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DIOSCOREA OPPOSITIFOLIA L- POTENTIAL NUTRIENT HERB OF GAUTALA AUTRAMGHAT REGIONAL FOREST

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Abstract : Food and nutritional security are the major challenges in 21 centuary world. Many plants growing wild have potential to contribute to sustainable food systems under climate change. In such scenario the food and nutritional insecurity, it is important to introduce new agriculture techniques and search for alternative food and feed ingredients. Some wild root and tuber crops can be used as nutritional food due to its high calorific value and superior carbohydrate content along with minerals and vitamins. Yam (Dioscorea spp.) provides food and medicines to millions of people in the world especially in the tropics and sub tropics. Yams are considered as food famine and plays important role in food needs of small and marginal tribal families during the food scarcity periods. These species are unique for their food, medicinal and economic values but their wider utilization is limited due to the presence of anti-nutritional compositions in some species. The present paper reviews nutritional status and neutraceutical uses of Dioscorea oppositifolia L.

Key words : Chemical profile,Thakar tribe,Pharmacological activity,ethnobotanical reports

Introduction : Nature has provided a wide range of natural products for nutrition and curing ailments of mankind. The knowledge of drugs and nutritious herbs has accumulated over thousands of years in India with unique tradition of Ayurveda,Unani and tribal or folk medicine. Since dawn of civilization there is strong relationship between human being and nature with extensive use of various forest products like roots,tubers,yam,fruits,flowers,bark,gum,resins,oils obtained from plant. These products are used as source of drug or as food. Among tribal communities dwelling in forest or nearby areas the forest products are ultimate source of medicine and food. Tribal communities have long tradition of folk knowledge about use of forest products were these communities have tried wide range of forest resource available for use and need. Among the different genera Dioscorea is widely used genera by the tribal communities of Gautala Autramghat area.

The genus Dioscorea is considered as one among the earliest angiosperms originated from Southeast Asia and Indo-Malayan region (Kumar et al., 2017). Dioscorea oppositifolia is widely distributed member of Dioscorea in forest area of Gautala Autramghat region. Tubers and bulbils of plant are edible and used as food during rainy season. It is also used as food of

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famine. The edible tuber, which can measure up to 1 m (3 ft) long and weigh up to 2 kg (4.5 lbs) or more if grown in deep loam soils, is nutritious with characteristic odour . The flavor, according to Plants for a Future (1997), is between a sweet potato and a regular potato. The tuber contains about 20% starch, 75% water, 0.1% vitamin B1, and 10 to 15 mg Vitamin C. It also contains mucilage, amylase, amino acids, and glutamine.

Morphological characters: Morphological characters were studied in Dioscorea oppositifolia and their variations were presented. It is a small climber. Stem woody, covered with minute glands . Leaves sub-opposite, 4 cm; leaflets 7-9 pairs, opposite, oblong-elliptic, 1 - 15 x 0.4- 0.6 cm, pubescent, base and apex obtuse, margin entire, petiole 1.5 cm; stipules 4 mm. Inflorescence racemes or panicles, axillary or peduncle ; bracts linear, 4 mm; pedicel 1mm. Flowers 4mm, across, base narrow wings oblong 3.5 mm . Pod spreading, straight, 2.5 cm, hirsute. Seeds 10 – 12. pitted, rotted and round with characterstic hairs randomly distributed throughout the tuber . Occurrence only in hilly region. Flowering and fruits in August to December.

Ethnobotanical Review :

Dioscorea oppositifolia is widely distributed member of Dioscorea in forest area of Gautala Autramghat region. Tubers and bulbils of plant are edible and used as food during rainy season. It is also used as food of famine. The edible tuber, which can measure up to 1 m (3 ft) long and weigh up to 2 kg (4.5 lbs) or more if grown in deep loam soils, is nutritious with characteristic odour . The flavor, according to Plants for a Future (1997), is between a sweet potato and a regular potato. The tuber contains about 20% starch, 75% water, 0.1% vitamin B1, and 10 to 15 mg Vitamin C. It also contains mucilage, amylase, amino acids, and glutamine. Tubers are cut into small pieces and boiled in water, water is decanted, cooked and used as food

Both the tuber and bulbils of D. oppositifolia are edible, but the bulbils are generally not collected and used as food by the local tribe 'Thakar'. The tuber is sometimes used as an herbal tonic. It stimulates the stomach and spleen and has an effect on the lungs and kidneys. The tuber has been eaten for the treatment of poor appetite, chronic diarrhea, asthma, dry coughs, frequent or uncontrollable urination, diabetes, and emotional instability. Externally, the tuber has also been applied to ulcers, boils and abscesses. It contains allantoin, a cell-proliferant that speeds up the healing process (Plants for a Future 1997).

Leaf juice from D. oppositifolia can be used to treat snakebites and scorpion stings. Its roots contain diosgenin, which is a compound often used in the manufacture of progesterone and other steroid drugs. Dioscorea oppositifolia has also been used traditionally as a contraceptive and in the treatment of various disorders of the genital organs as well as for asthma and arthritis (Plants for a Future 1997).

Chemical Profile : Diosgenin an aglycone is a chemical substance found in plant and are used commercially in pharmaceutical industry. Alkaloids are also found. Bark contains phytosterols,

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alkaloids, tannin and rich source of starch. (Sharma et.al. 2019) norsesquiterpenoids, dioscopposin A (1) and dioscopposin B have been isolated from stem of plant (Ying et.al 2021) The tubers of D. oppositifolia are highly proteinous, with the values of (10.06) in proximate analysis.

Mineral composition	
Iron	**22.00 ±0.08**
Sodium	**102.2 ±0.54**
Potassium	**1431 ±1.56**
Calcium	**680.06±0.82**
Magnesium	**432.5 ±1.11**
Phosphorus	**78.2 ±0.08**
Zinc	**3.24 ±0.08**
Manganese	**6.34 ±0.01**
Copper	**2.74±0.03**

Anti nutritional compounds	
Phenol	**22.00 ±0.08**
Tanins	**102.2 ±0.54**
HCN	**1431 ±1.56**
Oxalate	**680.06±0.82**
Amylase inhibitors	**432.5 ±1.11**

Pharmacological activity : The ethanol extract of D.oppositifolia show anti obesity effect on Female ICR mice preventing lipid accumulation in liver and prevent fat absorption. (Eun Ju Jeong,et.al.2016) Ethyl acetate extract of tuber show maximum anitimicrobial activity against human pathogenic bacteria (Sandhya and venkata 2020). ethanol extract of D. oppositifolia L. has anti-ulcer activity. (Sanjay kumar et.al 2017) In vitro studies have been reported for synthesis of nanoparticle from Diosgenin isolated from tuber show the potent cytotoxic activity on MCF-7 cell line was observed by MTT assay (Uma et.al 2021) . Rhizomes of D. oppositifolia L. have shown the potential to regulate serum levels of estrogen, follicle-stimulating hormone and luteinizing hormone thereby lowering post-menopausal symptoms (Li 2006). Proteins isolated from plant showed potential positively regulate translational levels of estrogen receptor beta, thus reducing the risk of ovarian cancer (Lu et.al. 2016). D. oppositifolia starches are highly compressible and form tablets with acceptable crushing force having granular size can be used as excipient (Riley et.al.2008,Odeku et.al 2007) The steroidal saponin in plant diosgenin—one of the major bioactive compounds in yam,was found to treat axonal atrophy and synaptic degeneration, thus improving memory dysfunction in transgenic mouse models of Alzheimer's disease (Tohda et.al. 2012). The methanol extracts at 250 mg/kg b.wt Carrageenan

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induced rat paw oedema in Male Wistar rats was reduced showed equal activity to that of standard drug Diclofenac at 100 mg/kg b.wt. with 63.15% of inhibition of inflammation. (Sanjay kumar et.al 2017)

The n-butanol extract of yam showed anti-obesity e ffect on diet-induced obese mice with a significant decrease in total body weight and parametrial adipose tissue weight. (Jeong 2016). Antioxidant potential of plant tubers have been reported (Nagai 2006)

Ethnobotanical Reports

Botanical name	Plant parts Ethno-botanical /Pharmacological values	Supporting literature
Dioscorea oppositifolia L.	Tuber Tuber is boiled with D. uniflorus and is given to women once a day for nearly a month after delivery to revive their strength.	Mishra S. et al., 2008
	Leaf Leaf paste is used as antiseptic for ulcers.	Sheikh et al., 2013
	Tuber Powered root mixed with cow urine is applied on scorpion bite.	Nashriyah et al., 2011
	Tuber Oral administration of tuber powder mixed with honey is used for increasing sperm	Sharma and Bastakoti, 2009
	Tuber Leaves are mixed with leaves of clematis and 2–3 drops of juice put in the nose of affected person to get relief after sneezing in fits and epilepsy	Kamble et al., 2010
	Tuber used for Swelling, scorpion stings, and snake bites	Edison et al., 2006
	Oral administration of tuber powder mixed with honey for increasing sperm.	Neelima et al., 2011
	Tuber Increase sperm number	Radha et al., 2013
	Tuber used for treatment of Fracture	Padal et al., 2012
	The roots are chewed to cure	Felix et.al. 2009

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toothache and aphthae

Discussion and Conclusion

Wild Dioscorea oppositifolia L**.** was found to be common food among tribes of Gautala Autramghat and it is found to be productive, as well as being highly nuritious, palatable and easily harvested. The comparative and multidisciplinary approach to the study of Dioscorea oppositifolia L may help in understanding their taxonomical determination,nutritive value and medicinal importance in depth. The adulterants in drugs obtain from Dioscorea oppositifolia L can be identified by this investigation. The Dioscorea oppositifolia may provide a valuable source of neutraceutical as important source of nutritious herb. Future investigation is needed for possible antioxidant properties in tubers along with detail chemical profile of plant. The plant is propogated through underground tubers so excessive harvesting of tubers may hamper the biodiversity of plant in wild. This may lead to to loss of this potential source of active compounds for the pharmaceutical industry. The understanding of the pharmacologically active compounds in plant will help in standardizations and analysis of formulations.

The active chemical constituents in plants as flavonoid, diosgenin tannin, saponin and phenols keep the plant in favorable category of neutraceutical with effective bioactive compounds. The problem of plant protein digestibility has been suggested to be because of the interplay of several factors such as protease inhibitors, amylase inhibitors, phytates, oxalates, lectins, goitrogens, hydrogen cyanide, total free phenolics, tannins and other antinutritional factors. It is important to develop carrier systems like nanoparticles for targeted delivery of yam bioactive extracts and compounds, thus improving efficacy and reducing side effects.(Tada 2009)

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