

Wethania cogulance - A miracle for diabetes

Pratibha Gupta^{1*}, Pratibha Singh²

¹Assistant Professor, Department of Botany, Career College Bhopal, Madhya Pradesh, INDIA.

²Professor and HOD, Department of Botany, Sarojini Naidu Govt. Girls P.G. (Autonomous) college Bhopal, B.U. Bhopal, Madhya Pradesh, INDIA.

Email: guptapratibha951@gmail.com

Abstract

Wethania cogulance (Ashutosh booti/Paneer Dodi) is a plant in the Solanaceae family is regarded as one of the plants with potent anti diabetic properties and well known for its ethno pharmacological activities. It is common in Pakistan, Iran, Afghanistan and East-West India conjointly used in folk medicine. This plant commonly known as Indian cheese maker has been used for vegetable rennet fermented and preparing cheese, which is attributed to the enzymatic activity of Paneer Dodi fruit. Different parts of this plant have been reported to possess a variety of living activities. Paneer dodi has been shown to exert hypoglycemic, hypolipidemic, free radical scavenging, cardiovascular, central nervous system depressant, hepatoprotective, and anti-inflammatory, wound healing, antitumor, immuno-suppressive, cytotoxic, antifungal and antibacterial properties. The twigs are chewed for cleaning of teeth and the smoke of the plant is inhaled for relief in toothache. A large numbers of phytochemical have been isolated from Wethania cogulance fruit extract, which are responsible for various pharmacological actions. The article aims in projecting a review of the plant regarding its morphology, chemical constituents and pharmacological properties. It has also included therapeutic effects of the whole plant and its extracts and isolated withanolides its active principal constituents.

Key Words: Anti-inflammatory, hypolipidemic, Indian cheese maker, Withanolides.

* Address for Correspondence:

Dr. Pratibha Gupta, Assistant Professor, Department of Botany, Career College Bhopal, Madhya Pradesh, INDIA.

Email: guptapratibha951@gmail.com

Access this article online	
Quick Response Code:	Website: www.statperson.com
	Accessed Date: 26 March 2018

INTRODUCTION

Withania has been used for thousands of years for conserve food and treat health disorders and to prevent diseases including epidemics. Ayurveda is the science of life. The knowledge of their healing properties has been transmitted over the centuries within and among human communities. The basic aim of Ayurveda is maintenance of health and treatment of various diseases. The plants are the key source of medicine in Ayurveda for treatment and prevention of diseases and maintenance of healthy life. Plants secondary metabolism is usually responsible for the biological properties of plant species used throughout the globe for various purposes, including treatment of number of untreated diseases. Plant based medicines have

created much awareness in the today's society due to their various well proven therapeutic effects and lack of side effects which has provoked the human to go back towards nature for safer herbal remedies. *Withania coagulans* (Ashutosh booti) is a plant in the Solanaceae family, native to Afghanistan and the India. Within the *Withania* genus, *W. somnifera* (Ashwagandha) and *W. coagulans* (Ashutosh booti) are economically significant, and are cultivated in several regions for their medicinal uses^{10,15}. The berries contain a rennet-like protease that can be used to clot milk for cheese production. It is a kind of Indian flower very effective to control diabetes^{2,12}. You can continue it with your medicines. Your sugar level will down in just one month. After sometime your medicines will be reduce & you will be able to eat sweets. Check your sugar and Cholesterol level before beginning of the course. Count after 10 days, 20 days and 30 days. You will see what difference it is making¹⁰.

Botanical description of *W. Cogulance*: This shrub is common in East India, Nepal and Afghanistan. In India it occurs in Punjab, Rajasthan, Simla, Kumaun and Garhwal.⁹

Stem: It is an erect greyish under-shrub, 60–120 cm high. : A rigid grey- tomentose under shrub 0.3-0.9 m. high,

branches terete, clothed with dense grey or yellowish white tomentum.⁹

Leaves: The leaves are lanceolate, entire, clothed with a persistent greyish tomentum on both sides. 2.5-5.7 by 1-2.2 cm., lanceolate-oblong, obtuse, entire, clothed with a persistent not easily detachable greyish tomentum, of a uniform colour on both sides, thick, more or less rugose, base acute, running down into an often obscure petiole; petiole 6 mm. long but often indistinct.⁹

Flower: The flowers are dioecious in axillary clusters, pedicels 0-6mm long, deflexed, slender.⁹

Calyx- The calyx is 6 mm long, clothed with grey tomentum and the corolla is 8 mm long, with lobes that are ovate-oblong, sub acute. Calyx 6 mm. long, campanulate, clothed with fine satellite grey tomentum; teeth triangular, 2.5 mm. long.⁹

Corolla: 8 mm long, stellately mealy outside, divided about 1/3 the way down; lobes ovate-oblong, sub acute.⁹

Male flowers: Stamens about level with the top of the corolla-tube; filaments 2 mm. long, glorious; anthers 3-4 mm. Long, Ovary ovoid, without style or stigma.⁹

Female flowers: Stamens scarcely reaching 1/2 way up the corolla-tube; filaments about 0.85 mm. long; anthers smaller than in the male flowers, sterile. Ovary ovoid, glabrous; style glabrous; stigma mushroom-shaped, 2-lamellate.⁹

Fruits: Berry 6-8 mm. diam. gabbros, smooth, closely girt by the enlarged membranous calyx which is scurfy pubescent outside.⁹

Seeds: 2.5-3mm diam., dark brown, ear-shaped, gabbros.⁹

Flowering period: January to April.

Fruiting period: berries ripen during January to May.

Regeneration: The natural regeneration is from seed.⁵

Taxonomical Classification

Kingdom: Plantae, Plants

Subkingdom: Tracheobionta (Vascular plants).

Super Division: Spermatophyta (Seeds plants).

Division: Angiosperma;

Class: Dicotyledons;

Order: Tubiflorae;

Family: Solanaceae;

Genus: *Withania*;

Species: *coagulans*

Botanical Name: *Withania coagulans* Dunal

Synonyms of paneer dodi-

Sanskrita Name: Rishyagandha

Hindi Name: Punir, Punir bandh, Akri, Binputakah,

Paneer doda

English Name: Indian Cheese maker, Indian Rennet, Vegetable Rennet

Trade Name: Paneer dodi, Panner, doda, Panir bed, Paneer dhodi.

Telugu: Panneru-gadda

Urdu: Hab kaknaj

Kannada: Amakiregadday

Malayalam: Amukiram

Tamil: Amukara, Amukkura

Part Used: Fruit, Leaf, Seed.

Chemistry of *W. Cogulance*: The phytochemical screening of aqueous and ethanolic extract of *Withania cogulance* shows a number of different phytoconstituents such as steroidal lactones, 13 alkaloids, flavonoids, tannin, saponins, carbohydrates, proteins, amino acids, organic acids, 138 withanolides, several sitoindosides, withanine, with aferin A, somniferine, anaferine, pseudowithanine, withananine, somniferinine, and withanolide A which makes it remarkable for its use by traditional practitioners¹³. Some other constituent's are nicotine, tropine, pseudotropine, 3a-tigloyloxy-tropine, choline, cuscohygrine, dl-isopelletierine and anhygrine⁷. The phytochemical studies reported earlier indicate that the alkaloids and steroids isolated from plant sources are responsible for hypoglycaemic activity of the plant. *Wethania cogulance* fruit contain the milk-coagulating enzyme, two esterases, free amino acids, fatty oil, an essential oil, withanolides and alkaloid¹. However amino acids are reabsorbed in proximal convoluted tubules of nephron and cannot function as diuretic. The seeds on petroleum ether extraction, give a 12-14% yellow fatty oil and unsaponifiable matter. Fatty acid composition is oleic, linoleic, palmitic, stearic and arachidonic acid. The unsaponifiable matter consists 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 and traces of maltose. The amino acids present are proline, hydroxyproline, valine, tyrosine, aspartic acid, glycine asparagin, cysteine and glutamic acid. the leaves show four steroidal lactones like Withanolides, viz Withaferin-A, 5, 20 α (R)- dihydroxy-6 α ,7 α -epoxy-1-oxo-(5 α)-with a-2,24-dienolide and two minor withanolides, of which one is -epoxy-22R-witha-2,24-dienolide (the so called withanone). α , 7 α -dihydroxy-1-oxo-6 α , 17 α probably 5 4 Withaferin A is the most important of the withanolides isolated so far[4,6,14,17][Table-1].

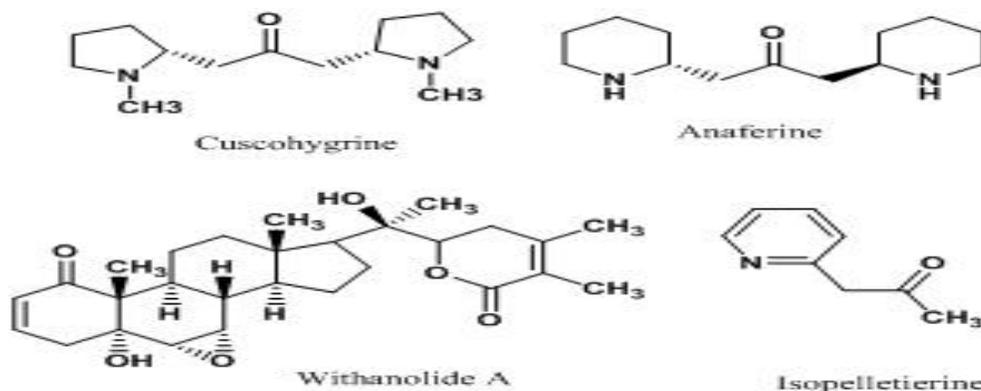


Figure 1:

Medicinal Uses

- *W. coagulans* is a remarkable stress-relieving, anti-cancer, used to cure Diabetes, blood purifier.
- Fruit of *W. coagulans* is used for curing digestive and liver complaints³.
- Its external application is prescribed against inflammatory conditions, ulcers, and scabies⁸.
- *W. coagulans* is mixed with Ashwagandh powder and oil to make an ointment, used in skin diseases. It act as antidote to scorpion sting¹⁶.
- Ethanolic extract of *W. coagulans* fruit showed anti fungal activity. Leaves and stem showed antibacterial activity.
- It is used to treat nervous exhaustion, debility, insomnia, wasting diseases, failure to thrive in children, impotence.
- The twigs are chewed for cleaning of teeth and the smoke of the plant is inhaled for relief in toothache¹⁸.
- Flowers of *W. coagulans* are used in the treatment of diabetes.
- The root is harvested in autumn and dried for later use.
- It work as diuretic because they increase urinary potassium level and alter urinary Na⁺/K⁺ output.
- Diuresis induced by *W. coagulans* extract at 500 mg/kg dose is strong with similar intensity comparable to furosemide.
- Antimicrobial, anti-inflammatory, hepatoprotective, anti-hyperglycaemic, cardiovascular, immunosuppressive, free radical scavenging and central nervous system depressant activities of the plant have been reported¹⁸.

Doses: You need to drop 10-12 of flower buds in a glass (use glass tumbler only) of water overnight. Filter the water through a sieve and drink it first thing in the morning. Get your sugar level checked to ascertain the reduction of blood sugar level. Once drop in blood sugar

is noticed, slowly reduce the dosage of medicines you take other than this. When the blood sugar level touches near normal you can discontinue usage of other medicines in consultation with your physician^{9,11}.

Therapeutic Uses: The fruits are sweet; applied to wounds; used in asthma, biliousness. The seeds are emmenagogue, diuretic; useful in lumbago, ophthalmic; 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 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. Honigberger says that the bitter leaves are given as febrifuge by the Luhanees. In Bombay, the berries have a reputation as blood purifiers. In Las Bella, the fruit is pounded and used as a cure for colic; 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 are inhaled for relief in toothache^{5,15}. In Northern India traditional healers use dry fruits for Diabetes mellitus. Paneer dodi is also represent as antimicrobial, anthelmintic, antifungal, hepatoprotective, hypoglycemic, hypolipidemic, cardiovascular, free radical scavenging, anti-inflammatory, antitumor, immunosuppressive, and depressant properties. 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. The active principle named "withanin" residing in the numerous small seeds contained within the capsules is a ferment closely allied to the animal rennet¹¹.

Side Effect of *W. Cogulance*: Indian rennet possesses the immune-suppressive ability. The ability may be useful during an organ transplant, when the immune system rejects the new organ thinking of it as a threat. In normal conditions the prologues of Indian rennet may make a

person vulnerable to infection or other diseases. Avoid its use during pregnancy¹².

Antimicrobial activity of *Withania cogunlance*: It has good antibiotic and inhibited the growth of various gram-positive μ tumor activities. Withaferin A in concentration of 10 bacteria, acid fast bacilli, aerobic bacilli and pathogenic fungi. It was active against *Micrococcus pyogenes* var. *Aureus* and *Bacillus subtilis* glucose-6-phosphate-dehydrogenase. Withaferin A has marked tumorinhibitory property when studied *in vitro* against cells derived from human carcinoma of nasopharynx (KB). It also acts as mitotic poison arresting the division of cultured human larynx carcinoma cells at metaphase. The studies also showed growth inhibitory and radio sensitizing effects *in vivo* on mouse Ehrlich ascites carcinoma. It also caused mitotic arrest in embryonal chicken fibroblast cells. Withaferin A show potent anti-arthritic and anti-inflammatory effect and also suppress arthritic syndrome. In contrast to hydrocortisone treated animals which shows weight loss, the animal treated with withaferin A showed weight gain in arthritic syndrome¹⁵. Withaferin A is also inhibits angiogenesis¹². It has been reported that some of the withanolide affescts events in the cholinergic signal transduction cascade of the cortical and the basal forebrain, indicating their promising role in the treatment of Alzheimer's disease².

Table 1: Phyto-chemical screening of 50% extract of fruits

S. No.	Test	50% Ethanol extract
	Alkaloids	
1	a. Dragendorff's test	+ve
	b. Wagner's test	+ve
	c. Mayer's test	+ve
	d. Hager's test—	+ve
	Carbohydrate	
2	a. Molisch test	+ve
	b. Fehling's Test 87	+ve
	c. Benedict's Test	+ve
	Protein	
3	a. Biuret Test	+ve
	b. Xanthoprotein Test	+ve
	c. Lead Acetate Test	+ve
	Amino acids	
4	a. Ninhydrin test	+ve
	Glycoside	
5	a. Baljet Test	+ve
	b. Keller Kiliani Test	+ve
6	Saponin test	
	a. Foam test	+ve
7	Tannins and phenol compounds	
8	Essential oils	
	a. spot test	+ve

CONCLUSION

The results from this review are quite promising for the use of paneer dodi as a multi-purpose medicinal plant on the other hand it is a miracle for diabetes, several limitations currently exists in the current literature. The plants are the key source of medicine in Ayurveda for treatment and prevention of diseases and maintenance of healthy life. *Withania* flowers are very effective to control diabetes. Paneer dodi can be used with other allopathy medicines. Sugar level will come down in just one month. Check your sugar and Cholesterol level before beginning of the course. *Withania* is very effective for diabetes without any side effect.

REFERENCES

1. Atta-ur-Rahman, Shabbir M, Yousaf M, Qureshi S, Dure-Shahwar NA, Choudhary MI: Three withanolids from *Withania coagulans*: Phytochemistry. 1999; 52(7): 1361–1364.
2. Beigomi M, Mohammadifar MA, Hashemi M, Rohani MG, Senthil K, Valizadeh M: Biochemical and rheological characterization of a protease from fruits of *Withania coagulans* with a milk-clotting activity: Food Science and Biotechnology. 2014 December; 23(6):1805–1813.
3. Bhattacharjee S K, Handbook of Medicinal Plants. 2004: p. 378, Pointer Publisher Jaipure 303003 (Raj), India.
4. Budhiraja RD, Sudhir S, Garg KN: Cardiovascular effects of a withanolide from *Withania coagulans* Dunal fruits: Indian J. Physiol Pharmacol. 1983; 27(2): 129-134.
5. Chadha YR: The Wealth of India, Raw Materials. New Delhi: CSIR. 1976 vol.:10.
6. Choudhary M I, Dure-Shahwar Parveen Z, Antifungal Steroidal Lactones from *Withania coagulans*: Phytochemistry. 1995; 40: 1243-1246.
7. Jain R, Kachhwaha S, Kothari S L: Phytochemistry, pharmacology, and biotechnology of *Withania somnifera* and *Withania coagulans* - A review: Journal of Medicinal Plants Research. 2012; 6(41):5388-5399.
8. Joshi S G, Medicinal Plants. 2000: p. 381-382, Mohan Primlani Oxford & IBH Publishers Co. Pvt. Ltd. 66 Janpath, New Delhi 110001, India.
9. Kirtikar KR, Basu BD. Indian Medicinal Plants. Allahabad, India: L M Basu. 1933: vol. 3.
10. Kirtikar KR, Basu BD. Indian Medicinal Plants. Dehradune , India : International Book Distributors, 1995
11. Lavie D, Glotter E, Shvo Y: Constituents of *Withania somnifera*. III. The side chain of withaferin A: J ORG CHEM. 1965:30:1774–1778.
12. M Foster, Sec. RS, Sheridan Lea M A: "Henriette's Herbal Homepage. A "Rennet" Ferment Contained in the Seeds of *Withania Coagulans*: The American Journal of Pharmacy. 1884 March; Vol. 56:606.
13. Mathur D, Agrawal R C, Shrivastava V: Phytochemical Screening and Determination of Antioxidant Potential of

- Fruits Extracts of *Withania coagulans*: Recent Research in Science and Technology. 2011; 3(11): 26-29.
14. Mirjalili M H, Moyano E , Bonfill M, Cusido R M, Palazón J, Steroidal Lactones from *Withania somnifera*: an Ancient Plant for Novel Medicine, *Molecules*. 2009; 14: 2373-2393.
 15. Mirjalili M H, Moyano E, Bonfill M, Cusido R M, Palazón J: "Steroidal Lactones from *Withania somnifera*, an Ancient Plant for Novel Medicine". *Molecules*. (2009); 14 (7): 2373–2393.
 16. Nadkarins K M, *Indian MateriaMedica*. 1964: p. 1291. Manglore Publishers, India.
 17. Neogi P, Kawai M, Butsugan Y, Mori Y, Suzuki M, Withacoagin a new withanolide from *withania coagulans* root: *Bull chem. Society Japan*. 1988;61(12):4479-4481.
 18. Pramanick D D, Srivastava S K, Pharmacognostic evaluation of *Withania coagulans* Dunal (Solanaceae) - an important ethnomedicinal plant: *Bioscience Discovery*. Jan-2015: 6(1):06-13.
 19. Subramanian SS, Sethi PD: Steroidal lactones of *Wethania ashwagandha*: *Indian journal Pharm*. 1971: 33:25-26.

Source of Support: None Declared
Conflict of Interest: None Declared