated with pains.[20]

### Anti-tumor activity

The methanolic extract of *Triumfetta rhomboidea* leaf showed significant antitumor activity against Dalton's Ascites Lymphoma bearing Swiss albino mice. Intra-peritoneal administration of extract (100 & 200 mg/kg) reduced the tumor volume, packed cell volume & viable cell count in dose dependent manner.[21]

### In vitro antioxidant activity

The ethanol extract of *Triumfetta rhomboidea* exhibited potent DPPH and ABTS radical scavenging activity with IC<sub>50</sub> values 16.56 and 39.00 mg/ml, respectively. It also showed significant *in vitro* antioxidant activity against H<sub>2</sub>O<sub>2</sub> radical with IC<sub>50</sub> values 97.80 mg/ml and moderate against nitric oxide radical with IC<sub>50</sub> value 345.50 mg/ml, respectively. [21-22]

### Antimicrobial activity

The essential oil of the aerial parts of *Triumfetta rhomboidea* was analysed by GC and GC-MS and assayed for its antibacterial and antifungal activities. The main constituents identified were trans-caryophyllene (22.4%), kessane (14%) and caryophyllene oxide (13%). The antimicrobial tests showed a mild activity against *Escherichia coli* and *Enterococcus hirae*. [23].

**Anti-larvae activity**

The crude extract of *Triumfetta rhomboidea* leaves did not show anti-larvae activity against various species of mosquito larvae.[24]

**Antiulcer activity**

Root extract of *Triumfetta rhomboidea* showed significant antiulcer activity.[25]

**Antiviral activity**

80% ethanolic extract of leaf exhibited promising antiviral activity against polio, coxsackies, semliki forest, herpes, and measles virus. Extract significantly reduced viral titre.[26]

**Ecboic activity**

*Triumfetta rhomboidea* showed ecboic property on the gravid mammalian uterus.[27]

**Table 1: Some common, ethnomedicinally important Indian species of genus *Triumfetta***

Name	Uses	Distribution
<i>Triumfetta annua</i>	The leaves are cooked as a side dish. Green paroquets feed on the ripe fruits or burrs.[2]	Almost throughout the greater part of India, up to the elevation of 1,500 m and in the Andamans.[2]
<i>Triumfetta pentandra</i>	The stem yields a fibre, which is reported to approach nearer to jute.[2]	Annual herb of waste lands, found throughout the plains of India.[2]
<i>Triumfetta pilosa</i>	The stem yields a fibre. The fibre is utilized for the manufacture of coirs, strong canvas and sail cloth for country crafts.[2]	Throughout the hotter parts of India.[2]
<i>Triumfetta rhomboidea</i>	The root is used in dysentery and the bark and fresh leaves in diarrhoea.[3]	Tropical and subtropical India.[2]
<i>Triumfetta rotundifolia</i>	The plant is used as a demulcent.[3]	Almost throughout India.[2]

**Table 2: Region wise ethnomedicinal uses and traditional method of application of *Triumfetta rhomboidea***

Area	Local name	Parts used	Uses/ailments treated	Preparation
Rajasthan	Lapta, Mondli[28]	Roots	Neck sores	Infusion
Andhra Pradesh	Kusanga, Kusangi[29]	Root	Galactagogue & Yoke gall	Orally as a powder
Bangladesh	Ludiful[30]	Whole plant	Urinary trouble & Dysentery	Juice & Paste
Madhya Pradesh	Bhora Chikti[31]	Root	Boils & Inflamed eyelids	Paste
Orissa	Bichhua[32]	Whole plant	Gonorrhea	Mucilage
Orissa	Raktasingi[32]	Root	Cough	Decoction
Western Uganda	Ruhigura[33]	leaves, root	Labour pain	Powder
Madhya Pradesh	Lapti[34]	Root & leaves	Urinogenital problem of male	Extract

Cont...				
Area	Local name	Parts used	Uses/ailments treated	Preparation
Haryana	Bhurat[35]	Root	Leucorrhoea	Powder & Paste
Southern Uganda (Mukono Dist.)	Baganda[36]	Root	Anxiety due to bewitching	Infusion
Karnataka (Mysore and Coorg dist.)	Vattesoppu[37]	Leaves	Cracks of foot sole	Paste
Rotuma-islands	Joan Ne Pija[38]	Bark Leaves	Jaundice-Hepatitis Diarrhea, Dysentery, Asthma, Inflammation	-
Eastern Tanzania (Bagamoyo dist.)	Mfungangombe, Mboshoko[39]	Leaves	Anemia	Aqueous extract
Eastern Tanzania (Bagamoyo dist.)	Mfungangombe, Mboshoko[39]	Roots	Bloody diarrhoea, amenorrhoea, vomiting and as an antispasmodic	Infusion or Decoction
Karnataka	Inothwane, Indola encane[40]	Roots	To induce labour during Pregnancy and Childbirth	Decoction
Rajasthan (Mount Abu)	Banokra[41]	Fresh leaves	Diarrhea	-

## CONCLUSION

In recent years, ethnobotanical and traditional uses of natural compounds, especially of plant origin received much attention as they are well tested for their efficacy and generally believed to be safe for human use. They obviously deserve scrutiny on modern scientific lines such as phytochemical investigation, biological evaluation on experimental animal models, toxicity studies and investigation of molecular mechanism of action of isolated phytoconstituents. *Triumfetta rhomboidea* is reported to possess Antibacterial, Diuretic, Analgesic & anti-inflammatory, Anti-tumor, *In vitro* antioxidant activity, Antimicrobial, Anti-larvae, Antiulcer, Antiviral and Ecobolic activities<sup>26</sup> but number of other pharmacological activities are yet to be explored. In future studies,

the isolated principles from plant material needs to be evaluated in scientific manner using specific experimental animal models and clinical trials are to be done to understand the molecular mechanism of action, in search of lead molecule from natural resources.

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