AMERICAN JOURNAL OF PHARMTECH RESEARCH
Journal home page: http://www.ajptr.com/

A Review on *Macrotyloma uniflorum*

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ABSTRACT

Horse gram *(Macrotyloma uniflorum* Lam.) is a popular pulse, locally known as Kollu belongs to the family Fabaceae that still remain an under exploited legume crop. Horse gram seeds are rich in protein and consumed in majority by poorest section of the society. It is rich in protein, iron, calcium and polyphenols. Different part of the plants are used for the treatment of heart disease, asthma, bronchitis , urinary discharges and for treatment of kidney stones. The present paper is an overview on its phytochemical and pharmacological properties reported in the literature.

Keywords: *Macrotyloma uniflorum*,phytochemical and pharmacological activity.

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Received 28 May 2015, Accepted 03 June 2015

Please cite this article as: Bharathi V *et al*., A Review on *Macrotyloma uniflorum*. American Journal of PharmTech Research 2015.

INTRODUCTION

The World Health Organization (WHO) estimates that 80 percent of the population of some Asian and African countries presently use herbal medicine for some aspect of primary health care. Medicinal plants have been used as an exemplary source for centuries as an alternative remedy for treating human diseases because they contain numerous active constituents of therapeutic value. In developing countries, it is estimated that about 80% of the population depends on traditional medicine for their primary healthcare. There arises a need to screen medicinal plants for bioactive compounds as a basis for further pharmacological studies. Medicinal plants are considered to be an important source of antioxidant compounds and the therapeutic benefit of many medicinal plants often attributes to their antioxidant properties[1]. Horse Gram is scientifically known as *M. uniflorum.* It also goes by the name *Dolichos uniflorus* due to a lot of confusion in the *Dolichos* category. The right name for the Horse gram scientifically is *Macrotyloma uniflorum*. According to USDA (United States Department of Agriculture) database both the name's *Macrotyloma uniflorum* and *Dolichos uniflorus* mean the same. Traditionally, it has been widely used in the treatment of kidney stones, inflamed joints, fever, sinus wounds and localized abdominal tumors [Muthu et al., 2006]. Experimentally, the seeds are reported as hepato-protective, diuretic and antioxidant.

Taxonomical position of *Macrotyloma uniflorum Lam*

Kingdom: Plantae, Family: Fabaceae, Genus: Macrotyloma, Species: *M.uniflorum*

Botanical Description

Climbing herb with slam up to 60 cm. tall with a perennial fibrous rhizome stem annual densely covered with whitish hairs. The tap root produces a branched root system with smooth, rounded nodules. Nodules containing nitrogen fixing bacteria. *Macrotyloma uniflorum* is an erect, sub-erect or trailing, densely hairy annual herb Compound, alternate, Trifoliolate, stipules lanceolate petiole

1-7 cm. long leaflet ovate elliptical apex rounded to acute base rounded lateral leaflets a symmetric hairy to glabrescent on both surfaces. Flower Short only 6-12 mm. long. The flower is cream - yellow with purple spot in auxiliary racemes with 2 appendages at base. Flower zygomorphic, bisexual, Fruit is a linear oblong pod 3-8 cm.x4-8 mm. up curved towards apex acuminate, densely hairy. When young later mar sparsely so margins glabrous smooth or warty dehiscent 5-10 seeds. Seed size ranges 6-8 mm long and 3-4mm broad smooth of which 100 seed weight is recorded 4gm.Seed trapezoidal oblong or somewhat rounded[3].

Distribution

In India it is the most extensively grown pulse, the maximum area being in Andhra Parades, Karnataka and Tamil Nadu. It is grown mainly to furnish feed and fodder for cattle and horse. It makes excellent hay and is suitable as green manure[4]. It is cultivated as major pulse crop in villages of Almora, Bageswar, Nainital, Pithoragarh and Chamoli.

Nutrient composition

Analyses of horse gram flour for crude protein, fat, ash and moisture contents were carried out essentially according to the standard method[5]. The carbohydrate content was determined as the weight difference using moisture, crude protein, lipid and ash content data. Total dietary fibre (TDF) was determined by rapid enzymatic assay. Resistant starch was isolated and determined by an enzymatic method[6].The analytical values were evaluated from the mean of three determinations for each sample.

Antioxidant activities

Ravishankar and Vishnu Priya[7] have evaluate antioxidant activity of ethanolic seed extracts of *Macrotyloma uniflorum*. The Ethanolic seed extract of *Macrotyloma uniflorum* was found to show significant scavenging activity of 64.01%±1.78at 500µg/ml in Nitric Oxide radical Scavenging Assay, 74.42%±2.37at 1000 µg/ml in Hydroxyl radical Method and 92.59%±2.05at 250 µg/ml in Phosphomolybdate method as compared to that of standard Ascorbic acid 69.42%±1.65at 500µg/ml in Nitric Oxide radical Scavenging Assay, 92.91%±1.24 at 1000 µg/ml in Hydroxyl radical Method, 99.38%±1.69at 250 µg/ml in Phosphomolybdate method. The *Macrotyloma uniflorum* exhibited significant scavenging activity against Nitric oxide radicals. Renu Singh et al[8] were carried out to evaluate the *in vitro* antioxidant activities of Methanol extract of *Dolichos biflorus* dal .The Scavenging effect of *Dolichos biflorus* dal extract was 4 times greater than that of the synthetic antioxidant ascorbic acid. They were reportedthat the *Dolichos biflorus* has a potential source of useful natural antioxidants. Kottai muthu et al.,[9]have reported that the Antioxidant potential of methanolic extract of *Dolichos biflorus* Linn in high fat diet fed rabbits is

concluded that administration of *D.biflorus* manifests a protective action against HFD induced oxidative stress in different tissues in rabbits.

HEPATOPROTECTIVE ACTIVITY

Parmar et al.,[10] have reported that the Hepatoprotective activity of methanolic extract of *Macrotyloma uniflorum* seed was investigated against D-Galactosamine and paracetamol induced hepatotoxicity in wistar albino rats. Silymarin was used as the reference standard at 50mg/kg orally. The degree of protection was determined by the estimation of biochemical parameter like Serum Glutamate Pyruvate Transaminase (SGPT), Serum Glutamate Oxaloacetate Transaminase (SGOT), alkaline phosphate (ALP), Bilirubin (Direct and Total). The 95% methanolic extract of *Macrotyloma uniflorum* (MEMUS) at the dose of (200mg/kg and 400mg/kg) produced a dose dependant reduction in above parametersin D-Galctosamine and paracetamol induced hepatotoxicity in rats. The histopathological study further supported the hepatoprotective activity of the test extract.Maximum protection was seen at 400mg/kg. The Macrotyloma uniflorum seed showed significant hepatoprotactive properties in wistar albino rats.

Antiobesity activity

Bhuvaneshwari et al.,[11] have reported that the hot Extract of *Dolichos biflorus* (Horse gram) on Body Weight in Overweight or Obese Human Volunteers. The *Macrotyloma uniflorum* exhibited significant antiobesity activity. Rufus auxilia et al., have studied that the phytochemical analysis of seed extracts *macrotyloma uniflorum* (horse gram).The aqueous extract of seeds of *macrotyloma uniflorum* contain more phytochemicals than compared to other extract. The anthelmintic activity of the seeds of *Macrotyloma uniflorum* has been nvestigated by Ansa Philip et al .The anthelmintic activity of the seeds of *Macrotyloma uniflorum* was found to have comparable effect with that of standard piperazine citrate.

Anticalcifying activity

Peshin and Singla [12] found out that in vitro effect of the immature seeds of *Dolichos biflorus* on crystallisation of calcium phosphate shared significant results. They noticed that the anticalcifying activity was lost completely by treating with activated charcoal, which was not recovered or eluted by solvent.

Antidiabetic effect

Lakshmi et al[13] investigated that the antidiabetic effect of α-amylase inhibitor isolated from the seeds of *Macrotyloma uniflorum* in streptozotocin-nicotinamide induced diabetic mice.

Antimicrobial activity

The effects of different fractions of methanolic effect of the seeds of D.biflorus on some micro organisms were studied by Basak and Ghosh [14].Extracts from different parts of the plant, including seeds were reported to act upon pathogenic micro organisms. A few active principles isolated from seed extract with methanol showed significant action against some test organisms.

PhytochemicalStudies

Sneha Das et al[15] have studied that the Chemical composition of ethanol extract of Macrotyloma uniflorum (Lam.) Verdc. using GC-MS spectroscopy. They were identified that the mome inositol, ethyl alpha-d-glucopyranoside, n- hexadecanoic acid, linoleic acid (9, 12-octadecadienoic acid), its esters and ethyl derivatives, Vitamin E, stigmasterol and 3-beta-stigmast-5-en-3-ol. The extracts are rich in linoleic acid and its esters, mome inositol and ethyl alpha-d-glucopyranoside; therefore, this plant can be medicinally beneficial as an antioxidant, in diabetes and its related disorders.

CONCLUSSION

The reported phytochemical and pharmacological studies support its traditional uses and may prove to be useful for clinical evaluation and development of commercial drugs. Now, various researches have been conducted to prove the efficacy of *Macrotyloma uniflorum* in various health problems. In spite of the reporting of these positive benefits of the plant, most of the *Macrotyloma uniflorum* research studies are of small scale in nature. So, more and better trial data are needed to define the clinical effectiveness of this popular herbal remedy more precisely.

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