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THE MEDICINAL USES OF *TINOSPORA CORDIFOLIA* (GURJO)

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ABSTRACT

Tinospora cordifolia is a perennial, climbing deciduous shrub. This plant belongs to the family Menispermaceae. A variety of phytochemical constituents have been isolated from different parts of *T. cordifolia*. These compounds belong to different groups such as alkaloids, steroids, diterpenoid lactones, aliphatic compounds, glycosides and polysaccharides. It is a widely used plant in Ayurvedic systems of medicine. Stem, roots and leaves are the most important parts of the plant, which are used in traditional systems of medicines. It possesses anti-neoplastic, antioxidant, anti-hyperglycemic and hepatoprotective properties. It is the important medicinal plant used in traditional Ayurvedic medicine for the treatment of fever, cold, diab*et*es, respiratory tract infections etc. This paper presents an appraisal of medicinal properties and pharmaceutical importance of *Tinospora cordifolia.*

Keywords - antioxidant activity, herbal drugs, phytoconstituents, *Tinospora cordifolia.*

INTRODUCTION

The World Health Organization (WHO) estimated that up to 80% of people still rely mainly on traditional remedies such as medicinal plants for their medicines. Since the beginning of human civilization, plants have been used as natural medicines (Bharathi, 2018). Recently, scientists are showing a great interest in the isolation of new drugs from traditional medicinal plants. *Tinospora cordifolia* is also commonly named as "Gurjo" (Nepali) and or "Gulancha" in English. It is distributed in the tropical and sub-tropical regions in Nepal. It is also found in various countries of Asia such as China, Thailand, Sri Lanka, Malaysia , Philippines, and Africa (Raghu *et al.,* 2006). It has been given various names i.e. gurjo, heart-leaved moonseed, guduchi, giloy etc. It is a popular medicinal plant in Atharva Veda and ancient Ayurvedic literature. This paper emphasizes on the information related to the morphology of Gurjo plant and their medicinal value.

Nepal is rich in biodiversity and huge knowledge of ancient traditional systems of medicine such as Ayurveda, Amchi etc. provide a strong base for the utilization of a large number of plants in healthcare. Demand for Ayurvedic plants is high in both developing and developed countries.

Tinospora cordifolia (willd) is a deciduous climbing shrub which belongs to the family Menispermaceae. It grows in a wide range of soil, acidic to alkaline with moderate level of soil moisture. The plant has diverse medicinal property and help to boost the immune system and body's defense against Micro-organisms and virus (Tirtha, 2007). This plant is rich source of phenolics, alkaloids, sesquiterpenoid, polysaccharides, glycosides and steroids. So, researchers show huge interest in this plant with high curiosity due to its immense pharmaceutical value like anti-ageing, immunomodulatory,

anti-diabetic, anti-arthritic, anti-inflammatory etc. (Goel *et al*., 2014; Panchabhai *et al*., 2008).

Morphological description

Tinospora cordifolia is a large, glabrous, perennial, deciduous, climbing shrub. The stem is fleshy, succulent and climbing in nature with long filiform fleshy aerial roots. The bark is creamy white to grey, and stem contains rosette like lenticles. Its leaves are simple, heart shaped, ovate, alternate or lobed, about 7-9 nerved and membranous (Albinjose *et al*., 2015; Dwivedi et al., 2016; Meshram *et al*., 2013). The thread like, aerial and long filiform roots are usually arising from the branches (Singh *et al*., 2003). Its flowers bloom in summer, flowers are in axillary position, 2-9cm long raceme on leaflet branches, unisexual, small and yellow in colour. Male flowers are clustered while female are usually solitary. There are six sepals that are arranged in two whorls and are yellowish green in colour (Joshi *et al*., 2016). Fruits are developing during winter season. Fruit of this plant are fleshy, orange reddish when fully matured. The seeds are curved (Shetty *et al*., 2010).

CHEMICAL COMPOSITION

A variety of constituents have been isolated from different parts of *Tinospora cordifolia*. They belong to different classes such as alkaloids, Steroids, Glycosides, Diterpenoid lactones, Sesquiterpenoid, Sesquiterpenoid etc (Nasreem *et al*. 2010). Few important alkaloids found in the stem and root of *Tinospora cordifolia* are Berberine, Palmatine, Magnoflorine, Tembetarine, Choline, Palmatine, Tinosporin, Isocolumbin, Tetrahydropalmatine, Magnoflorine (Singh *et al*., 2003; Sinha *et al*., 2004). Steroids found in the stem of *T. cordifolia* are Ecdysterone, Giloinsterol , Makisterone A, b-sitosterol, d-sitosterol, ecdysterone, g- sitosterol, b-hydroxygenase, makisterone, giloinsteroljateorine, columbin (Singh *et al*., 2003). Glycosides found in the stem are 18-norclerodane glucoside, Furanoidditerpeneglucoside, Tinocordiside, Tinocordifolioside, Cordioside, Cordifolioside, Cordifolioside Syringin, Syringin-apiosylglycoside, Palmatosides, Palmatosides, Cordifoliside A, Cordiofoliside B, Cordifoliside C, Cordifoliside D, Cordifoliside E (Singh *et al*., 2003; Gagan et al., 1994; Wazir *et al*., 1995; Gagan *et al*., 1996; Maurya *et al*., 1997; Ghosal *et al*., 1997). Diterpenoid lactones are Furanolactone, Clerodane derivatives, Tinosporon, Tinosporides, Jateorine, Columbin (Singh *et al*., 2003; Maurya *et al*., 1997; Maurya et al., 1989; Swami Nathan et al., 1989). Aliphatic compound are Octacosanol, heptacosanol, nonacosan-15-one (Singh *et al*., 2003; Thippeswamy *et al*., 2008) and Miscellaneous compounds are Tinosporidine, cordifol, cordifelone, N-trans-feruloyl tyramine as diacetate, giloin, gilonin, tinosporic acid, Jatrorrhizine (Singh et al., 2003; Hanuman *et al*., 1986).

Medicinal applications

Tinospora cordifolia is widely used in traditional medicine because of its biological activities like anti-periodic, anti- inflammatory, immunomodulatory, anti-neoplastic activities, anti-oxidant, anti-diabetic, anti-spasmodic, anti-stress, anti-leprotic, anti-malarial, anti-allergic, anti-arthritic activity, hepato-protective etc. *Tinospora cordifolia* is used in various ailments fevers, diabetes, asthma, dyspepsia, jaundice, skin diseases, urinary problems, and chronic diarrhoea and dysentery. It is also used in the treatment of leprosy, helminthiasis, heart diseases and rheumatoid arthritis.

The stem of this plant is used in respiratory tract infections, skin diseases (Aiyer *et al*., 1963; Raghunathan *et al*., 1982), antidote to snake bite and scorpion sting (Nadkarni *et al*., 1976), stomachic, diuretic, stimulates bile secretions, allays thirst, enriches the blood and cures

jaundice (Nayampalli *et al*., 1988), The juice of plant stem is useful in diabetes, dyspepsia, vaginal and urethral discharges (Singla *et al*., 2010), radio -protective activity (Chintalwar *et al*., 1999), jaundice (Sangeetha *et.al*., 2013) , regulates the blood sugar level (Patel *et al*., 2011). Bark of stem is used in Anti-inflammatory activity, Anti-allergic, Anti-spasmodic, Anti-pyretic, Anti-leprotic (Nayampalli *et al*., 1986; Ikram *et al*., 1987; Asthana *et al*., 2001). Root of this plant is used in Anti-neoplastic property, Anti-oxidant activity (Sarma *et al*., 1998). Whole plant is used in analgesic and neuro pharmacological activities, antidote to snake bite and scorpion sting, antipyretic and anti-inflammatory activity (Jeyachandran *et al*., 2003 ; Gupta *et al*., 1956), Diabetis, Rheumatoid arthritis, Gout, Cancer, high cholesterol content (Upadhyay *et al*., 2010), Anti-asthmatic and chronic cough treatment (Spelman *et al*., 2001), Anaemia, jaundice,normalization of altered liver functions (Karkal *et al*., 2007), Cardiac disorders (Rao *et al*., 2005), Anti-leprotic (Asthana *et al*., 2001). The powder of root and stem is used along with milk for treatment of cancer (Bhatt *et al*., 1987). The whole plant is used in scabies in swine, diarrhoea, uinary diseases, syphilis, skin diseases, bronchitis, to promote longevity, increase body's resistance and stimulate the immune system (Kapur *et al*., 2008; Nagarkatti et al., 1994; Rege *et al*., 1993; Vasudevan *et al*., 1995). *Tinospora cardifolia* decreases the tissue damage caused by radiation (Pandey et al., 2015). The plant is also used in treatment of eye disorders and fractures (Devprakash *et al*., 2011)

CONCLUSIONS

Tinospora cordifolia with its multiple values, can be the Nobel source of different types of bio chemical compounds. It is highly popular for various types of phytochemical compounds and its biological activity with medicinal application. This review confirms that *Tinospora cordifolia* has pharmaceutically high valuable nature i.e. antidiabetic, immunomodulatory, anticancer, antimicrobial, antioxidant, antitoxic etc. The presence of such bioactive compounds shows that this plant can be a valuable resource for the preparation of novel medicines used in the treatment of different diseases and disorders in the future.

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