INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

OPEN ACCESS

Review Article

Dioscore Bulbifera As Natural Remedy: An Investigation into It Therapeutic Review

Sanjana Dupare*, Dr. Shivshankar Mhaske, Vikas Gawande, Radha Gaykwad, Tejas Sharma

Satyajeet college of pharmacy, Mehkar.

ARTICLE INFO

Published: 08 Jan. 2025

Keywords:
Dioscorea bulbifera, cardioprotective, hepatoprotective, neuroprotective, immune functioning, antioxidant, anti-inflammatory, antimicrobial, antidiabetic, and anticancer.

DOI:
10.5281/zenodo.14616587

ABSTRACT

Dioscorea bulbifera, commonly known as air yam, has been traditionally utilized in various cultures for its medicinal properties. This review investigates the therapeutic potential of Dioscorea bulbifera with an emphasis on its phytochemical composition, pharmacological effects, and its applications in contemporary medicine. The plant is rich in bioactive compounds, including alkaloids, flavonoids, saponins, and steroids, which contribute to its antioxidant, anti-inflammatory, antimicrobial, antidiabetic, and anticancer activities. Recent studies have highlighted its potential role in managing metabolic disorders, improving immune function, and reducing oxidative stress. Additionally, the bulb of Dioscorea bulbifera has been explored for its neuroprotective, hepatoprotective, and cardioprotective properties. Despite promising results from preclinical and clinical studies, the exact mechanisms of action of these bioactive constituents remain under investigation. This review aims to consolidate current knowledge on the medicinal use of Dioscorea bulbifera, while also identifying gaps in research and proposing directions for future studies to optimize its therapeutic applications.

INTRODUCTION

Dioscoreaceae are widely distributed in the tropics and mostly a tropical climbing family. Roughly all species are perennial herbaceous or shrubby climbers with large tubers or rhizomes. Leaves are mostly alternate, simple, but sometimes palmately lobed or compound [1]. Dioscorea is a genus in the monocotyledonous family Dioscoreaceae [2] .The genus Dioscorea comprises around 600 species and It sustains livelihood around the globe. Despited the tens of thousands of species within the genus, A12 species have been domesticated for food, among them 8 species (D. alataL., D. bulbifera L., D. cayenensis Lam., D.

***Corresponding Author:** Sanjana Dupare
Address: *Satyajeet college of pharmacy, Mehkar.*
Email ✉: sanjanadupare19@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

esculenta(Lour.) Burkill, D. dumetorum (Kunth) Pax, D. oppositaThunb., D. rotundata Poir. And D. polystachya Turcz.are popularly cultivated for eating Dioscorea bulbifera L. Dioscorea bulbifera L. is a glabrous non spiny climber of 10–20 feet high with bulbils 1–8 cm in size Plants had been used as herbal medicinal sources long before Prehistoric period. Medicinal plants used as traditional medicine has well documented in the Unani manuscripts and Egyptian papyr uses. And Chinese writings. Also, there is evidence that Ayurveda, Unani and other European an Mediterranean systems have has been using medicinal plants to treat different therapeutic diseases, in the form of traditional preparations. The demand for Herbal medicines due to its safety and less side effective has led to Utilization of medicinal plants across the globe . Medicinal market surveys Confirmed that by 2023, herbal medicine will be a USD 111 billion Industry worldwide (Anonymous, 1997; Dhiman and Bhattacharyya, 2020) L. (Dioscoreaceae) also known as: air yam, aerial yam, bitter yam, yam, potato yam and parsnip yam) is a traditional Asia, Northern Australia and America is the origin of traditional medicinal plant and tropical Africa. It has a historical past of use in a traditional medicine system with Such general diseases as hemoptysis, goiter, skin infections, orchitis, etc.Pharyngitis and cancer fall under Chinese traditional medicine.Editorial Board of Chinese Materia Medical, 1999; Guan et al., 2017).It has been used to detoxify poison and to clot blood to stop bleeding. Several phytochemical analysis have revealed the Present in the tubers are the phytoconstituents directly associated with different medicinal purposes D. bulbifera has received less attention simply due to its vast medicinal value.



Figure 1: Some common *Dioscorea* species. (1) Leaves of *D. pentaphylla* (2) *D. bulbifera* Tubers (3) *D. puber* Tubers (4) *Unequal round winged shaped Seeds of Dioscorea deltoidea* (5) Leaves of *D. puber* (6) Tuber of *different Dioscorea* spp. (7) *D. oppositifolia Flowers*, (8) *D. hispida* Flowers and (9) *D. alata.*

❖ **Classification**

- Kingdom: Plantae
- Phylum: Tracheophyta
- Order: Dioscoreales
- Class: Spermatopsida, Mangolipsida, Monocotyledons
- Family: Dioscoreaceae
- Genus: Dioscorea
- Species: D. Deltoidea, D. Bulbifera, L. D. alata

Aim

Dioscorea bulbifera, commonly known as air potato, is investigated for its **therapeutic potential** due to its traditional use in treating various ailments, including cancer, diabetes, and inflammation. Research highlights its bioactive compounds' effectiveness against diseases such as goiter and skin infections, while also showcasing antiinflammatory and wound healing properties. However, concerns about its toxicity necessitate further studies to understand its pharmacological benefits and safety better. Conservation efforts are

crucial as this plant faces extinction due to overharvesting for medicinal purposes.

Objective

The investigation of Dioscorea bulbifera aims to explore its therapeutic potential, particularly in wound healing, anti-inflammatory, and antioxidant activities. The objective includes identifying bioactive compounds responsible for these effects and evaluating their efficacy against conditions like inflammation and oxidative stress. Additionally, research highlights its traditional uses in treating various ailments, including diabetes and cancer, suggesting a broader pharmacological relevance. Overall, the studies underscore the plant's promise as a source of natural remedies for inflammatory and metabolic diseases.

- **Geographical distribution and botanical description**

This is a plant species native to tropical Asia, Northern Australia, America, and sub Saharan Africa. In China, this plant is found in the southern part, namely, Anhui, Fujian,

Gansu, Guangxi, Guangdong, Guizhou, Henan, Jiangsu, Tibet and Yunnan. Provinces (Editorial Board of Chinese Materia Medical. The geographic distribution of D. bulbifera is Fig 1. D. bulbifera is also known as air potato or air yam (Vasanthi et al., 2010; Guan et al., 2017). In Chinese herbal medicine is also known as "Huangdu" and "Huangyaozi" (Guan et al., 2017).It is herbaceous, perennial climber that grows up to 10-20 m in Length with several fibrous roots (Langeland and MeisenBurg, 2008; Lim, 2016) (Fig 2). Leaves are alternate, broadly cordate, With brilliant shining green color, rounded basal lobes emerging from One point . Aerial tubers (bulBils are oval to round in shape with smooth surfaces and freely Form in leaf axils Stems. They arise annually from a tuberous, woody rootstock. These stems either Climb up nearby vegetation or run along the ground .The occurrence of bisexual and unisexual flowers characterizes subfa-Families of Dioscoreaceae Langland and Meisenburg, 2008. Seeds(1.2-1.6 by 0.5 cm) are trilocular, dark brown and Medicinal plants have had important sources of medicine since time immemorial. of traditional medicine for most of the human population and cur- Currently, they also serve as the primary source of the production of pharma- medicinal drugs. The parts of the plant have been used for the diagnosis and treatment of various diseases from past few centuries. The genus Dio-Scorea has a long and significant ethnomedicinal values and several It has found various medicinal applications in the studies conducted. Tropics Among the several species of Dioscorea, D. bulbifera is widely used It has been a part of traditional medicine for treating many diseases. D. bulbifera has received more attention since it has several ethnomedicinal uses. Extremely famous for its salty and bitter taste. Attracted much attention in recent decades. flavour. D. bulbifera has been used to treat cough, epistaxis, , hemoptysis, pharyngitis, skin infections, piles, throat infections and to remove dandruff Besides the aforementioned, it is it has also found applications in treating several conditions such as detoxify poison, coagulation of blood to stop haemorrhage and elimination of pathogenic heat and cancer. Traditional Medicine from the Editorial Board of Chinese Medicine. Materia Medica, 1999). Tubers of D. bulbifera are roasted and cooked as vegetable and serves to cure cough, dysentery, piles, ulcers, diabetes, leprosy and syphilis (Dutta, 2015). In Uganada, tubers of D. Bulbifera are boiled by the local people and eaten to cure HIV. Patients (Nabatanzi, 2016). Raw bulbil in the Republic of Congo are eaten. D. bulbifera application to ringworm for treatment use and application (Terashima et al., 1985). In the Indian traditional medicine sys- . D. bulbifera is used against diarrhoea, struma, dysentery, | throat infection and tuberculosis (Sharma and Bastakoti,

2009; Panduraju et al., 2010; Lim, 2016). It also acts as an antihel minthic from the tribal people of Satpuda Hills, India D. bulbifera tuber in Dehradun, Uttarakhand is Taken orally by Bhoxa community as a therapy for diarrhea and dysentery (Gairola et al., 2013). Boiled and pounded roots of D. bulbifera are administered orally in salt solution to treat cough (Singh et al., 2009). Its shoots and leaves are pounded and rubbed on hair to remove dandruff (Dutta, 2015). The leaves of D. bulbifera are also Used in the traditional system as a treatment for skin diseases. In The tubers also help in enhancing the appetite by eating. Raw (Mishra et al., 2008). Ethnobotanical uses of D. bulbifera The Bulbifera in traditional medicine are also listed impartially winged.

- **Ethnobotanical uses of D. bulbifera**

Medicinal plants have always been prized as a treasure throughout history.For most of the human race, represents traditional medicine and cru .Now, they are also the main source for the manufacture of pharmaceutical drugs. The various plant parts have been used for the treatment of various diseases from past few centuries. The genus Dioscorea is long with potential ethnomedicinal values and scores several Various medicinal applications of studies have been realized throughout the Tropics: Girach et al., 1999; Tiwari and Pande, 2006; Mishra et al., 2008; Sharma and Bastakoti, 2009; Teron, 2011; Dutta, 2015). Among the several species of Dioscorea, D. bulbifera has been most exploited. in the traditional medicine for the treatment of a variety of ailments. Given its several ethnomedicinal uses, D. bulbifera has received more attention of the past two decades. It is known for being salty and bitter D. bulbifera is thus used traditionally to treat a cough, epistaxis, hemoptysis, pharyngitis, skin infections, piles, throat infections and to remove dandruff. In addition to this, it is also used in the treatment of several conditions such as detoxify poi- son, clot blood to arrest bleeding and be able to remove pathogenic heat and can- cer in Chinese traditional medicine (Editorial Board of Chinese Materia Medica, 1999. D. bulbifera tubers are roasted and cooked. as vegetable and serves to cure cough, dysentery, piles, ulcers, diabetics, leprosy and syphilis (Dutta, 2015). In Uganada, tubers of D. Bulbifera is boiled and ingested by local people to treat HIV. patients (Nabatanzi, 2016).Raw bulbil in the Republic of Congo The use of D. bulbifera is applied to treat ringworm to cure (Terashima et al, 1985). In the Indian traditional medicine sys- Tem, D. bulbifera has been used against diarrhoea,struma,dysentery, throat infection and tuberculosis . It is used as an antihel- minthic by tribal people of Satpuda Hills in India In Dehradun, Uttarakhand, D. bulbifera tuber is taken orally for diarrhea and dysentery treatment among the Bhoxa community. The roasted and ground tubers of D. bulbi- They are given orally with salt to treat coughs. Its twigs and young shoots are crushed and applied to hair to remove dandruff. The leaves of D. bulbifera are also used in traditional system for the treatment of skin diseases. In addition, the tubers are eaten to stimulate appetite.

➢ **Traditional uses in ethnomedicinal**

- Dioscorea bulbifera, also known as air potato, air yam, or potato yam, has been used extensively in traditional medicine across Asia, Africa, and the Americas to treat a variety of ailments.
- Diabetes: The tubers are used to lower blood sugar levels in diabetic patient
- Cancer: Extract from the plant have shown anti-cancer properties and are used to treat various types of cancer.
- Arthritis and inflammation: The plant has been used as an analgesic and anti-inflammatory agent to treat arthritis and other inflammatory condicondition.

- Skin diseases: Topical applications of D. bulbifera extracts are used to treat skin diseases and inflection.
- Wounds and burns: The plant is used to promote healing of wounds, cuts,
- and burns.
- Digestive disorders: D. bulbifera is used to treat stomach aches, constipation, and other digestive issues.
- Respiratory problems: Extracts from the plant are used to treat coughs, asthma, and other respiratory ailments.

The plant is commonly found in tropical and subtropical regions of Asia, Africa, and the Americans. It grows well in shaded areas but can also thrive in open regions.

The tubers and aerial bulbils are the main parts used for medicinal purpose

Regional Ethnomedicinal Uses:

1.Ayurveda: Antibacterial, used for pulmonary and respiratory diseases, fever, and skin diseases.

2.Traditional Chinese Medicine: Diseases of the digestive system, diarrhea, and respiratory ailments.

3.African Traditional Medicine: Malaria, fever, and rheumatisms.

4.Folk medicine (Southeast Asia): Several conditions, diarrhea, fever, and skin disease.

• Ethnobotanical uses of D. bulbifera.

Tablet 1

Plant part	Ethnomedicinal uses	Mode of action
Leave	Paste of leaves used to cure skin related infection.	-
Stem	Twigs & tender are crushed & applied hair to remove dandruff.	-
Tuber	Used to cure skin infection	-
Tuber	Used to enhance appetite by eating raw.	Oral
Tuber	Used to treat throat pain.	Oral
Tuber	Tuber are boiled & used to treat abdominal pains.	Oral
Tuber	Bulbils are roasted, cooked as vegetable & server to cure cough, piles, ulcer.	Oral
Tuber	Dried tuber & take are cut into pieces & taken early morning to cure piles.	Oral
Tuber		
Tuber	Bulbils are boiled & served HIV.	Oral

Pharmacological studies of D. bulbifera

In conformation with the ethnomedicinal uses, tubers have been employed in traditional medicinal system and for the pharmacological activities (Table 1) and also for the other biological activities. Traditional medicinal system, various

solvent extracts have been formulated from the leaves and rhizomes for numerous biological D. bulbifera is used for several biological activities is D. bulbifera is used for several biological activities is primarily due to their pharmacologically active compounds with huge pharmacological activities (Komori, 1997; Subasini et al., 2013; Ghosh et al., 2014). Some important biologically active compounds from D. Bulbifera.



Fig 2. *Dioscorea bulbifera* (A) Leaf (B) Tuber (C) Whole plant.

Chemical composition and phytochemical analysis.

Dioscorea rhizomes contain 75% of starch. They are non-edible, due to their very bitter taste. The main constituents of dioscorea are diosgenin, a steroidal sapogenin (4 to 6%) and its glycosides, Smilagenin and β- isomer yammogenin. Rhizomes also contain an enzyme sapogenase. Tubers are also rich in glycosides, and phenolic compounds. Diosgenin is the hydrolytic product of saponin-dioscin [8]. Dioscin is made of two. It contains two molecules of L-rhamnose and one molecule of D. glucose. Gracillin contains two molecules of D. glucose and one molecule of L-rhamnose [9]. Ozo.et al [10] in 1985 reported flavonoid constituents Cyanidin-3- glucoside and the procyanidin dimmers B-1 and B-3 in Dioscorea alata L. A report shows that Dioscorea also contains dioscorins which exhibit carbonic anahydrase and trypsin inhibition activities [11] . Other studies.

Report the existence of saponins, alkaloids, flavonoids, tannin, and phenols in Dioscorea. belophylla [12]. Also Yoon et al [13] in 2008 reported Allantoin, in Dioscorea rhizome.

Table 2 -: Phytochemicals present in D. bulbifera and their biological activities.

Phytochemical	Class	Biological activities
Kaempferol	Flavonoids	Anti-tumor, Anti-inflammatory,
Protocatechuic acid	Benzene and substituted derivatives	Cancer, Chemopreventive
Vanillic acid	Benzene & substitute derivatives	Anti-hypertension, Antioxidant.
Diosgenin	Steroid and steroids derivatives	Anti-proliferative, Apoptotic, anti-metastatic, Anti-bacterial, Anti-viral, Anti-diabetic, Anti-obesity,

Stigmasterol	Steroid & steroid derivatives	Apoptosis, Anti-Alzheimer's, Neuroprotective, Antibacterial
Pennogenin	Steroid & steroid derivatives	Anti-tumor, Anti-fungal
Palmitic acid	Fatty acyl	Food & nutritions
B-sitosterol	Steroid & steroid derivatives	Anti-cancer, antidepressants
Diosbublin A & Diosbublin B	Naphthofurans	Surfactant & emulsifier
Diosbublin F	Prenol lipid	Surfactant & emulsifier
Myricetin	Flavonoids	Anti-tumor promotion , Neuroprotective
Myricetin 3-O-galactosides	Flavonoids	Antitumor
Myricetin -3-O-glycoside	Flavonoids	Antitumor
Hyperoside	Flavonoids	Anti-inflammatory, antifungal, antiviral
Caryatin	Flavonoids	Antitumor

Pharmacology properties 1.Anticancer activity

D. bulbifera is widely used in traditional medicine for the treatment of cancer. Different solvent extracts of D. bulbifera significantly inhibited the growth of tumor in colon cancer, human liver cancer and other tumor cells. Antitumor promoting activity was attributed by the action of the chemicals Kaempferol-3,5-dime-thylether, Caryatin, (+) Catechin, Myricetin, Quercetin-3-Ogalacto-side, Myricetin-3-O-galactoside and Myricetin-3-O-glucoside on mouse epidermal JB6 (Cl-22 and Cl-41) cell lines. However, very few compounds from D. bulbifera failed the test. It exerts antitumor activities against a variety of cancer cells, such as human breast cancer cells MCF-7, SiHA, and human epidermal carcinoma cells A431.

2.Anti-obesity

Obesity has become the most significant disease for quite a number of decades. The foremost cause of obesity is inappropriate and, in some cases, excessive consumption of dietary fats. Two phytochemicals have been identified as to have potency against this disease. Dioscin was shown to prevent mice fed on a high-fat diet from NAFLD. It was Reported that dioscin showed effective lipid-lowering and alleviated liver lipid accumulation symptoms. While it also increased energy consumption and oxygen consumption in the mice. Diosgenin has been reported to reduce the hepatic and the plasma total cholesterol levels in rats on high cholesterol diets. However, it has increased the high density lipoprotein cholesterol levels in the plasma.

3.Aphrodisiac activity

Erectile dysfunction or male impotence is considered as the inability of man to achieve and Maintain an erection sufficient to allow mutually

satisfactory intercourse. With his partner. Sexual health and function are important determinants of quality of life. Overcome the problem of sexual or erectile dysfunction various natural aphrodisiac potential are prefered. The present review discuss about aphrodisiac potential of plants, its biological source, common name, part used and references. Which is helpful for researcher to development new aphrodisiac formulation.

4.Nuropharmcology activity

The hydro alcoholic extract of Dioscorea bulbifera exhibited strong neuropharmacological activity, which contained CNS depressant as well as anxiolytic activity. At 100 and 300 mg/kg, it decreased spontaneous motor activity in mice and extended pentobarbital-induced hypnosis. It increased exploratory behavior in anxiety tests; so, it is used as an anxiolytic agent. Phytochemical analysis contains terpenoids, flavonoids, and alkaloids; so, these compounds were responsible for neuroactive activity.

5.Diabetic

A wide range of studies have Indicated that diets containing fenugreek seeds and yam \ Roots rich in Diosgenin possess anti-diabetic effects in experimental Models [54, 55]. Diosgenin administered to streptozotocin-induced diabetic Rats has produced a considerable decrease in plasma glucose than other diabetic Controls [56]. In addition to this, these findings were supported by the fact that the Steroid increases the activities of the key enzymes associated with glucose Metabolism which are generally subdued by diabetes .In addition, studies on lipid accumulation in 3T3-L1 preadipocytes of type 2 diabetic rats have shown that diosgenin at concentration of 0.1 to 10 μmol·L−1 can cause the expression of PPARγ (peroisome proliferative-activated receptor gamma) and adipocyte differentiation and leads to a hypolipidemic effect of diosgenin [57]. Chronic inflammation in adipose tissue was found to be the second cause of obesity-related insulin resistance and type 2 diabetes.

6.Effect of cardiovascular system

Several researches showed that, diosgenin significantly affects lipid profile through lowering TC in plasma and LDL and also increases the ratio of HDL to total cholesterol due to its cholesterol absorption-reducing and cholesterol secretion-increasing activities [59]. Concentration-dependent vasorelaxation in superior mesenteric Rings are compared to phenylephrine as a positive control. Diosgenin acts by Increasing intracellular calcium concentrations in mesenteric Endothelial cell loaded with FURA-2. Apart from it, level of nitric oxide (NO) is Also increased by diosgenin [60]. Diosgenin was studied for Vasodilatory effect via porcine resistance left anterior descending coronary artery and it was found that diosgenin through protein kinase signaling cascade and an opening of BK (Ca) channel of arterial smooth muscle cells resulted in an acute end the linum in dependent coronary artery relaxation [. Diosgenin effects on mouse were studied by myography and confocal microscopy for contraction of smooth muscle cell and calcium signaling in isolated aorta. Diosgenin was also found to have potential therapeutic uses for vascular diseases by inhibiting receptor-mediated calcium signals and smooth muscle contraction in the isolated aorta.

7.Effect on blood system

Diosgenin is shown to have anti-thrombosis effect in both in vitro and in vivo studies using thrombotic rat inferior vena cava and pulmonary thrombosis mice models. The model resulted in suppressed platelet aggregation, thrombosis and extended activated partial thromboplastin time (APTT), prothrombin time (PT) and thrombin time (TT) in the models depending on the dose used. Anti-thrombotic effect of Diosgenin has also been proven as it prolongs the coagulation time and bleeding time.

8.Effect on reproductive system

Diosgenin was tested on ovariectomized rats and was shown to Posses action on the calpain isoform expression in ovariectomized rats. As Compared to the normal controls expression of mu- or m-calpain was Seen to be lesser in the ovariectomized group [66]. Diosgenin was seen to significantly raise the mammary development scores, when studied for its impact on the growth of mammary epithelium for approximately a fortnight via factors of multiplication in DNA.

Clinical trial

Recent clinical trials involving Dioscorea bulbifera have highlighted its therapeutic potential. A study in Thailand demonstrated its effectiveness in wound healing, showing significant improvement in wound size and infection control among patients [4]. Additionally, research indicates its anti-diabetic properties, particularly in inhibiting enzymes related to Type II diabetes management [1]. Dioscorea bulbifera has also been noted for its anti-cancer effects, specifically through the action of Diosbulbin C, which inhibits lung cancer cell proliferation [5]. These findings underscore the plant's diverse medicinal applications and the need for further exploration.

Toxicity and safety of discroa bulbifera

Dioscorea bulbifera is the most frequently used species of Dioscorea in traditional medicine, but its use has been associated with reports of heavy hepatotoxicity. It has been suggested that toxic furan diterpenoids like diosbulbin B and 8-epidiosbulbin E in the rhizome of Dioscorea bulbifera cause liver damage through oxidative stress and metabolic activation of cytochrome P450 enzymes [1][2][3]. Over 100 cases of liver injury linked to this herb have been published in China [2]. The LD50 is approximately 80 mg/kg orally in mice, which has indicated the toxic side of this herb, at least. This herb is toxic and should be used with precaution. Hepatotoxicity is the most common form of toxicity of this plant and is evidenced as jaundice, vomiting, nausea and liver dysfunction . The result of one study showed that chloroform fraction of the methanolic extract of D.bulbifera was toxic when used on SD rats. In addition Of the rhizome of D. bulbifera also possessed toxic compounds (Wang et al., 2010). In addition, aqueous fractions of ethanol extracts of D. bulbifera also induced probable damage in mice liver function and mice liver tissue structure Fractions (saponins and flavonoids) were reported to interfere with liver function through considerable changes of liver index, liver weight, biochemical indexes, appearance and diet. What is weird is that the level of D. bulbifera toxicity was dose-dependent and time of administration for drugs. Moreover, this disobulbin D product also possessed cytotoxic potential on hepatocytes and induced elevation in the levels of liver enzymes and Intracellular release levels of LDH However, D. bulbifera has anti-nutrition factors which is safe for human consumption. According to recent studies, it is safe for the consumption of the D. bulbifera Not conclusive. However, high efforts are required to conduct well documented toxicity and mutagenic test for safety evaluation of D. bulbifera. Besides, several mechanisms clinical studies are also required to determine the valid use of D. bulbifera safely.

Drug Interactions study

Dioscorea bulbifera, also known as air potato or bitter yam, is a plant with potential medicinal properties. However, it may interact with certain drugs, affecting their efficacy or increasing the risk of adverse effects**.**

- Synergistic Compatibility detoxification, that is, combining D. bulbifera With other herbal medicines has been reported to enhance therapeutic effects and reduce toxic effects.
- Combination with Angelica sinensis can improve anti-tumor effect of D. bulbifera and decrease renal toxicity and kidney toxicity.

- Combination with Glycyrrhizins uralensis reduced Liver damage and renal toxicity of D. bulbifera.

Potential Drug Interactions

1. Blood Thinners (Warfarin, Aspirin): Dioscorea bulbifera may increase bleeding risk.
2. Diabetes Medications (Metformin, Insulin): May enhance hypoglycemic effects.
3. Blood Pressure Medications (ACE inhibitors, Beta blockers): May potentiate hypotensive effects.
4. Anticoagulants (Heparin, Coumadin): Increased risk of bleeding.
5. Immunomodulators (Cyclosporine, Tacrolimus): May affect immune system function.
6. Antacids and Acid Reducers (Omeprazole, Ranitidine): May interfere with nutrient absorption.

Pharmacological Interactions

1. Alkaloids in Dioscorea bulbifera may interact with:

- Opioid receptors (morphine, codeine)
- Dopamine receptors (antipsychotics)
- Serotonin receptors (antidepressants)

2. Saponins may interact with:

- Cholesterol-lowering medications (statins)
- Anti-inflammatory medications (NSAIDs)

Precautions and Contraindications:

1. Pregnancy and Breastfeeding: Insufficient data; consult healthcare provider.
2. Surgery: Stop using Dioscorea bulbifera 2 weeks before surgery.
3. Bleeding Disorders: Use with caution.
4. Diabetes: Monitor blood sugar closely.
5. Hypotension: Monitor blood pressure**.**

Future Direction

Dioscorea bulbifera, also known as air potato is threatened due to overharvesting of tubers because of its medicinal properties; such as antidiabetic, anticancer properties, among others[1][5]. There must be education to the local communities on the importance and efforts must be made for sustainable harvesting, micropropagation, in order to restore its population [5]. Possible long-term research in the phytochemical properties may lead to the derivation of novel bioactive compounds for medicinal use. Its invasive nature in some regions should also be handled for its proper management in ecologies.

CONCLUSION

Dioscorea bulbifera is of high medicinal value since the plant species has been used conventionally in the treatment of several diseases, including diabetes, cancer, and inflammation. Research work has revealed that some of the phytochemicals found within the species of Dioscorea bulbifera include diosgenin and flavonoids such as quercetin and kaempferol, giving the plant anti-cancer, anti-inflammatory, and antioxidant activities. While the species holds a lot of medicinal value, extinction faces this plant because the species of Dioscorea bulbifera has been over-harvested for medicinal use. It will conserve this species, which will benefit the future generations while, further study is required to explore the complete therapeutic potential and safe usage of this species.

REFERENCES

1. Abhyankar, R.K., Upadhyay, R., 2011. Ethno medicinal studies of tubers of Hoshanga bad, M.P. bulletin of environment Pharmacology and Life Sciences 1,
2. Adeniran, A.A., Sonibare, M.A., Rajacharya, G.H., Kumar, S., 2018. Assessment of genetic Fidelity of Dioscorea bulbifera L. and Dioscorea hirtiflora Benth. And medicinal bioactivity produced from the induced tuberous roots. Plant Cell Tissue and Organ Culture 132,
3. Kumar, V., Chandra, S., 2013. Efficient regeneration and antioxidant activity of the Endangered species Swertia chirayita.

International Journal of Pharma and Bio-Sciences 4, 822–833.

4. Dutta, B., 2015. Food and medicinal values of certain species of Dioscorea with special Reference to Assam. Journal of Pharmacognosy and Phytochemistry 3, 15–18.
5. Filomeni, G., Graziani, I., de Zio, D., Dini, L., Centonze, D., Rotilio, G., Ciriolo, M.R., 2012.Neuroprotection of kaempferol by autophag in models of rotenone-mediated Acute toxicity: Possible implications for Parkinson's disease. Neurobiology of Aging 33, 767–785.
6. Kim, Y.S., Li, X.F., Kang, K.H., Ryu, B.M., Kim, S.K., 2014. Stigmasterol isolated from Marine microalgae Navicula incerta induces apoptosis in human hepatoma HepG2 Cells. BMB Reports 47, 433– 438.
7. Kamble, S.Y., Patil, S.R., Sawant, P.S., Sawant, S., Pawar, S.G., Singh, E.A., 2010. Studies on Plants used in traditional medicine by Bhilla Tribe of Maharashtra. Indian Journal Of Traditional Knowledge 9, 591–598.
8. CK Kokate, AP Purohit, SB Gokhale. Pharmacognosy. 42 ed. Nirali Prakashan, 2008.
9. AN Kalia. Text Book of Industrial Pharmacognosy, CBS Publishers and distributors, 2011.
10. ON Ozo, JC Caygill, DG Coursey. Phenolics of five yam (Dioscorea) species, Phytochemistry. 1984; 23:329-331.
11. JAR Salvador, JFS Carvalho, MAC Neves et al., Anticancer steroids: linking natural and semi-synthetic com-pounds, Natural Product Reports. 2013; 30(2):324-374.
12. S Selim, S Al Jaouni. Anticancer and apoptotic effects on cell proliferation of diosgenin isolated from Costus specious (Koen.) Sm, BMC Complementary and Alternative Medicine. 2015; 15(1):article no. 301.
13. Y Chen, YM Tang, SL Yu et al., Advances in the pharmacological activities and mechanisms of diosgenin, Chinese Journal of Natural Medicines 2015; 13(8):578-587.
14. J Raju, R Mehta. Cancer Chemopreventive and therapeutic effects of diosgenin, a food saponin, Nutrition and Cancer. 2009; 61(1):27-35.
15. PS Chen, YW Shih, HC Huang, HW Cheng. Diosgenin, a steroidal saponin inhibits migration and invasion of human prostate cancer pc-3 cells by reducing matrix metal-loproteinases expression, PLoS ONE. 2011;6(5):Article ID e20164.
16. DS Kim, BK Jeon, YE Lee, WH Woo, YJ Mun. Diosgenin induces apoptosis in HepG2 cells through generation of reactive oxygen species and mitochondrial pathway, Evidence-Based Complementary and Alternative medicine. 2012; Article ID 981675.
17. Wang G, Lin B, Liu J, Wang G, Wang F, et al. (2009) Chemical constituents from tubers of Dioscorea bulbifera. Zhongguo Zhong Yao zazhi 34(13): 1679-1682.
18. Ahmed Z, Chishti MZ, Johri RK, Bhagat A, Gupta KK, et al. (2009) Antihyperglycemic and antidyslipidemic activity of aqueous extract of Dioscorea bulbifera tubers. Diabetologia Croatica 38(3): 69-72.
19. Okon JE, Ofeni AA (2013) Antidiabetic effect of Dioscorea bulbifera on Alloxan-induced diabetic rats. CIB Tech J Pharmaceutics 2(1): 14-19.
20. Song CS, Liu XF, Du YT, Zhao FZ, Wang SH, et al. (1983) The experiment of hepatic and renal toxicity induced by D. bulbifera. Bull Chin Mater Medica 8: 34-36.
21. Li YJ, Liu SM, Luo MM, Liu HF (2005) The express and principle study of Liver toxicity

of Dioscorea bulbifera L. Chin J Exp Med Formulae11: 40-42.

22. Wang JM, Ji LL, Liu H, Wang ZT (2010) Study of the hepatotoxicity induced by Dioscorea bulbifera L. rhizome in mice. Bio sci Trends 4(2): 79-85.
23. Su L, Zhu JH, Cheng LB, Li YH (2003) Experimental pathological study of subacute intoxication by Dioscorea bulbifera L. J Forensic Med 19: 81-83

HOW TO CITE: Sanjana Dupare*, Dr. Shivshankar Mhaske, Vikas Gawande, Radha Gaykwad, Tejas Sharma, Dioscore Bulbifera as Natural Remedy: An Investigation into It Therapeutic Review, Int. J. of Pharm. Sci., 2025, Vol 3, Issue 1, 534-545. https://doi.org/10.5281/zenodo.14616587