

Exploration of traditional views for therapeutic applications of a potent indigenous aphrodisiac herb: Kapikachu (*Mucuna pruriens*)

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Abstract

Remedies involving natural origin substances such as plants are becoming the choice amongst masses globally. Some plants such as *Mucuna pruriens* are the significant agents of food and medicine. The classical texts highlight multiple formulations where this herb has been the choice and member of aphrodisiac and male infertility formulations such as vajikarana ghrita, vrishyama kshiram, krauncha yoga and kauncha paak. Different other texts have also highlighted this herb for other applications shotha, cholera and yonisankocha. L-dopa, is the main effective phyto-constituent, which attracted the focus of the researchers and thereafter, its role as neuro-protective agent has been well established and comprehensively, being used in diseases such as Parkinsonism. Along with being a therapeutic agent, *Mucuna pruriens* also contributes as nourishing agent in humans and as fodder to livestock. This review has been mainly focused to look into the communications exhibited by the ancient scientists along with some pharmacological potential as depicted by the modern day researchers. This review may be of valuable consideration to physicians with classical practice, to benefit the mankind as different classical formulations, as available in the texts has been discussed. Researchers may also focus on the areas where synergism of this medicinally important herb contributes to the pharmaceutical industry and in treating various disorders.

Key words: Kapikachu, *Mucuna pruriens*, Classical, Ayurveda, L-Dopa, Aphrodisiac

Introduction

Plants, the multifunctional agents, play an integral role in the life of human where it contributes significantly towards food, shelter, and clothing and as medicines. Their applications in such forms date to pre-historical times and are similarly even today. The importance of plants as therapeutic agents may be acknowledged by the fact that about 80% of the population rely over such herbs and their products, for the primary healthcare treatment, especially in the developing countries [1]. Nowadays, a bent of general population has been observed towards the use of herbal drugs, due to rise of threats by the synthetic drugs such as possible side effects and emergence of multi-drug resistant strains [2, 3]. Hence, the use of medicinal herbs, nowadays, is on heights and is also contributing towards the economy of a country, such as India [4]. The demand of such herbs is on rise as they are being widely contributing towards the Pharmaceuticals and Nutraceuticals industry. Amongst the various important herbs such as haridra and neem, kapikachu (*Mucuna pruriens*) is a potential herb, renowned for its use in conditions such as loss of libido, low sperm count and Parkinson's disease [5, 6]. This drug has been well known since ancient era, and is popular amongst the modern researchers as well. Scientifically renowned as *Mucuna pruriens*, the climber is a member of nearly 200 indigenous formulations, being widely used traditionally [6]. This medicinal drug is of immense use nationally along with a valuable market internationally [6]. The seeds

of this legume possess L-dopa, the main chemical constituent along with other alkaloids such as mucunine, mucunadine, prurienine and lecithin [6]. Such phyto-constituents ascertain the multiple pharmacological applications of this herb. Although, a number of studies have been done on this herb, exhaustive study needs to be focussed where more applications may be explored for the human benefit. The authors in this study have made an attempt to relook the classical literature for the potentials of this climber as discussed by the Ayurvedic scholars. This study may help the Ayurvedic physicians to incorporate the formulations as discussed in texts such as Charaka Samhita. The gap between the scientific basis of different classical formulations incorporating kapikachu, may also be worked by the researchers, to ensure the applications of the suggested Ayurvedic medicines.

Charaka Samhita

The authors of this esteemed classical text has placed kapikachu (*Mucuna pruriens*) in **balya mahakshaya** (decoction having strengthening action) and has been named as rishbhi. Along with kevanch, shatavari (*Asparagus racemosus*), ashwagandha (*Withania somnifera*), kutaki (*Picrorhiza kurroa*), bala (*Sida cordifolia*), atibala (*Abutilion indicum*) and masparani (*Teramnus labialis*) has also been placed in this group [7]. Being aphrodisiac in action, many formulations have been explained in the text. A preparation of milk with kapikachu (*Mucuna pruriens*) seeds, black gram (*Vigna mungo*), kharjura (*Phoenix dactylifera*) fruits, shatavari (*Asparagus racemosus*), shringata and mridwika (*Vitex vinifera*) has been said to be promoting the sexual vigour of the person. To prepare this milk, 80 g of each of this ingredients should be boiled in milk and water (each 640 ml), followed by filtration with clean cloth. Subsequently, sugar, vansalocana (*Bambusa arundinacea*) and fresh ghee (each 80gm) should be added. The milk must be consumed with honey and boiled swastika rice. By use of this preparation, a weak and an old person achieves a progeny and is stimulated sexually like a young man [8]. Its seeds are the component of bringhana gutika and vaajikarana ghrta which is aphrodisiac and strengthening. The **Bringhana gutika** is formulated where the roots of Sarpat (*Saccharum munga*), Shatavari (*Asparagus racemosus*), Kshirkakoli (*Lilium polyphyllum*), Vidarikand (*Prerauria tuberosa*), Bhatkateya (*Solanum virginianum*), Jeewanti (*Leptadenia reticulata*), Jeevak (*Malaxis muscifera*), Meda (*Polygotum verticillatum*), Kakoli (*Roscoea purpurea*), Rishbhak (*Malaxis acuminata*), Bala (*Sida cordifolia*), Ridhi (*Habenaria intermedia*), Gokhru (*Tribulus terrestris*), Rasana (*Pluchea lanceolata*) are taken along with the seeds of Kewanch (*Mucuna pruriens*) and Punarnava (*Boerhaavia diffusa*), and decoction is prepared and filtered. Subsequently, the kalka (paste) of mulethi (*Glycyrrhiza glabra*), munakka (*Ribes nigrum*), anjeer (*Ficus carica*), marich (*Piper nigrum*), seeds of kapikacchu (*Mucuna pruriens*), flower of mahuaa (*Madhuca longifolia*), kharjura (*Phoenix dactylifera*), shatavari are added along with juice of vidarikhand, amla (*Emblia officinalis*), ikha (*Saccharum officinarum*), ghrta and cow milk. The ingredients are mixed for ghrta paka. When water evaporates and ghrta is left over, it is then filtered, followed by addition of sugar, vanshlochan, powder of piper (*Piper nigrum*), marich (*Piper nigrum*), dalchini (*Cinnamomum zeylanicum*), elachi (*Elettaria cardamomum*), nagkesar (*Mesua ferra*) along with honey. Thereafter, the vati is prepared and this formulation is Brinhana gutika [8]. For preparation of **Vajikarana ghrta**, urad (Vinga munga) without husk, kevach beej (*Mucuna pruriens*), jeevak (*Malaxis muscifera*), rishbhak (*Malaxis acuminata*), kakoli (*Roscoea purpurea*), meda (*Polygotum verticillatum*), ridhi (*Habenaria intermedia*), shatavari (*Asparagus racemosus*), ashwagandha (*Withania somnifera*) and mulethi (*Glycyrrhiza glabra*) are taken to prepare the

decoction. Thereafter, goghrit (clarified butter from cow milk), vidarikand swarasa (*Pueraria tuberosa*), ikharasa (*Saccharum officinarum*), and goduddha (cow milk) are added and moderately heated for some-time and filtered. Finally, mishri, vanshlochan churna (*Bambusa arundinaceae*), madhu (honey), pippali churna are mixed to form vajikaran ghit [8]. For formulating **Pathyakar swarsa**, Kewanch (*Mucuna prurita*) beej, urad (*Vigna munga*), khajur (*Phoenix dactylifera*), shatavari (*Asparagus racemosus*), fresh singhada, munkka, (*Ribes nigrum*) are taken, mixed with milk, heated until the milk is left over in very less quantity, followed by filtering. Thereafter, mishri (sugar candy), vanshlochan and ghit are added in this milk to for final preparation [9]. For the preparation of **Vrishyama kshiram**, Khajur (*Phoenix dactylifera*), urad (*Vigna munga*), kashirkakoli (*Lilium polyphyllum*), shatavari (*Asparagus racemosus*) chhuhara (Dry Date nut), mulethi (*Glycyrrhiza glabra*), munakka (*Ribes nigrum*) are taken along with seeds of kevach (*Mucuna pruriens*) and boiled it with water, until 1/4th is left over. This decoction is then cooked with go dugdha (cow milk) and subsequently, the sugar, ghee are added when go dugdha remains in very less amount. The prepared formulation is vrishyam kshiram [9]. To prepare **Vrishyapuplika**, the powder of jeevniya, snigdha, and ruchikar fruits is taken with kevach beej churna (*Mucuna pruriens* seed powder), urad powder (*Vigna munga*), til powder (Sesame powder), moong powder, wheat and rice flour, then milk is added to prepare its pulika [10]. To prepare **Apatyakari pashtikaadigutika**, fresh guarsathi rice is taken (not fully dried) and dipped in milk to swell properly, and crush thereafter. Kewanch (*Mucuna prurita*) beej and milk are added and cooked. Subsequently, it is cooked with decoction of urad, bala, mridparani-mashparani (*Teramnus labialis*), jeevanti, jeevak, ridhi, rishbhak, kakoli, gokhru, mulethi, shatavari kwatha, vidarikand kwatha, munaka kwatha and khajur kwatha. These kwatha must be taken in different ratio for the paak of kevach beej. Thereafter, churna of vanshlochan, urad, shaali dhana, saathi chawal, and wheat flour are added in equal quantities to make it dense and finally, the sugar and honey are mixed in higher quantity, to formulate its vati called as Apatyakari pashtikaadigutika [10]. To prepare **Vrishya mahishrasa**, kevach (*Mucuna prurita*) beej and sprouts of urad (*Vigna munga*) are mixed equal quantity and added to mahisha maans ras which is already mixed completely with ghit, juice of khatta anardana (pomegranate seeds), and dadhi (curd). The mixture is then cooked and subsequently, the powder of dhaniya (*coriandrum sativum*), jeera (*Cuminum cyminum*), and sunthi (*Zingiber officinale*) are added for final formulation [11]. For the preparation of **Vrishya maashaadipupalika**, the powder of urad, kevach beej, genhu (wheat flour), sathi & dhaan chawal (rice), sugar, vidarikand along with seed powder of taalamkhana, (*Hygrophila auriculata*) are taken, mixed with milk and thereafter pupalika is prepared with goghrita [11]. Another preparation, **Apatyakar ghitam**, is prepared taking the kwatha of Shatavar, vidarikand, urad, kewanch beej, and gokhru separately, and then godugdha and ghrita are added followed by its proper cooking until ghee is left over. This preparation, thus formed is apatyakara ghitam [12]. To prepare **Vrishya gutika**, goghrita is cooked with vidarikand swarasa. When, goghrita is left over, cow milk (100 times) is added and the mixture is re-cooked and filtered. Thereafter, churna of vanshlochan, pipar, kwanch beej, ikh rasa and ghit are added to make vrishya gutika [12].

Sushruta Samhita

The authors of this authentic classical text have placed kapikachu as a member of Vidaarigandhadi gana (group). Named as kachura (*Mucuna pruriens*), seeds are also the part of vata sanshamana group, which also includes other

medicinal herbs such as haridra (*Curcuma longa*), varuna (*Crataeva nurvala*), bala (*Sida cordifolia*), atibala (*Abutilon indicum*), guduchi (*Tinospora cordifolia*), errand (*Ricinus communis*), pashanbheda (*Bergenia lingulata*), shatavari (*Asparagus racemosus*), punarnava (*Boerhaavia diffusa*) [13]. Different preparations possessing kapikachu as an ingredient have been discussed by the authors. **Kraunch yoga:** Milk is cooked with kraunch seeds and wheat, followed by filtration and cooling. This milk is given to the patient for drinking along with ghee [14]. **Kraunch-ikshurak yoga:** The powder of kraunch and tamaal makhana (*Hygrophila auriculata*) seeds to be taken by the patient along with sugar and un-boiled milk [14]. **Guptaphaladi yoga:** The milk prepared with the seeds of Kraunch, gokshur and uchata (*Blepharis edulis*) may be given to the patient along with sugar, and it improves the sexual vigour of a male [14]. The kheer of kewach seed and wheat may be prepared, filtered, cooled and subsequently, given to the patient with ghee and milk. This milk is suggested to be vaajikarana (aphrodisiac) in action [15]. In the cases of atisaar (diarrhoea), the powder of kauch moola (roots of *Mucuna pruriens*) should be taken with water in pakwaatisar and raktatisar [15]. Milk prepared with kewach beej may also be used in same condition [15].

Ashtanga Sangraha

In this classical text, the scholars have included kapikachu (*Mucuna pruriens*) in vidaryadi gana and named it as kanduri (*Mucuna pruriens*). The drug possesses the properties of being hridya (heart tonic) and bringhana (nourishing body tissues). It pacifies vata and pitta. It is beneficial in disorders like shotha (inflammation), gulma (abdominal or fantum tumor) and kaas (cough) [16]. The preparation of the legume is even useful in raktipitta (haemorrhage) [15].

Bhaavprakasha Nighantu

The author of this authentic text has included kapikachu (*Mucuna pruriens*) in guduchyadi varga. The various synonyms have been mentioned: kewach, kauch, kunch and khujani. The various parts of this climber to be used are its seeds, fruit hairs and roots. The seeds act as poushtik (nutrient), uttejak (stimulant), vajikarana (aphrodisiac) and pacify vata. The roots are useful in urinary disorder. The fruit hairs are poisonous and produce kandu (itching), daha (burning sensation) and shotha (inflammation). Kwatha (decoction) or swrasa (juice) of roots is used in vaata vyadhi (vata disorder) and angaghata (paralysis). Cold infusion of kapikachhu when mixed with honey can be given in cholera. The decoction of kauch moola (roots) is useful in yonisankoch (contraction of vagina) [17].

Chakkardutta Samhita

Acharaya Chakrapani has mentioned swarasa (juice) of kaunch to be used in a Vaatvyadhi [15].

Adarsha Nighantu:

In this Ayurvedic text, kapikachhu has been mentioned under Plaashaadi varga. The various synonyms and regional names have been mentioned. As per this text, kapikachhu is a climber and mainly found in rainy season throughout India while in some regions it may be found during all the seasons of a year. The hairs are present on

surface of legumes and leaves which produce kandu (itching) and daha (burning sensation). Moola (roots), beeja (seeds), roma (hairs) and phalli (pods) of the plant are the main parts to be used. The dose of kapikachhu churna has been mentioned to be 3-6 masha. The rasa (taste) of the selected parts are madhur (sweet) and tikta (bitter), veerya (potency) sheeta (cold), vipak madhur (sweet) and doshkarma is suggested to be vaatpittanashaka (pacifies vata and pitta dosha) [15].

Dhanwantari Nighantu

In this text, kapikacchu is included in Guduchyaadivarga. The seeds possess the property of being madhura (sweet) and tikta (bitter) with veerya (potency) sheeta (cold). Acharya has described guna karma of kapikacchu as sukhavardhak (enhance sperm count) and is raktapittshamaka [18].

Raj Nighantu

As per Raj nighantu, Kapikacchu has been considered in Guduchyaadi varga. Seeds, roots and legumes are used for medicinal purpose. Acharya has highlighted various synonyms of this drug. In Sanskrit it is renowned as Kapikachhu, Atmagupta, Swayamgupta, Kundli, Chanda, Gupta, Jaya, Kachhura, Shimbi, Badri, and Kachhu. In hindi: kevach, khujani, kach, in Bengali: Aalkhushi, in Punjabi: Kvaanch, kuch, in English called as a Cowitch and in Gujarat: kauch, kaucha. The rasa of Kapikachhu is Madhur. It is veeryavardhaka (semen enhancer) in action and is beneficial in vaatroga (nervous disorders), kshaya (emaciation), sheetpitta and raktapitta (haemorrhage) [19].

Shankar Nighantu:

Acharya Shankar has described plant as a climber having legumes. Hairs are present on its legumes which cause irritation and itching on the skin. The seeds are Veeryavardhak, raktapittanashak, balakaraka, vaatnashak, raktapittanashak [20].

Rastanrasaar Siddhaproyga Sangrah:

The methodology of a extensively used formulation, Kauch paak, is found in this classical text. Elaboarting the method of preparation, the seeds are soaked in warm water for 12 h, seed coat removed with the help of cotton cloth and subsequently dried in the sunlight. The seeds are then powdered and boiled with 16 times of cow milk till concentrated. Theafter, ghee is added and cooked at low heat. Syrup is prepared by adding four times of sugar. This syrup is then added in the initial mixture. The fine powder of following drugs are added finally – Agar , Jatiphala, Javitri, Sonth, Lavang, Jira, Dalchini, Pippali, Tejpatra, Elaichi, Nagkesar, Kapoor, Samudhri shosha, Ajowan, karaja beej, Akarakara, tamalkhana, Bilwa and cooked for some more time. On cooling, honey and kesar are added to the prepared formulation [21].

Dravyaguna Vigyana:

The author in this text has been described this plant as shukrajanana (aphrodisiac), the botanical source, where, Latin name: **Mucuna prurita** and Family **Leguminosae** has been defined along with different synonyms with regional names enlisted. In this text, kapikachu (Mucuna) has been described as a hairy climber which can be found throughout hot regions of India. Chemically, the seed of this plant contains dopa, gallic acid, and glucoside. Kapikachhu possess guru (heavy) and snigdha (unctuous) properties, madhur (sweet) and tikta (bitter) rasa (taste), shows mandhur vipak (metabolism) and has) ushna veerya (potency). The various action and uses of kapikachhu has been discussed in this text. The seeds, roots and the hairs are used for the medicinal purpose. The dosage mentioned is as seed powder (3- 6 gm), root decoction 50-100 (ml) and hairs- 125 mg. The formulation of this herbal drug is Vanari guitka and Maashbalaadipaachana [22].

The Ayurvedic Pharmacopeia of India

In this official text, this herbal medicinal drug has been discussed with the name as Atmagupta [23, 24].

Table 1: Macroscopic and microscopic features of Kapikachu seeds and root as illustrated in API [23, 24]

Macroscopic feature	Microscopic features
Seeds: The colour of the seeds is dark brown along with the spots; usually observed with 1.2-1.8 cm length, 0.8-1.2 cm width. They are smooth at touch, hard, difficult to break; with indistinct odour, and sweetish-bitter taste.	Seeds: Outermost is a single layer with cells similar to palisade cells, followed by inner 2/3 layers of testa (outer layer consist of thin walled, ovoid, tangentially long cells; inner layers may be thick walled, beaker or dumb shaped, cells); tegmen is formed by oval shaped, compressed, thin walled, parenchymatous cells (some may contain starch grains); cotyledons is formed by thin walled, angular, polygonal, closely arranged, parenchyma cells, possessing starch and aleurone grains; starch grains are usually small, simple, oval or rounded; a few vascular bundles may also be observed along with vessels exhibiting reticulate thickening or pitted surface.
Root: The root pieces are long with nearly 7 mm or more in thickness, possessing dark brown to black lateral roots, hard along with fibrous fracture; and indistinct odour and taste.	Root: shows a narrow cork consisting of 4 or 5 rows of tangentially elongated cells; secondary cortex narrow consisting of 2 to 5 rows of thin-walled, parenchymatous cells, a few containing brownish contents; secondary phloem wide, forming bulk of the bark in the form of long, radial strips that are conical due to the medullary rays funneling out in the phloem region; phloem fibres are arranged in groups or occasionally single; phloem rays uni to biseriate; cambium distinct 1 or 2 layered; secondary xylem very wide composed of usual elements, vessels large as well as small, surrounded by xylem parenchyma and fibres; medullary rays in the xylem also mostly uniseriate, somewhat wavy, consisting of radially elongated thin-walled cells.

Atmagupta has been introduced with its botanical source (Latin name: *Mucuna pruriens*, Family: Fabaceae and roots, seeds to be used). Multiple synonyms have been suggested regional where it is renowned as Kapikachu, Kandura, Markati (Sanskrit), Banar kakua (Assamese), Cowhage (English), Kaucha, Kavach (Gujrati), Kewanch, kaunch (Hindi), Nasugunnee and Nasugunne (Kannada), Naikuruna (Malyalam), Kawach and Tatgajuli (Punjabi) and Konch and Kanwach (Urdu). Various external morphological characters of parts (seeds and roots) of the plant have been elaborated along with the microscopic characters (Table 1). Thereafter, the identity, purity and strength have been suggested which helps in standardization of various sample of crude drugs. The other aspects of seeds and roots have also been elucidated such as rasa panchaka, uses, dose and formulations [23, 24].

Table 2: Different aspects of *Mucuna pruriens* as discussed in API [23, 24]

Component		Seed	Root
Identity, Purity and Strength	Foreign matter	< 1%	< 1%
	Total ash	< 5%,	< 6%,
	Acid- insoluble ash	< 1%	< 1%
	Alcohol – soluble extractive	> 3%	> 4%
	Water- soluble extractive	> 23%	> 5%
	Fixed oil	>3%	-
Rasa Panchaka	Rasa(taste)	Madhura (sweet), Tikta (Bitter)	Tikta (bitter), Kashaya (astringent)
	Guna (property)	Guru (heavy), Snigdha (unctuous)	Guru (heavy), Snigdha (unctuous)
	Veerya(potency)	Sheeta (cold)	Sheeta (cold)
	Vipak (metabolic property)	Katu (pungent)	Katu (pungent)
	Karma (action)	Kaphanaashaka, Vatashamaka, Raktadoshanashaka, Vrishya, Balya	Pitthara, Kaphahara, Vrishya, Vajikarna
Formulations		Brihat Masa taila	-
Uses		Vatavyadhi, Klaiyya (Impotency), Raktapitta, Daurbalya (weakness)	Krishta (weakness/emaciation), Pakvatisara, vatavyadhi, yonishithilta
Dose		3-6 g	3-6 g (powder for the decoction)

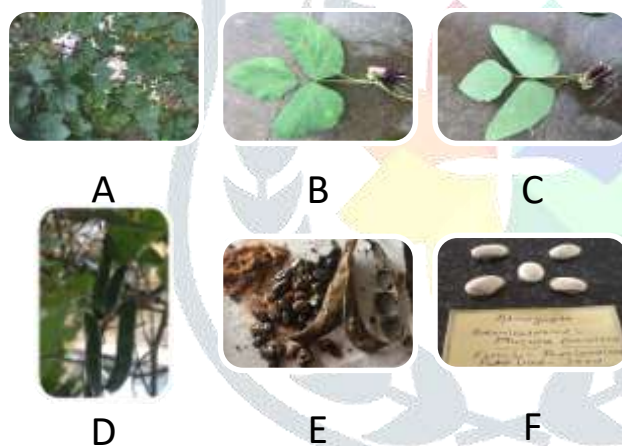


Figure 1: *Mucuna pruriens* as growing in Ayushya Vatika, Lovely Professional University; A: Climber of plant; B-C: Dorsal and ventral side of compound leaf with flower respectively; D: S-shaped fruit; D: fruit along with seeds and hairs; E: White seeds of *Mucuna pruriens*.

The potential of this herb can be recognised by the fact that different modern texts also discusses about this herb where different views has been exhibited in their texts (Table 4).

Table 4: *Mucuna pruriens* as per different modern texts

Text Book	Content Reviewed
Pharmacognosy	Kevach consists of dried seeds of <i>Mucuna prurita</i> belonging to family Fabaceae which is found throughout India and commercially cultivated in tropical parts, especially in Maharashtra. The macroscopic and microscopic characters of kevach seed have been described with some of its chemical constituents like seeds contain amino acids including L-dopa: 1.5%, Licthine: 12.5%, alkaloids mucunine, pruriene and fats. L-dopa shows maximum effects in rigidity and hypokinesia [25].
Indian Materia Medica	Different scientific names (<i>Carpopogon pruriens</i> , <i>Dolichos pruriens</i>), synonyms and regional names of <i>Mucuna prurita</i> have been discussed. It

	is reported to be an annual climbing shrub, common in tropics and cultivated in some parts for the sake of its golden brown velvety legumes which are cooked and eaten as a vegetable. Mucuna contains resin, tannin, and fat as its constituents. Seeds, roots, and legumes are main parts used. The seeds of Mucuna possess astringent, anthelmintic, and aphrodisiac properties. The root acts as nervine tonic and diuretic. The pods show vermifuge and are mildly vesicant. The various infusions of pods are a good remedy for dropsy [26].
Major Herbs of Ayurveda	kevach (<i>Mucuna prurita</i>) is widely grown in the tropics as a fodder crop. It is a tender evergreen twining climber, reaching 3 m, with downy leaves up to 45 cm long divided in to three ovate, pointed leaflets. It is mainly used as an anti-parkinsonian agent, anthelmintic and as aphrodisiac. Alkaloids, triterpenes and sterols, proteins and amino-acids, fatty acids and carbohydrates are the major constituents of Mucuna. Various Ayurvedic properties of Mucuna has been mentioned as: rasa (taste)-madhur (sweet) and tikta (bitter), guna (property)- guru (heavy) and snigdha (unctuous), veerya (potency)- ushana (hot), vipaka (metabolic property)- madhur (sweet), doshkarama- rasayana (aphrodisiac). The dose of Mucuna seed powder has been suggested to be 1.5-2.5g [27].
Medicinal Plants	Kapikachhu (<i>Mucuna prurita</i>) with its various Scientific (<i>Dolichos pruriens</i> , <i>Mucuna monosperma</i> , <i>Stizolobium pruriens</i> , and <i>Carpopogon pruriens</i>), English (cowage, cowitch plant) and Sanskrit names (kapikachhu, atmagupta, markati, kandura, sukasimbi, kachhura). The habitat of Mucuna has been mentioned as a large half woody perennial twiner. It has been found native to West Indies and tropical America, Andaman and Nicobar islands and throughout India. The plant extract induces marked hypotensive effect. The seeds of Mucuna possess mucuadine, mucuadinine, mucuadinine and pruriendine constituents along with small amounts of nicotine and reddish viscous oil. Roots, seeds, and fruit of Mucuna have been suggested as parts used. Different actions or uses of Mucuna are expressed in the text such as roots are useful in yonisankochan (contraction of vagina), balya (strengthening agent), and vajikara (aphrodisiac). It has also been considered in homeopathic treatment. It is very useful during teething period along with conditions such as jaundice and constipation [28].

Not only in different texts, but the work has been done to acknowledge the applications of this natural drug scientifically as elaborated in the classical texts. Mucuna is probably out-looked as an herb which possesses the capacity to be used as a nutritional agent along with medicinal values. Such herbs exhibit a potential where they can take care of alleviating different diseases along with supplementing nutrition. Nearly 120 different species of Mucuna has been reported, where 15 species may be found in India [29]. Recent researches have proved the action of this drug in various disorders such as neurodegenerative ailments, osteoporosis, diabetic wounds, immune potentiator and antiprotozoal agent. Much work has been done by the researchers to raise the curtains and peep in the potentials of this valuable herb [29].

Table 5: Pharmaceutical constituents of Mucuna [29, 30]

S. No	Chemical constituent	
1	L-dopa	
2	Alkaloids	L- 3- caboxy- 1, 2, 3, 4- tetrahydroisoquinoline
		(-) - 1-methyl- 3carboxy- 6, 7- dihydroxy- 1, 2, 3, 4- tetrahydroisoquinoline
		dimethyl- 3carboxy- 6, 7-dihydroxy- 1, 2, 3, 4- tetrahydroisoquinoline

			(-)- 1- 3-carboxy- 1, 1- dimethyl- 7, 8- dihydroxy- 1, 2, 3, 4- tetra hydroisoquinoline
3	Lipid derivatives		Triactont- 5, 7, 9- triene
			Docos- 2, 4, 6-triene- 1, 8- diol
			Docos- 5- en- 1- oic acid
4	Arginine	16	Mucynine
5	Ash	17	Myristic-acid
6	Aspartic acid	18	N, N- dimethyltryptamine
7	Behenic acid	19	N, N dimethyltryptamine
8	Betacarboline	20	Nicotine
9	Betasitosterol	21	Oleic acid
10	Bufotenine	22	Palmitic acid
11	Choline	23	Prurienine
12	Linoleicacid	24	Niacin
13	Linoleicacid	25	Riboflavin
14	Mucunadine	26	Saponins
15	Mucunain	27	Serotonin

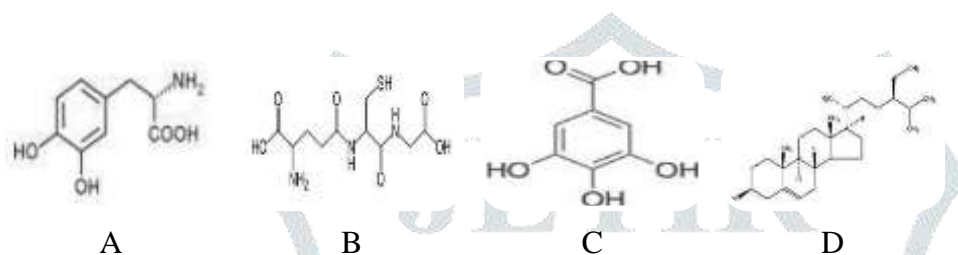


Figure 2: Chemical structure of different constituents found in Mucuna; A: L-dopa; B: Glutathione; C: Gallic acid; D: Beta-sitosterol [29, 30, 31]

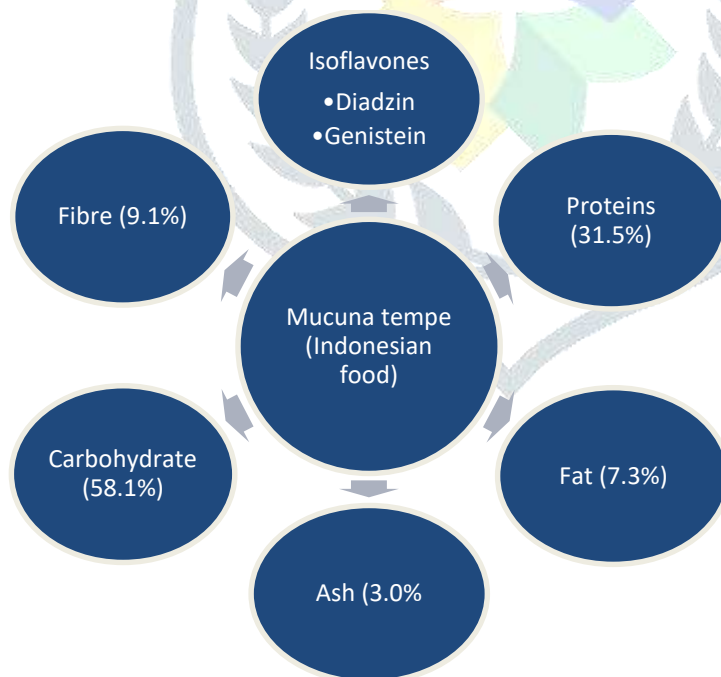


Figure 3: Nutritional constituents in Mucuna seed Tempe (An Indonesian food preparation) [29]

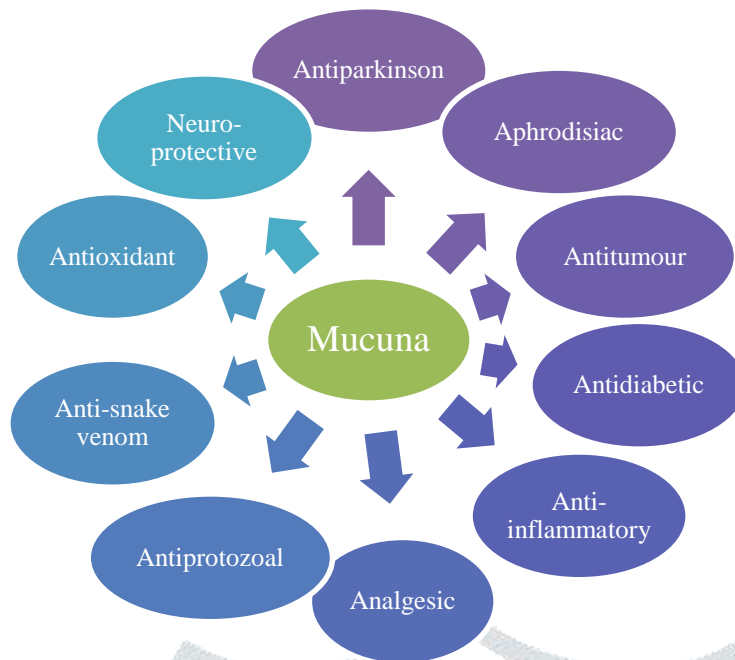


Figure 4: Pharmacological potentials of Mucuna [29, 30, 31]

Other than different pharmacological applications, some side-effects of Mucuna have also been reported such as nausea, sensation of abdominal bloating, vomiting, abnormal body movements, and insomnia. The different preparations may also induce hallucinations, confusion, delusions, and agitation along with other symptoms of psychosis. The hairs found over the pods are strong irritants, which may produce severe manifestations such as itching, swelling and burning [32].

Conclusion

Mucuna pruriens is an indispensable plant owing the nutritional and medicinal properties. Its use can be established historically, where multiple formulations has been communicated in the classical texts such as Charaka Samhita and Sushruta Samhita. It has been mainly reflected to be used as an aphrodisiac agent along with improving conditions such as impotency, body strength and atisaar (diarrhoea). This review may help various clinicians with classical practice, where the patients may be provided with highly performing Ayurvedic formulations as cited by the Vedic scientists. Subsequently, with the modernisation and technology coming into the human life, this herb has been studied and ample phytoconstituents were found in all parts of this climber, thus uplifting its economic importance in terms of food and medicine. The immature pods serve as the source of food and contribute to the nourishment of the body. L-Dopa, the main phenolic phyto-constituent, ensures this herb to be the natural herb of choice in male infertility and neuro-degenerative disorders such as Parkinsonism. The side effects, as reported by some studies, suggests that its use in certain conditions such as pregnancy, breast feeding and cardiovascular disease may be avoided. Additionally, not only for humans, but it has even placed itself as a nutritional agent for the livestock as fodder thereby, influencing the feed industry as well. Comprehensively, the review elucidates the remarkable therapeutic and nutritional potentials of this herb. More studies may be carried out, where the synergism of this healing agent with other natural products may be focussed, to provide an alternative to synthetic drugs.

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Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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