Plants have been one of the important sources of medicine even since the dawn of human civilization. Inspite of tremendous development in the field of allopathy during 20th 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.

**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[2]. Some common, ethnomedicinally important species of this genus found in India have been listed in Table 1[2-3].

<table>
<thead>
<tr>
<th>Name</th>
<th>Uses</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Triumfetta annua</em></td>
<td>The leaves are cooked as a side dish. Green paroquets feed on the ripe fruits or burrs.</td>
<td>Almost throughout the greater part of India, up to the elevation of 1,500 m and in the Andamans.</td>
</tr>
<tr>
<td><em>Triumfetta pentandra</em></td>
<td>The stem yields a fibre, which is reported to approach nearer to jute.</td>
<td>Annual herb of waste lands, found throughout the plains of India.</td>
</tr>
<tr>
<td><em>Triumfetta pilosa</em></td>
<td>The stem yields a fibre. The fibre is utilize for the manufacture of coirs, strong canvas and sail cloth for country crafts.</td>
<td>Throughout the hotter parts of India.</td>
</tr>
<tr>
<td><em>Triumfetta rhomboidea</em></td>
<td>The root is used in dysentery and the bark and fresh leaves in diarrhoea.</td>
<td>Tropical and subtropical India.</td>
</tr>
<tr>
<td><em>Triumfetta rotundifolia</em></td>
<td>The plant is used as a demulcent.</td>
<td>Almost throughout the India.</td>
</tr>
</tbody>
</table>
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 *Triumfetta* render them useful for injections for invertebrate 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-agora (Assamese), Banokra (Bengali), Soh byrhit (Khasi), Leeching (Manipuri), Jotijotia (Oriya), Jhinjharita (Sanskrit), Aaayottippuntu (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**: Spermatophyta
- **Division**: Magnoliophyta
- **Class**: Magnoliopsida
- **Subclass**: Dilleniidae
- **Order**: Malvales
- **Family**: Tiliaceae
- **Genus**: Triumfetta
- **Species**: Triumfetta rhomboidea 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 a galactagogue, aphrodisiac and diuretic[6, 11]. It is an important medicine for gonorrhea, 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.

<table>
<thead>
<tr>
<th>Area</th>
<th>Local name</th>
<th>Parts used</th>
<th>Uses/ailments treated</th>
<th>Preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rajasthan</td>
<td>Lapta, Mondli[26]</td>
<td>Roots</td>
<td>Anemia</td>
<td>Infusion</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>Kusanga,Kusangi[19]</td>
<td>Root</td>
<td>Galactagogue &amp; Yoke gall</td>
<td>Orally as a powder</td>
</tr>
<tr>
<td>Orissa</td>
<td>Bichhua[12]</td>
<td>Whole plant</td>
<td>Gonorrhoea</td>
<td>Mucilage</td>
</tr>
<tr>
<td>Orissa</td>
<td>Raktaising[12]</td>
<td>Root</td>
<td>Cough</td>
<td>Decoction</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>Lapti[14]</td>
<td>Root &amp; leaves</td>
<td>Urinogenital problem of male</td>
<td>Extract</td>
</tr>
<tr>
<td>Southern Uganda (Mukono Dist.)</td>
<td>Baganda[16]</td>
<td>Root</td>
<td>Anxiety due to bewitching</td>
<td>Infusion</td>
</tr>
<tr>
<td>Karnataka (Mysore and Coorg dist.)</td>
<td>Vattesoppu[17]</td>
<td>Leaves</td>
<td>Cracks of foot sole</td>
<td>Paste</td>
</tr>
<tr>
<td>Rotuma-islands</td>
<td>Joan Ne Pija[18]</td>
<td>Bark Leaves</td>
<td>Jaundice-Hepatitis</td>
<td>Decoction</td>
</tr>
<tr>
<td>Eastern Tanzania (Bagamoyo dist.)</td>
<td>Mfungangombe, Mbohocho[19]</td>
<td>Leaves</td>
<td>Anemia</td>
<td>Aqueous extract</td>
</tr>
<tr>
<td>Eastern Tanzania (Bagamoyo dist.)</td>
<td>Mfungangombe, Mbohocho[19]</td>
<td>Roots</td>
<td>Bloody diarrhoea, amenorrhoea, vomiting and as an antispasmodic</td>
<td>Infusion or Decoction</td>
</tr>
<tr>
<td>Karnataka</td>
<td>Inothwane, Indola encane[10]</td>
<td>Roots</td>
<td>To induce labour during Pregnancy and Childbirth</td>
<td>Decoction</td>
</tr>
<tr>
<td>Rajasthan (Mount Abu)</td>
<td>Banokra[41]</td>
<td>Fresh leaves</td>
<td>Diarrhoea</td>
<td>—</td>
</tr>
</tbody>
</table>

Table 2: Region wise ethnomedical uses and traditional method of application of *Triumfetta rhomboidea*
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.[19] H and 13C NMR and FAB-MS data for scutellarein-7-O-a-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 β-sitosterol, friedelin, friedelinol, quercetin, 2,6-dimethoxy-1,4-benzoquinone and rosmarinic acid were isolated from Triumfettarhomboidea[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 edema 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].

Antitumor 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 Triumfettarhomboidea exhibited potent DPPH and ABTS radical scavenging activity with IC50 values 16.56 and 39.00 mg/ml, respectively. It also showed significant in vitro antioxidant activity against H2O2 radical with IC50 values 97.80 mg/ml and moderate against nitric oxide radical with IC50 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-larval activity against various species of mosquito larvae[24].

Antiiulcer activity
Root extract of Triumfetta rhomboidea showed significant antiiulcer 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 titer[26].

Ecbolic activity
Triumfetta rhomboidea showed ecbolic property on the gravid mammalian uterus[27].

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[17-18], Diuretic[19], Analgesic & anti-inflammatory[20], Anti-tumor[21], In vitro antioxidant activity[21-22], Antimicrobial[23], Anti-larval[24], Antiulcer, Antiviiral[25] and Ecbolic activities[26] 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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