**REVIEW OF VARAHIKANDA (DIOSCORIA BULBIFERA) FOR ITS PHARMACOLOGICAL PROPERTIES**

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**ABSTRACT**

Dioscorea bulbifera (Linn) is an important medicinal plant. The medicinal uses of Varahikanda are of utmost importance. In Ayurvedic literature it is used to cure some disease. A review of research work done regarding anciet and ayurvedic properties of varahikanda, i.e. Dioscorea bulbifera is mentioned here. The study shows that Varahikanda posseses various pharmacological properties. According to Ayurveda Jeevaneeya, Rasayana, Balya, Krumighna, Framehaghna, Kushtagha, Vrushya, Nadvrurn, Visarpa, Udarshool, Raktapitta. According to modern science it possesses Antimiorobial activity, Wound healing activity, Antihyperglycemic activity, Dyslipidemic activity, Anticancer activity, Immunomodulatory activity, Antioxidant activity and Antiinflammatory and Analgesic activity, Anthelmintic activity, Aphrodisiac activity.

**KEYWORDS:** Varahikanda, Dioscorea bulbifera, pharmacological actions.

**INTRODUCTION**

Discorea bulbifera (linn), family Discoreaceae commonly known as varahikanda. It is an important medical plant. Almost all parts of of varahikanda are of medicinl importance and
used traditionally for the treatment of various ailments in ayurvedic medicine it used commonly. *Sushrata* and *vagabhata* both highlighted its importance as “Rasayana” and *Jeevaneeya Dravya*. *Acharya sushruta* states its important in ‘sarwopaghata shamaniya rasayana adhyaya’ and ‘Nirvutta santapeeyarasayana Adhyaya’ of “chikitsasthana”. *Acharya vagabhata* give its importance in *mutraghatachikisitam adhyay* as *pittashmari bhedan yoga*, *Visarpchikisitam adhyay* as *Pittajavisarpanashak yoga*, and *Rasayanavidhi adhyay* as *Rasayan yoga*.

**Properties and uses of Varahikanda mentioned in samhita and nighantu.**

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of Samhita and Nighantu</th>
<th>Properties and Uses</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td><em>Sushruta Samhita</em></td>
<td>Prameha, Kushta, Krumiorog, Visarpa, Nadivrun, Rasayana.</td>
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<td>2.</td>
<td><em>Vagabhata Samhita</em></td>
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<td>3.</td>
<td><em>Bhavprakasha Nighantu</em></td>
<td>Kushta, Medohar, Krumirog, Udarshool, Pravahika, Raktapitta, Prameha, Raktatisar.</td>
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<td>4.</td>
<td><em>Dhanwantari Nighantu</em></td>
<td>Kushta, Krumiroga, Hrudya, Balya, Rasayan.</td>
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<td><em>Raja Nighantu</em></td>
<td>Kushta, Prameha, Vrushya, Balya, Rasayana.</td>
</tr>
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</table>

**Vernacular Names**\(^{[6]}\)

- **ENGLISH**: yam
- **HINDI**: ratalu, sauralu, pitaalu, zamin kand
- **BENGALI**: banalu, kukuralu, gaicha, alu
- **GUJARATI**: goradu
- **KANNAD**: heggenasu
- **MALYALAM**: kattu kachil
- **MARATHI**: Manakund, konfa goradu, karanda, karukarinda, gathalu.

**Botanical discription**\(^{[7]}\)

Tubers variable, Bulbils numerous, irregular in shape, 2.5cm, or more across, brown, warted. Stem twining to the left. Leaves usually alternate, about 10-15 by 7-5-10 cm., often much larger or smaller, ovate, acuminate, base more or less deeply chordate, lobes rounded, 7-11 nerved. Male spikes 5-10 cm. long, clustered, axillaries of in leafless panicles. Stamens 6. Female spikes 10-25 cm, long in axillary clusters of 2-5. Capsule 1.8-2-2cm long, oblong. Seeds winged at the base.
Pharmacological actions

- **Wound healing activity**[8]
  
  The tubers of Dioscorea bulbifera are used as a folk remedy to cure wounds, leucoderma and boils. The present study was undertaken to verify the effect of the tubers of Dioscorea bulbifera on experimentally induced excision wound model in rats for periods of 22 days.

  The study of wound healing model reveals significant wound healing activity, high rate of wound contraction and decrease in the period for epithelisation of the extracts of tubers that are comparable with standard ointment.

- **Anticancer Activity**[9]

  Antitumor Activity of water extract (fraction A), ethanol extract (fraction B), ethyl acetate extract (fraction C), non ethyl extract (fraction D) and compound diosbulbin B isolated from Dioscorea bulbifera Linn. [DB] investigated in vivo this present study the result showed that fractions B and C both decreased tumor weight in S 180 and H22 tumor cell bearing mice, while fraction A and B had no such effect. Furthermore, fraction C altered the weight of spleen and thymus and the amount of total leukocytes, lymphocytes and neutrophils in tumor bearing mice. Further result showed that compound diosbulbin B demonstrated antitumor effect in the dose-dependent manner at dosage of 2 to 16 mg/kg without significant toxicity in vivo. Furthermore on the basis of chemical analysis of the above extracts by high performance liquid chromatography (HPLC) with diode array detector (DAD), diosbulbin B was found to be the major antitumor effects which may be related to influencing the immune system for the first time, and the compound diosbulbin B is the major antitumor compound of Dioscorea bulbifera.

- **Antimicrobial activity**[10]

  The successive extract of Dioscorea bulbifera (bulbils) has been investigated for In vitro antimicrobial activity against Klebsiella pneumoniae, Escherichia coli, Bacillus aureus, Proteus vulgaris, staphylococcus aureus, Aspergillus niger, Aspergillus flavus, A fumigatus and rizopus nigricans. The petroleum ether and chloroform extracts showed significant activity against A. Fumigatus and R. Nigricans.

  The petroleum ether and distilled water extract showed good activity against K. Pneumoniae. The chloroform extract showed feeble activity against S. Aureus.
• **Aphrodisiac activity**\(^{[11]}\)

Erectile dysfunction or male impotence is defined as the inability of man to achieve and maintain an erection sufficient mutually satisfactory intercourse. With his partner. Sexual health and function are important determinants of quality of life. To overcome the problem of sexual or erectile dysfunction various natural aphrodisiac potential are preferred. The present review discuss about aphrodisiac potential of plants, its biological source, common name, part used and references. which are helpful for researcher to development new aphrodisiac formulation. In dioscorea bulbifera linn is mentioned as aphrodisiac.

• **Antioxidant activity**\(^{[12]}\)

Dioscorea bulbifera is major staple food crop which is species of yam wildly distributed around the world in tropical and subtropical regions. Dioscorea bulbifera have been traditionally used to lower glycemic index thus providing more sustained form of energy and better protection against obesity and diabetes it also has anticancer property. The present study was undertaken to investigate the antioxidant activity of dioscorea bulbifera. The ethanol extract of tuber of dioscorea bulbifera were screened for their enzymatic and non enzymatic activity. The level of enzymatic antioxidant glutathion peroxidase (GPX), catalase (CAT), superoxide dismutase (SOD) and glucose-6-phosphate dehydrogenase (G6PD) and glucose-s-transferase (GST) was found to be very impressive dioscorea bulbifera contains good and commendable store of non enzymatic antioxidant namely reduced glutathione (GSH), Vitamin C, Vitamin E. Our result have good significance as this increase the innate antioxidant potential of dioscorea bulbifera which is useful in providing the antioxidant need in the diet and thereby dioscorea bulbifera accomplishes high value nutritive and natural store of antioxidant.

• **Anthelmintic activity**\(^{[13]}\)

Ethnobotanical information from nigeria specifies the usage of dioscorea bulbifera bulbifera linn in treatment of parasitic diseases in human and thus could be of value in the development of resistance to common synthetic anthelmintic activity of methanol extract of the flesh and peel of the bulbils of Dioscorea bulbifera on fascicola gigantica and perithima posthama at concentrations ranging from 10 to 100 mg/ml. Albendazole and normal saline were induced in assay as standard reference drug and control respectively. Thin layer chromatography was used to screen the methanol extracts of flesh and peel of bulbils of dioscorea bulbifera for secondary metabolites in comparision with gallic acid and querectin. The median lethal
concentration values of the flesh and peel extracts of dioscorea bulbifera were 39.67 and 30.40 mg/ml for earthworm and 61.73 and 41.79 mg/ml for liver fluke respectively. The peel was more potent at 100 mg/ml causing paralysis in 5.6± 0.51 min and death in 10±0.45 min in earthworm the finding from this study shows dioscorea bulbifera possess in vitro anthelmintic compound worthy of for the evolutions.

- **Antihyperglycemic and dyslipidemic activity**[14]
Dioscorea bulbifera the air potato has been used in the chinese system of medicine to treat disease of lungs, kidney and spleen and many types of diarrhea. Commonly known as yams. These plants have been traditionally used to lower glycemic index thus providing a more sustained form of energy and better protection against obesity and diabetes. The present study was carried out to scientifically evaluate the aques extracts of dioscoirea bulbifera tubers (DBE A003) for its antihyperglycemic activity in glucose primed and streptozocin (STZ) treated wistar rats and antidyislipidemic potential in high fat diet feed C57BL/6J mice, respectively. The antihyperglycemic condition by priming wistar rats with 1.59/kg P.O. glucose and rendering them diabetic by infection of STZ (45mg/kg) intraperitonelly. Dyslipidemic condition was in C57 BL/65 mice by feeding them high fat diet. DBEA003 at 250,500 and 1000 mg/kg doses administrated for 3 weeks to STZ treated rats and for 4 weeks to high fat diet feed C57BL/6J miceshowed significant antihyperglycemic and dyslipidemic effects.

In STZ treated rats with severe diabetes. The 7 week DBEA003 treatment produced severe reduction in blood glucose level and increase in body weight serum glucose and lipid levels were reversed towards normal in DBEA003 treated high fat diet fed mice.

- **Immunomodulatory activity**[15]
Cyclophosphamide (CTX) is commonly used in cancer chemotherapy, which causes immunosuppression and tissue oxidative stress at high doses. As potential protective agents, some polysaccharides were shown to have anti-tumor, anti-inflammatory and/or anti-oxidant properties. This study explored potential effects of oral treatment of Dioscorea bulbifera polysaccharides (DBLP at 100 or 150 mg/kg) in U14 cervical tumor-bearing mice treated with CTX (25 mg/kg). While CTX suppressed tumor growth (65.4% inhibition) and DBLP alone also inhibited tumor (25.6% at 100 mg/kg or 37.6% at 150 mg/kg), CTX+DBLP combination produced tumor inhibition rates of 5.6 (for 100 mg/kg DBLP) or 9% (for
150 mg/kg) higher than CTX alone. While tumor itself and CTX treatment reduced thymus and/or spleen/body weight indices, DBLP alone or CTX + DBLP combination attenuated this reduction. DBLP lowered peripheral blood T-cell subpopulation CD4+/CD8+ ratio, and DBLP+CTX combination attenuated CTX effect in lifting CD4+/CD8+ ratio. Tumor itself and CTX treatment heightened oxidative stress (with decreased superoxide dismutase but increased lactate dehydrogenase and malondialdehyde levels in serum and tissues), which was attenuated by DBLP treatment, and DBLP+CTX combination suppressed CTX-induced oxidative stress. Combination use of DBLP with CTX can potentially enhance CTX anti-tumor effect and can attenuate CTX-induced immunosuppression and oxidative stress in U14 cervical tumor-bearing mice.

- **Analgesic and Anti-inflammatory activity**[^16]

The aqueous and methanol extracts from the dry bulbils of Dioscorea bulbifera L. var sativa (Dioscoreaceae)—evaluated orally at the doses of 300 and 600 mg/kg against pain induced by acetic acid, formalin, pressure and against inflammation induced by carrageenan, histamine, serotonin and formalin in mice and rats, showed a dose dependant inhibition of pain and inflammation with a maximum effect of 56.38%, 73.06% and 42.79% produced by the aqueous extract, respectively on pain induced by acetic acid, formalin and pressure. while the methanol extract at the same dose respectively inhibited these models of pain by 62.70%, 84.54% and 47.70%. The oral administration of aqueous and methanol extracts caused significant anti-inflammatory activity on paw oedema induced by histamine, serotonin and formalin. The present results show that the bulbils of Dioscorea bulbifera var sativa possess potent analgesic and anti-inflammatory activities. These activities may results from the inhibition of inflammatory mediators such as histamine, serotonin and prostaglandins. Thus, the analgesic activity of the bulbils of Dioscorea bulbifera may be at least partially linked to its anti-inflammatory activity.

These properties can be compared as follows.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Ayurvedic Properties</th>
<th>Modern Properties</th>
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<tbody>
<tr>
<td>1.</td>
<td>Pramehaghnna</td>
<td>Antidiabetic activity</td>
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<td>2.</td>
<td>Jeevaneeya</td>
<td>Antioxidant activity</td>
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<td>3.</td>
<td>Rasayana, Balya</td>
<td>Immunomodulatory activity</td>
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<td>4.</td>
<td>Prvahika, Visarpa, Kushtghna</td>
<td>Antimicrobial activity</td>
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<td>5.</td>
<td>Nadivruna</td>
<td>Wound healing activity</td>
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<tr>
<td>6.</td>
<td>Raktaapitta, Raktatisar</td>
<td>Anticancer activity in blood cancer</td>
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<tr>
<td>7.</td>
<td>Medohar</td>
<td>Dyslipidemic activity</td>
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<tr>
<td>8.</td>
<td>Udarshool, Nadivrun</td>
<td>Anti-inflammatory and</td>
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<td></td>
<td>Activity</td>
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<tr>
<td>9</td>
<td>Krumighana</td>
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<td>10</td>
<td>Vrushya</td>
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</table>

**DISCUSSION**

The Ayurvedic references shows that the plant *Varahikanda* possesses, Rasayana, Jeevaneeya, Pramehaghna, Kushtaghna, Balya, Vrushya, Raktapittahar, Udarshoolahar, Pravahikahar, Nadivrunhar, Medohar and Krumiroghar properties. Modern studies states the properties of *Varahikanda* as Immunomodulatory activity, wound healing activity, Antioxidant activity, Antidibetic activity, Dyslipidemic activity, Analgesic and Anti inflammatory activity, Aphrodisiac activity, Anthelmintic activity, anti carcinogenic activity, Antimicrobial activity.
CONCLUSION

The literary study of Varahikanda from Ayurvedic texts and modern researches concludes that Varahikanda i.e. Dioscorea bulbifera Linn. has following properties. According to Ayurveda Rasayana, Jeevaneeya, Pramehaghna, Kushtaghna, Balya, Vrushya, Raktapittahar, Udarsheolahar, Pravahikahar, Nadivrurnhar, Medohar and Krumiroghar and According to modern Immunomodulatory activity, wound healing activity, Antioxidant activity, Antidibetic activity, Dyslipidemic activity, Analgesic and Anti inflammatory activity, Aphrodisiac activity, Anthelmintic activity, anti carcinogenic activity, Antimicrobial activity.

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