

A REVIEW ON PANEER PHOOL**Manisha Y. Sonalkar*, Dr. Sachin A. Nitave and Dr. J. J. Magdum Trust's,**

India.

Article Received on
10 December 2023,Revised on 30 Dec. 2023,
Accepted on 20 Jan. 2024

DOI: 10.20959/wjpr20243-31162



*Corresponding Author

Manisha Y. Sonalkar

India.

ABSTRACT

The present review article highlights the significance of species, botanical name, taxonomical classification, morphology, chemical constituents, phytochemistry, and pharmacological action of Paneer Phool. *Withania coagulans* Dunal. has been shown to exert hypoglycemic, hypolipidemic, free radical scavenging, cardiovascular, central nervous system depressant, hepatoprotective, anti-inflammatory, wound healing, antitumor, immuno-suppressive, cytotoxic, antifungal and antibacterial properties. The twigs are chewed for cleaning of teeth and the smokes of the plant is inhaled for relief in toothache.

KEYWORDS: *Withania coagulans*, Panner Dodi, Paneer Phool.**INTRODUCTION**

Herbs are one of the most effective therapeutic elements in the Indian Ayurvedic system, as documented in literature such as the Vedas and Samhitas. Herbal medicines are used by up to 80% of the population in Indian to meet their health care needs. *Withania coagulans* Dunal belongs to the family Solanaceae is one of the important ayurvedic medicinal plants commonly known as vegetable rennet, Indian cheesemaker, Indian rennet, Paneer ke phool, Paneer band or Paneer dodi widely used over 3,000 years in India. It is found in the Eastern Mediterranean region and extends into South Asia. Across India, it grows in drier regions such as Punjab, Gujarat, and Rajasthan. *Withania coagulans* is commonly known as paneer in Punjab because fruits and leaves have properties to coagulate milk. The milk coagulating properties of the fruit is attributed to the pulp and husk of berries which possess enzyme which has milk coagulating activity. Fruits of *Withania coagulans* exhibit sedative, emetic as well as diuretic properties. They help treat diabetes, nervous exhaustion, disability, insomnia, wasting diseases, failure to thrive in children, impotence. chronic liver disease, dyspepsia, flatulent coli asthma, biliousness, and other gastrointestinal infections. The berries are used to

purify the blood. Chewing the twigs of the plant is used to clean teeth and inhaling the smoke relieves toothaches.

Botanical description

Botanical name: *Withania coagulans*

Family: Solanaceae

Subfamily: Solenoidal

Tribe: Physaleae

Subtribe: Withaninae

Sanskrit Name: Rishyagandha

Hindi Name: Paneer doda

English Name: Indian cheesemaker, Indian rennet, vegetable rennet

Trade Name: Paneer dodi, Paneer doda, Paneer bed, Paneer dhodi.^[1]

Taxonomical classification

Kingdom: Plantae, plants

Subkingdom: Tracheobionta, vascular plants

Superdivision: Spermatophyte, seeds plants

Division: Angiosperm

Class: Dicotyledons

Order: Tubiflorae

Family: Solanaceae

Genus: *Withania*

Species: *Coagulan*

Vernacular Name of *Withania coagulans*

Bengal: Asvagandha

Bombay: Kaknaj

Gwalior: Asgandha

Panjab: Khamjaria, Khamjira

Sindhi: Punirjafota, Punirband

Persian: Kaknajehindi, Punirbd

Arabic: Kaknajehindi

Telgu: Panneru-gadda

Urdu: Hab kaknaj

Geographical sources

It is found in the Eastern Mediterranean and extends to North Africa and Southeast Asia. It is growing throughout India In Dry areas such as Punjab, Gujarat, Rajasthan, Shimla, Kumaon, and Gujarat.

Morphological characteristics

Seeds: Seeds of Dodi paneer 2.5-3.0 mm in diameter, dark brown, slightly pear-shaped, pale. Natural regeneration occurs from seeds.

Leaves

The Leaves of the Paneer Dodi 2.5-5.7 by 1-2.2cm long, lanceolate-oblong, complete, obtuse, uniform color on both sides, thick, small, or more rugose with acute base.



Fig. No. 1.

Flowers

The flowers of the Paneer Dodi are long, campanulate, clothed with fine stellate grey hair, triangular teeth, 2.5 mm long dioecious, in axillary clusters, 0.6mm long, inflexible, slender, calyx 6mm long. The flower's corolla length is 8mm, is vertically measured outside and divided by about a third down; the lobes are oval and subacute. The stem is about the same width as the best of the corolla tube; the filament is 2m long and glabrous; the anthers are 3 mm long. Ovary ovoid, without style or stigma; female flowers stamens about the same size as the upper tube of the corolla; filaments 2 mm long, glabrous; anthers 3-4 mm long. Female flowers: Stamens.

Fruits

Berry 6-8 mm. Globose, smooth, closely curved by the enlarged membrane calyx, the outside-pubescent scurfy-pubescent.^[2]



Fig. No. 2.

Chemical constituents

The berries contain the milk-coagulating enzyme, two esterases, free amino acids, fatty oil, an essential oil and alkaloids. The amino acids present are proline, hydroxyproline, valine, tyrosine, aspartic acid, glycine asparagin, cysteine and glutamic acid. Fatty acid composition are oleic, linoleic, palmitic, stearic and arachidonic acid. The unsaponifiable matter consist of triacontain, three sterols including dihydrostigmasterol and β -sitosterol. The defatted meal from the seeds contains free sugar consisting of D-galactose and D-arabinose, The leaves contain four steroidal lactones called Withanolides, Withaferin A is the most important of the withanolides. It has good antibiotic and anti tumor activities. Withaferin A in concentration of 10ml. inhibited the growth of various gram-positive bacteria, acid fast bacilli, aerobic bacilli and pathogenic fungi.

Therapeutic uses

The fruits is sweet; applied to wounds; used in asthma, biliousness, stranguary. The seeds are emmenagogue, diuretic; useful in lumbago, ophthalmia; lessen the inflammation of piles. The ripe fruits are supposed to possess anodyne or sedative properties. They are alterative, diuretic and believed to be useful in chronic liver complaints. They are used as an emetic. The dried fruits, sold as Punir-ja- fota in Sind, are employed in dyspepsia and flatulent colic, and other intestinal affections. They are prescribed in infusion, either alone or conjoined with the leaves and twigs of *Rhazya stricta*, an excellent bitter tonic. In Bombay, the berries have a reputation as blood purifiers. the wood is used for cleaning the teeth. In the Ormera Hills, the smoke is applied to aching teeth 'to destroy the worm' (Hughes Buller). The twigs are chewed for cleaning teeth, and the smokes of the plant is inhaled for relief in toothache. In Nothern India traditional healers use dry fruits for the treatment of Diabetes mellitus. It has also antimicrobial, anthelmintic, antifungal, hepatoprotective, hypoglycemic, hypolipidemic,

cardiovascular, free radical scavenging, anti-inflammatory, antitumor, immunosuppressive, depressant property. Round capsular fruit and the leaves have the peculiar property of coagulating or curdling milk; a small portion is rubbed with a little water or milk and is added to the milk to be coagulate.

Experimental studies done on *Withania coagulans* Dunal

Antihyperglycaemic Activity

The drug *Withania coagulans* exhibited hypoglycaemic activity which is an effective and safe alternative treatment for diabetes. Hypoglycemic activity of *Withania coagulans* was exhibited in streptozotocin induced rats. Significant improvements in symptoms and signs were observed and euglycemia was attained in diabetes mellitus type. A withanolide, named coagulanolide isolated from *Withania coagulans* fruits has antihyperglycemic activity in rats. The median effective dose of isolated coagulanolide from fruits of *Withania coagulans* was determined about 25 mg/kg in streptozotocin-induced diabetic rats, which is comparable to the standard antidiabetic drug metformin. The 4 week treatment with *Withania coagulans* dried fruit extract significantly reversed hyperglycemia in streptozotocin-induced diabetic rats that was comparable to glipizide¹².

Antihyperlipidemic activity

The aqueous extract of *Withania coagulans* fruits in high fat diet induced hyperlipidemic rats, significantly reduced elevated serum cholesterol, triglycerides, lipoprotein and the LPO levels. The hypolipidemic effect of *Withania coagulans* fruits were found to be comparable with ayurvedic product containing *Commiphora mukul*. The coagulanolide isolated from fruits of *Withania coagulans* has antidyslipidemic effect on mice. The hydroalcoholic extract of *Withania coagulans* dried fruits was effective and comparable to atorvastatin in controlling the high cholesterol diet-induced hyperlipidemia in rats.

Anti-inflammatory activity

The alcoholic extract of *Withania coagulans* showed significant antiinflammatory effect in acute inflammation induced with egg albumin. A withanolide from *Withania coagulans* showed significant anti-inflammatory effects in acute inflammation. The hydro alcoholic extract of *Withania coagulans* fruits showed significant anti-inflammatory activity in carragenin induced rat paw oedema model.

Antifungal and Antibacterial Effects

The essential oil obtained by steam distillation of the petroleum ether extract of the fruits was active against *Micrococcus pyogenes* var. *aureus* and *Vibrio cholerae*. The volatile oil from the fruits of *Withania coagulans* showed antibacterial activity against *Staphylococcus aureus* and *Vibrio cholerae*. Two withanolides (14,15 β -epoxywithanolide I [(20S,22R) 17 β ,20 β -dihydroxy -14 β , 15 β -epoxy-1-oxo-witha-3,5,24-trienolide] and 17 β -hydroxywithanolide K (20S,22R) 14 α ,17 β ,20 β -trihydroxy-1-oxo-witha-2,5,24-trienolide]) have been isolated from the *Withania coagulans*. The second compound was found to be active against a number of potentially pathogenic fungi. The antifungal activity of the crude extract, 17 β -hydroxywithanolide K and withanolide F were tested against nine highly pathogenic fungi. These compounds also showed activity against gram positive bacteria (Atta-ur-Rahman and Choudhary 1998).

Cardiovascular Effects

A steroidal lactone, Withanolide isolated from the aqueous extract of fruits of *Withania coagulans*, has cardiovascular effect. A new withanolide, with a unique chemical structure similar to the aglycones of the cardiac glycoside, isolated from the fruits of *Withania coagulans*. This withanolide produced a moderate fall of blood pressure in dogs which has been blocked by atropine and not mepyramine or propranolol. In rabbits Langendorff preparation and ECG studies, produced myocardial depressant effects but in perfused frogs hearts it caused mild positive inotropic and chronotropic effects.

Immunosuppressive Effects

Withaferin A and withanolide E were reported to have specific immunosuppressive effects on human B and T lymphocytes as well as on mice thymocytes. A known withanolide, coagulin-H, was evaluated for its effect on various cellular functions related to immune responses including lymphocyte proliferation, interleukin-2 (IL-2) cytokine expression. These results were compared with prednisolone. Coagulin-H was found to have a powerful inhibitory effect on lymphocyte proliferation and the Th-1 cytokine production. The inhibition of the phytohaemagglutinin (PHA) activated T-cell proliferation by coagulin-H.^[3]

Table No. 1: Medicinal use of different parts of *Withania coagulans*.^[2]

Sr. No.	Parts of Plant	Pharmacological Activity	Description
1	Fruits and Flowers	Antihyperglycemic activity	Pharmacological effect on blood glucose, lipid profile. Soak about 10-15 pods of paneer dodi in glass of water overnight.
2	Fruits	Cardiovascular effect	The Withanolides produces moderate fall in blood pressure.
		Anti-inflammatory activity	Its external application prescribes for inflammatory conditions.
		Antibacterial and Antihelmintic	It is protective against microbial infections.
		Hepatoprotective activity	It helps in protecting the liver and maintain its general well-being.
		CNS Depressants	It is used in Alzheimer's disease.
		Antimutagenic and Anticarcinogenic effect	Ability to reduce the tumor size.
3	The aerial part of the plant/root	Antihyperlipidemic activity	Reduce the serum cholesterol, Triglycerides, Lipoprotein, and LPU levels.
		Immunosuppressive effect	Withaferin A has a specific immunosuppressive effect on human B and T-lymphocytes.
4	Root	Anti-tumor activity	It shows the remarkable inhibitory activity of DMSO induced cytotoxicity and decrease TNF α production.
		Antimicrobial activity	It has inhibited the growth of various Gram +ve micro tumor activities.

Marketed Preparation of Paneer Dodi

1. Attar Ayurveda: Paner Phool Herb for Diabetes (400gms)
2. Birju Mahavir: Paneer Dodi Phool/ Paneer Doda.

CONCLUSION

Withania coagulans was known by the name 'Panner Dodi' is the most important multipurpose ayurvedic medicinal plant, extensively used in herbal formulations. The different part i.e. berries, leaves, root etc. of *Withania coagulans* posses variety of biological activity. It is an important medicinal herb as large numbers of phytochemicals like esterases, free amino acids, have been isolated from this plant. In various studies it has been seen that the *Withania coagulans* posses several medicinal properties such as hepatoprotective, antiinflammatory, antihyperglycaemic, free radical scavenging, hypolipidaemic activities etc.

REFERENCES

1. Monika Kherade, etal, Comprehensive Review on Withania coagulance, International Journal of Pharmacy & Pharmaceutical Resesarch (IJPPR), 2021; 22(2): ISSN 2349 – 7203, 257-282.
2. Nandini Shimpi, etal, Review on Withania coagulant (Paneer Phool)- for the treatment of diabetes International Journal of Creative Research Thoughts (IJCRT), December, 2023; 11(12): ISSN 2320-2882, 802-813.
3. Vandana Gupta etal, Withania Coagulans Dunal. (Paneer Doda): A Review, International Journal of Ayurvedic and Herbal Medicine, 2013; 3(5): ISSN 2249-5746, 1330–1336.