

Underutilized Bean: Nutritional Value and Biological Activity of Winged Bean

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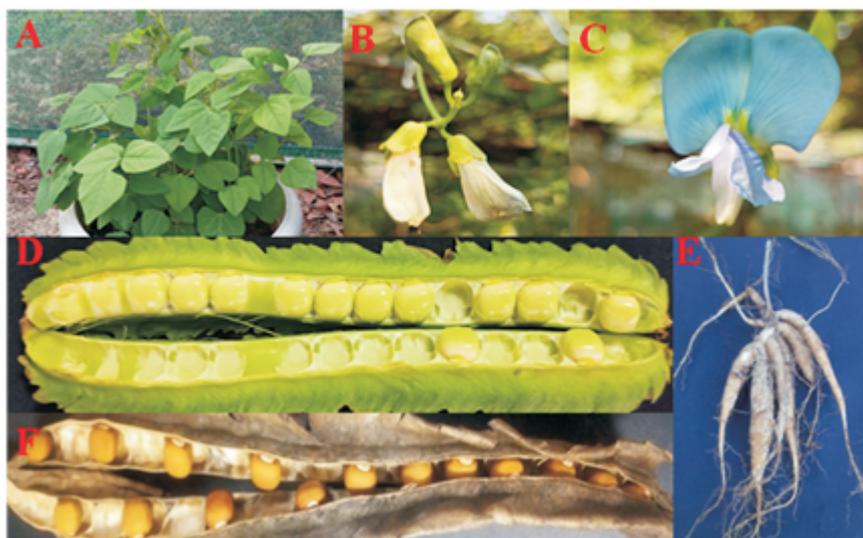
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KEYWORDS: Winged bean, *Psophocarpus tetragonolobus* L., Soybean of the tropics, Poor man's food, Antioxidants

SUMMARY

Winged bean (*Psophocarpus tetragonolobus* L.) is the rich source of protein and oil range to be 28-40% and 15- 18% respectively. It also contains different types of medicinally impotent bio-active metabolites including phenolic compounds. Phenolic compounds provide valuable health promoting antioxidants, whereas protein is responsible for nutritional quality. Therefore, it has potential to be future nutritional leguminous crops. The roots of winged bean have nodules that play important role in nitrogen fixation, so former need very little cost to grow this crop.

INTRODUCTION

Winged bean popularly known as goa bean, angled bean, dragon bean and officially known as (*Psophocarpus tetragonolobus* L.) DC-2n=18) is a member of the Legumenace family. Winged bean has a twining and climber habit and requires support for growth having a 4-6 meter length. The roots of winged beans change into tubers having lengths of 7 to 14 cm. They are resistance towards biotic and abiotic stress. Winged bean can be grown in poor, sandy or clay soil without addition of fertilizer because bacteria that grow on its roots are capable of capturing large amounts of atmospheric nitrogen and converting it to usable form for plants. After sowing, it takes 8-10 days to sprout. After 8-10 weeks, the creeper starts flowering. Flowering occurs in several flashes (8-9) from different parts of the stem. Within 4 weeks, tender beans grow. Pod bearing lasts for 3-4 months. The whole plant parts are edible and maybe consumed as crude or cooked that's why to consider it as "poor man's food". (*Psophocarpus tetragonolobus* L.) also known as "soybean of the tropics" because of its excessive protein content. The winged bean used to preparation of tempah winged bean milk, miso, and curd, and the formulation of weaning foods had been mentioned. The leaves of the winged bean are cooked and eaten like spinach

(wealthy in vitamin A). The seed- protein and oil content in winged beans had been said to be 28-40% and 15-18% respectively showed characterization of winged bean based on molecular, chemical and physiological parameters, and has provided significant insights for further improvement of this plant for its AL qualitative and quantitative purposes.

ORIGIN AND DISTRIBUTION

Winged Bean is native to Asia (India), South-East Asia, Indonesia, and Papua present day Guinea, in addition to some components of Africa. The plant has an African ancestry and has spread in Asia. The domestication and cultivation of the plant is reported from the hot, humid, equatorial countries such as Burma, Sri Lanka,

According to Indonesia ranks second in production of winged bean as compared to Papua New Guinea, which ranks first in production.

NUTRITIONAL VALUE

The leaves of the winged bean are cooked and eaten like spinach (wealthy in vitamin A). The seed-protein and oil content in winged beans had been said to be 28-40% and 15-18% respectively.

PHARMACOLOGICAL ACTIVITIES

Winged bean was used since a long time as a medicinal plant in different countries. Its fruits and roots were used as medicines that

Sr. No.	Constituents	Value (mg/100 gram)			
		Leaf	Green unripe Seed	Dry Ripe Seed	Tuber
1	Moisture%	85	93	26.6	65
2	Ash	0.8	1.9	4.9	1.7
3	Fiber	4.2	3	16.1	17
4	Fat	2.5	3.4	20.4	1.1
5	Protein	7.6	10.7	36	15
6	Carbohydrate	8.5	42.1	42	30.5
7	Energy	0.2	0.71	1.89	0.63

TABLE 1. Nutritional value of different part of winged bean

Malaysia, Thailand, Philippines, Indo China, India, Bangladesh, Indonesia, Papua New Guinea and several Pacific islands.

Academic editor: Dr. Sandeep Singh, PhD, Kanpur, (208021), Uttar Pradesh, India.

increase strength, and as treatment of ulcers in New Guinea. Traditionally, winged bean is used to treat diabetes, cancer, infection, eye and migraine diseases, muscle weakness, and asthma. Previously, several studies have been reported pharmacological activities of winged beans, such as an antioxidant, anti-hypertensive and anti-fungal). It is also used in remedy for small pox and as a cure for vertigo. Winged bean protein hydrolysates were known as potential functional food sources that have angiotensin-I-converting enzyme (ACE) inhibitor and anti-oxidative properties. The bi-functional proteolysate and bio-peptides with high angiotensin converting enzyme inhibitory activity had been prepared and identified from winged bean seeds. Determine winged bean has ability to reduce blood pressure (BP) in Spontaneously Hypertensive Rates (SHR), along with characterization of five identified WBS peptide sequences via in vitro and in silico approaches. The anti-hypertensive drugs are diuretics, ACE inhibitors, calcium channel blockers, alpha and beta blockers in nature. Further, different studies were done to investigate the anti-oxidant, antimicrobial, anti-inflammatory activity. Winged bean is a source of many known antioxidants like vitamin C, and it is also rich in polyphenols and flavonoids. Phenolics also alleviate cardiovascular diseases. Phenolic compounds are responsible for the antioxidant activity of fruits, as a result of their redox properties that allow them to act as reducing agents, hydrogen donors, singlet oxygen quenchers and metal chelators. Thus, they can serve as sources of health-promoting nutrients and phyto-chemicals for human and animals.

CONCLUSION

The winged bean legumes have special interest due to their application in folk medicine, pharmacology, industry, nutritional benefits, and large quantity of seeds, tolerance to adverse conditions and resistance to pests and ecosystem restoration. These legumes widen the food as well as environmental protection because

of their in- built developments to resist the unfavorable conditions like increased temperature, drought and soil erosion. A variety of under explored wild legumes could be of significant value in nutrients, health and soil fertility. The winged bean legumes have special interest because of their use in folk medicine, pharmacology, industry, nutritional advantages, huge quantity of seeds, tolerance to adverse situations and resistance to pests and environment recovery. Winged bean is the one of the best natural source of nutritional food, anti-oxidants, anti- bacterial and anti-fungal activities.

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Citation: Sarvendra *et al.* (2022). Underutilized Bean: Nutritional Value and Biological Activity of Winged Bean. *Frontiers in Food & Nutrition Research*, 8(1), 1-3.