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A Comprehensive review on Tukhme Konch (Mucuna Pruriens) with Special Reference to Unani System of Medicine. A Review Article

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Abstract:-

Mucuna pruriens (Fabaceae) is an established herbal drug used for the management of male infertility, nervous disorders, and also as an aphrodisiac. It has been shown that its seeds are potentially of substantial medicinal importance. The ancient Indian medical system, Ayurveda, traditionally used M. pruriens, even to treat such things as Parkinson's disease. Mucuna Pruriens has been shown to have anti-Parkinson and neuro protective effects, which may be related to its anti-oxidant activity. In addition, anti-oxidant activity of Mucuna Pruriens has been also demonstrated in vitro by its ability to scavenge DPPH radicals and reactive oxygen species. In this review the medicinal properties of Mucuna pruriens are summarized, taking in consideration the studies that have used the seeds extracts and the leaves extracts. Medicinal plants have served as a constant source of medicaments, which have a great efficacy and demand for the treatment of various diseases. One of the plants that deserve attention is Mucuna pruriens. The present review was designed to evaluate the preliminary phytochemical screening and secondary metabolites. Different parts of the plant are used in Ayurvedic research since ancient period due to their excellent medicinal values and cure many diseases such as bone fractures, cough, dog-bite, madness, pain, pleuritis, ring worm, scorpion sting, snake-bite, sores and syphilis, and is anticholestrolemic, antiparkinson, antidiabetic, aphrodisiac, anti-inflammatory and antimicrobial, it is also used for the treatment of menstruation disorders, constipation, edema, fever, tuberculosis, etc

Keywords: Mucuna pruriens, Phytochemicals, Antioxidant, Parkinson's disease, Skin, Diabetes.

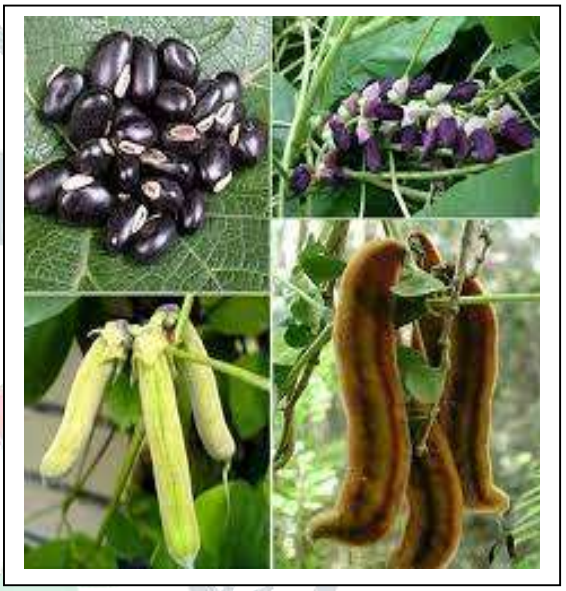
1. Introduction:

The genus Mucuna, belonging to the Fabaceae family, sub family Papilionaceae, includes approximately 150 species of annual and perennial legumes. Among the various under-utilized wild legumes, the velvet

bean Mucuna pruriens is widespread in tropical and sub-tropical regions of the world. It is considered a viable source of dietary proteins due to its high protein concentration (23–35%) in addition its digestibility, which is comparable to that of other pulses such as soybean, rice bean, and lima bean. It is therefore regarded a good source of food. The dozen or so cultivated Mucuna spp. found in the tropics probably result from fragmentation deriving from the Asian cultigen, and there are numerous crosses and hybrids. The main differences among cultivated species are in the characteristics of the pubescence on the pod, the seed color, and the number of days to harvest of the pod. "Cowitch" and "cowhage" are the common English names of Mucuna types with abundant, long stinging hairs on the pod.

The plant Mucuna pruriens, widely known as "velvet bean," is a vigorous annual climbing legume originally from southern China and eastern India, where it was at one time widely

|Fig.1 Mucuna Pruriens



|Fig.2 Seeds of Mucuna Pruriens

cultivated as a green vegetable crop. It is one of the most popular green crops currently known in the tropics; velvet beans have great potential as both food and feed as suggested by experiences worldwide. The velvet bean has been traditionally used as a food source by certain ethnic groups in a number of countries. It is cultivated in Asia, America, Africa, and the Pacific Islands, where its pods are used as a vegetable for human consumption, and its young leaves are used as animal fodder. The plant has long, slender branches; alternate, leaves; and white flowers with a bluish- purple, butterfly-shaped corolla. The pods or legumes are hairy, thick, and leathery; averaging 4 inches long; are shaped like violin sound holes; and contain four to six seeds. They are of a rich dark brown color, and thickly covered with stiff hairs. In India, the mature seeds of Mucuna bean are traditionally consumed by a South Indian hill tribe, the Kanikkars, after repeated boiling to remove anti-nutritional factors. Most Mucuna spp. exhibit reasonable tolerance to a number of abiotic stresses, including drought, low soil fertility, and high soil acidity, although they are sensitive to frost and grow poorly in cold, wet soils. The genus thrives best under warm, moist conditions, below 1500 m above sea level, and in areas with plentiful rainfall. Like most legumes, the velvet bean has the potential to fix atmospheric nitrogen via a symbiotic relationship with soil microorganisms.

Mucuna spp. has been reported to contain the toxic compounds L-dopa and hallucinogenic tryptamines, and anti-nutritional factors such as phenols and tannins. Due to the high concentrations of L-dopa (4–7%), velvet bean is a commercial source of this substance, used in the treatment of Parkinson's disease. The toxicity of unprocessed velvet bean may explain why the plant exhibits low susceptibility to insect pests. Velvet bean is well known for its nematicidic effects; it also reportedly possesses notable allopathic activity, which may function to suppress competing plants. Despite its toxic properties, various species of Mucuna are grown as a minor food crop. Raw velvet bean seeds contain approximately 27% protein and are rich in minerals. During the 18th and 19th centuries, Mucuna was grown widely as a green vegetable in the foothills and lower hills of the eastern Himalayas and in Mauritius. Both the green pods and the mature beans were boiled and eaten. In Guatemala and Mexico, Mucuna pruriens has for at least several decades been roasted and ground to make a coffee substitute; the seeds are widely known in the region as "Nescafé," in recognition of this use.

2. A Traditional Medicine-Tukhme Konch (Mucuna Pruriens)

Mucuna Pruriens is a popular Indian medicinal plant, which has long been used in traditional Unani, chines, and Ayurveda Indian medicine, for diseases including Parkinsonism. This plant is widely used in Ayurveda, which is an ancient traditional medical science that has been practiced in India since the Vedic times (1500–1000 BC). M. Pruriens is reported to contain L-dopa as one of its constituents. The beans have also been employed as a powerful aphrodisiac in Unani and have been used to treat nervous disorders and arthritis. The bean, if applied as a paste on scorpion stings, is thought to absorb the poison. The non- protein amino acid- derived L- dopa (3,4-dihydroxy phenylalanine) found in this under- utilized legume seed resists attack from insects, and thus controls biological infestation during storage. In Research all anti-nutritional compounds confer insect and disease resistance to plants. Further, L-dopa has been extracted from the seeds to provide commercial drugs for the treatment of Parkinson's disease. L-Dopa is a potent neurotransmitter precursor that is believed, in part, to be responsible for the toxicity of the Mucuna seeds. Anti- epileptic and anti-neoplastic activity of methanol extract of Mucuna Pruriens has been reported. A methanol extract of MP seeds has demonstrated significant in vitro anti-oxidant activity, and there are also indications that methanol extracts of Mucuna Pruriens may be a potential source of natural anti-oxidants and anti-microbial agents.

3. Functional Components of Mucuna Pruriens.

In addition to the low levels of sulfur-containing amino acids in M. pruriens seeds, the presence of anti-physiological and toxic factors may contribute to a decrease in their overall nutritional quality. These factors include polyphenols, trypsin inhibitors, phytate, cyanogenic glycosides, oligosaccharides, saponins, lectins, and alkaloids. Polyphenols are able to bind to proteins, thus lowering their digestibility. Phenolic compounds inhibit the activity of digestive as well as hydrolytic enzymes such as amylase, trypsin, chymotrypsin, and lipase. Recently, phenolics have been suggested to exhibit health related functional properties such as anti-carcinogenic, anti-viral, anti-microbial, anti-inflammatory, hypotensive, and anti-oxidant activities.

Trypsin inhibitors belong to the group of proteinase inhibitors that include polypeptides or proteins that inhibit trypsin activity. Tannins exhibit weak interactions with trypsin, and thus also inhibit trypsin activity. Phytic acid [myoinositol-1,2,3,4,5,6-hexa (dihydrogen phosphate)] is a major component of all plant seeds, which can reduce the bioavailability of certain minerals such as zinc, calcium, magnesium, iron, and phosphorus, as well as trace minerals, via the formation of insoluble complexes at intestinal pH. Phytate-protein complexes may also result in the reduced solubility of proteins, which can affect the functional properties of proteins.

Cyanogenic glycosides are plant toxins that upon hydrolysis liberate hydrogen cyanide. The toxic effects of the free cyanide are well documented and affect a wide spectrum of organisms since their mode of action is inhibition of the cytochromes of the electron transport system. Hydrogen cyanide (HCN) is known to cause both acute and chronic toxicity, but the HCN content of Mucuna Pruriens seeds are far below the lethal level. It is investigated the concentration of oligosaccharides in M. Pruriens seeds, and verbascose is reportedly the principal oligosaccharide therein. Fatty acid profiles reveal that lipids are a good source of the nutritionally essential linoleic and oleic acids. Linoleic acid is evidently the predominant fatty acid, followed by palmitic, oleic, and linolenic acids. The nutritional value of linoleic acid is due to its metabolism at tissue levels that produce the hormone- like prostaglandins. The activity of these prostaglandins includes lowering of blood pressure and constriction of smooth muscle. Phytohemagglutinins (lectins) are substances possessing the ability to agglutinate human erythrocytes.

The major phenolic constituent of Mucuna pruriens beans was found to be L-dopa (5%), along with minor amounts of methylated and non-methylated tetrahydroisoquinolines (0.25%). However, in addition to L-dopa, 5-indole compounds, two of which were identified as tryptamine and 5-hydroxytryptamine, were also reported in M. pruriens seed extracts. Mucunine, mucunadine, prurienine, and prurieninine are four alkaloids that have been isolated from such extracts.

4. Pharmacological activities of Tukhme Konch (Mucuna pruriens)

All parts of the Mucuna plant possess medicinal properties. In vitro and in vivo studies on Mucuna pruriens extracts have revealed the presence of substances that exhibit a wide variety of pharmacological effects, including anti-diabetic, anti-inflammatory, neuro protective and anti-oxidant properties, probably due to the presence of L-dopa, a precursor of the neurotransmitter dopamine. It is known that the main phenolic compound of Mucuna seeds is L-dopa (approximately 5%). Nowadays, Mucuna is widely studied because L-dopa is a substance used as a first-line treatment for Parkinson's disease. Some studies indicate that L-dopa derived from M. pruriens has many advantages over synthetic L-dopa when administered to Parkinson's patients, as synthetic L-dopa can have several side effects when used for many years.

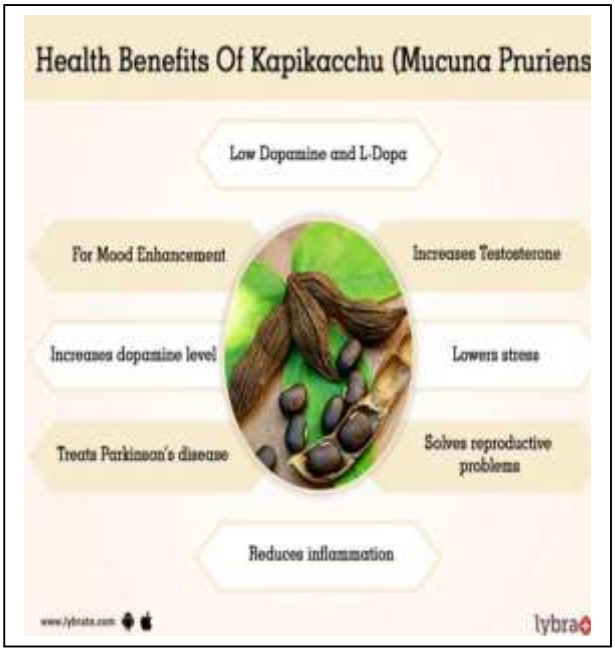


Fig.3 Health befits of Mucuna Pruriens

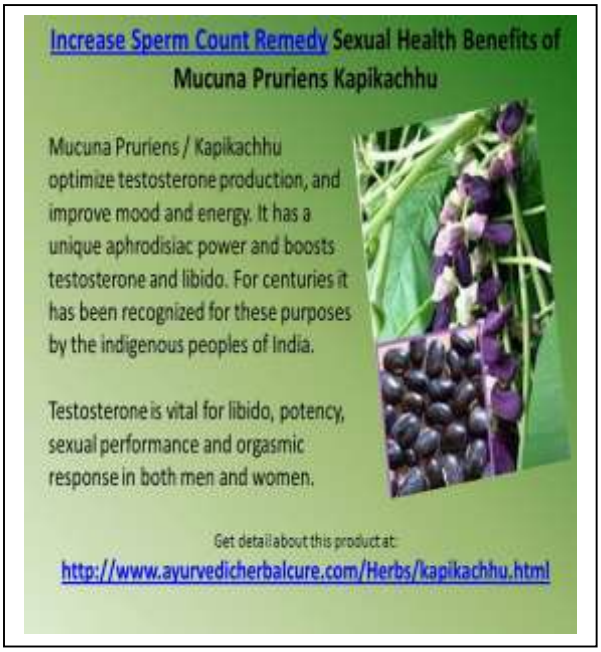


Fig.4 Health befits of Mucuna Pruriens

In small amounts (approximately 0.25%) L-dopa corresponds to methylated and non-methylated tetra hydro iso-quinoline . These substances are present in the Mucuna roots, stems, leaves, and seeds. Other substances are present in different parts of the plant, among which are N,N-dimethyl tryptamine and some indole compounds. Alcoholic extracts of the seeds were shown to have potential anti-oxidant activity in in vivo models of lipid peroxidation induced by stress. On the other hand, Spencer et al. (1996) have reported that the pro-oxidant and anti-oxidant actions of L-dopa and its metabolites promote oxidative DNA damage and could also be harmful to tissues damaged by neurodegenerative diseases, namely Parkinsonism. Moreover, a study using in vitro models revealed that L-dopa significantly increases the levels of oxidized glutathione in rat brain striatal synaptosomes. The observed depletion of reduced glutathione (GSH) could be due to the generation of reactive semiquinones from L-dopa.

5. Mucuna pruriens Seed against Venom Poisoning.

Mucuna pruriens is one of the plants that have been shown to be active against snake venom and, indeed, its seeds are used in traditional medicine to prevent the toxic effects of snake bites, which are mainly triggered by potent toxins such as neurotoxins, cardiotoxins, cytotoxins, phospholipase A_2 (PLA_2), and proteases. In Plateau State, Nigeria, the seed is prescribed as a prophylactic oral anti-snakebite remedy by traditional practitioners, and it is claimed that when the seeds are swallowed intact, the individual is protected for one full year against the effects of any snake bite. The mechanisms of the protective effects exerted by Mucuna pruriens seed aqueous extract (MPE), were investigated in detail, in a study involving the effects of Echis carinatus venom (EV). In vivo experiments on mice showed that protection against the poison is evident at 24 hours (short-term), and 1 month (long term) after injection of MPE. MPE protects mice against the toxic effects of EV via an immune mechanism. MPE contains an immunogenic component, a multiform glycoprotein, which stimulates the production of antibodies that cross-react with (bind to) certain venom proteins. This glycoprotein, called gp Muc, is composed of seven different isoforms with molecular weights between 20.3 and 28.7 kDa, and

pI between 4.8 and 6.5.

6. Pharmacological activity of Mucuna pruriens and its compounds

It is likely that one or more gp Muc isoform is analogous in primary structure to venom PLA_2. The presence of at least one shared epitope has been demonstrated with regard to MP seeds and snake venom. These cross-reactivity data explain the mechanism of the long-term protection conferred by MP, and confirm that certain plant species contain PLA_2-like proteins, which are beneficial for plant growth, and are involved in important processes. In addition, MP seeds contain protein and non-protein components that are able to directly inhibit the activity of proteases and PLA_2, and are responsible for short-term protection. In fact, MPE contains protease inhibitors that are active against snake venom, in particular a gp Muc isoform sequence also found in a "Kunitz type" trypsin inhibitor contained in soy. Two-dimensional gel electrophoresis has been used to separate the seven gpMuc isoforms, in order to perform N-terminal analysis of each individual isoform. The sequences obtained are shown in. According to their sequences, we can group the isoforms at positions 1, 2, and 4 on the gel, which are identical in 12/12 aa. The isoform at position 3 is identical to those aforementioned, with regard to the first 10 aa, and those at positions 5, 6, and 7 differ from those at positions 1,2 and 4 by just 3 aa. On the other hand, the direct inhibitory action of MPE is probably caused by L-dopa, the main bioactive component, which acts in synergy with other compounds.

7. Anti-microbial Effects of Mucuna Pruriens Leaves.

Various parts of certain plants are known to contain substances that can be used for therapeutic purposes or as precursors for the production of useful drugs. Plant-based anti-microbial represent a vast untapped source of medicines and further investigation of plant anti-microbial is needed. Anti-microbial of plant origin has enormous therapeutic potential. Phytochemical compounds are reportedly responsible for the anti-microbial properties of certain plants. While bioactive compounds are often extracted from whole plants, the concentration of such compounds within the different parts of the plant varies. Parts known to contain the highest concentration of the compounds are preferred for therapeutic purposes. Some of these active components operate individually, others in combination, to inhibit the life processes of microbes, particularly pathogens. Crude methanolic extracts of M. pruriens leaves have been shown to have mild activity against some bacteria in experimental settings probably due to the presence of phenols and tannins. Further studies are required in order to isolate the bioactive components responsible for the observed anti-microbial activity.

8. Neuro protective Effect of Mucuna Pruriens Seeds.

Parkinson's disease is a common neurological entity found in elder people. It is characterized by tremor, rigidity, Brady-kinesia and postural instability. It occurs due to the insufficient formation and action of dopamine. Human beings have always had the potential for insufficient dopamine. Although Parkinson's disease has increased in its prevalence over time, it must have existed to some extent for as long as human existence. There are references found to Parkinson's disease symptoms throughout history. There is no elaborate description of Parkinson's disease in the Unani literature. However, while going through these, one gets enough literature under the heading of Ra'asha i.e. tremor. As tremor constitutes one of the important symptoms of Parkinson's disease. Parkinsonian tremor can be well visualized under the context of such descriptions, as given by Unani scholars.

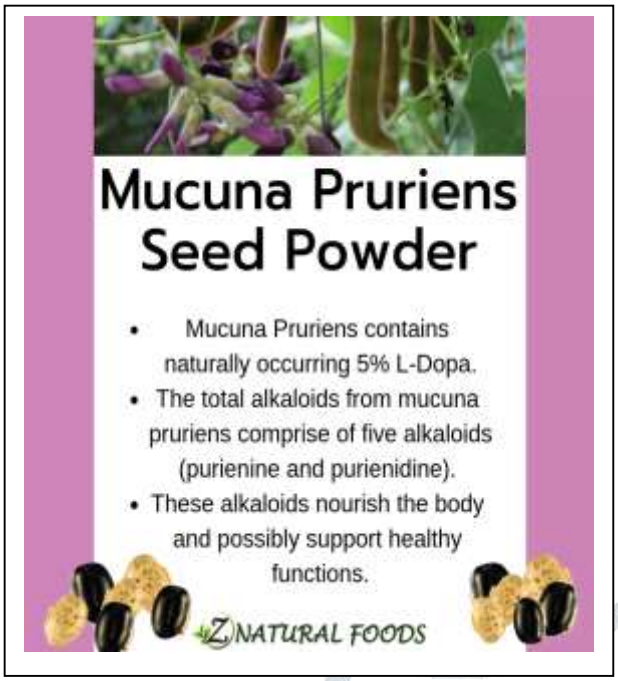


Fig.5 Constituents of Seed of Mucuna Pruriens

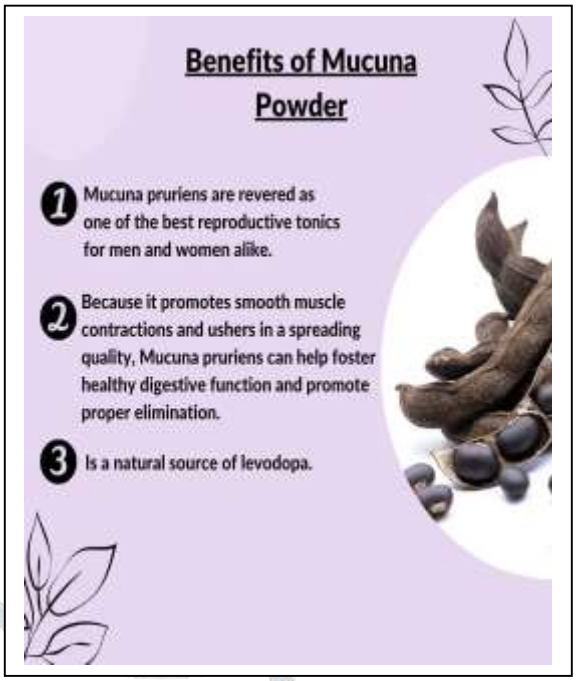


Fig.6 Benefits of Powder of Mucuna Pruriens

Among the ancient Unani scholars, the father of medicine, Hippocrates (460 B.C.) who was the first to recognize Parkinson's disease symptoms, i.e. Ra'asha quoted by Zakaria al-Razi. One such quote described in Al-Hawi Fi al-Tib is as follows:

"Ra'asha occurring because of the dryness of organs is the worst type and is untreatable"1.

Avicenna accepted the descriptions of Hippocrates about the Ra'asha and describes various types of Ra'asha with their treatment as well.

Hippocrates described, that Ra'asha occurs due to brain malfunction in hyperpyrexia (Humma Muharriqa) and disappears spontaneously. Dioscorides (100 A.D.) has discussed the detailed treatment of Ra'asha in his famous book Kitabul Hashaish as quoted below:

"Qurdmana is useful in paralysis and when given with Arq-e-karnab, it is beneficial in tremors also. Roasted brain of wild rabbit is beneficial in Ra'asha occurring after chronic disease. Castorium (Jund badaster) is useful in Ra'asha in both systemic and local forms.

In India, the seeds of M. pruriens have traditionally been used as a nervine tonic, and as an aphrodisiac for male virility. The pods are anthelmintic, and the seeds are anti-inflammatory. Powdered seeds possess anti-parkinsonism properties, possibly due to the presence of L-dopa. It is well known that dopamine is a neurotransmitter. The dopamine content in brain tissue is reduced when the conversion of tyrosine to L-dopa is blocked. L-Dopa, the precursor of dopamine, can cross the blood-brain barrier and undergo conversion to dopamine, restoring neurotransmission. Good yields of L-dopa can be extracted from M. pruriens seeds with EtOH-H_2O (1:1), using ascorbic acid as a protector. An n-propanol extract of M. pruriens seeds yields the highest response in neuro protective testing involving the growth and survival of DA neurons in culture. Interestingly, n-propanol extracts, which contain a negligible amount of L-dopa, have shown significant neuro protective activity, suggesting that a whole extract of M. pruriens seeds could be superior to pure L-dopa with regard to the treatment of Parkinsonism.

9. Anti-Dibetic effect of Mucuna pruriens

Using a combination of chromatographic and NMR techniques, the presence of d-chiro-inositol and its two galacto-derivatives, O-α-d-galactopyranosil-(1→2)-d-chiro-inositol (FP1) and O-α-d-galactopyranosil-(1→6)-O-α-d-galactopyranosil-(1→2)-D-chiro-inositol (FP2), was demonstrated in M. pruriens seeds. Galactopyranosyl d-chiro-inositols are relatively rare and have been isolated recently from the seeds of certain plants; they constitute a minor component of the sucrose fraction of Glycine max (Fabaceae) and lupins, and a major component of Fagopyrum esculentum (Polygonaceae). Although usually ignored in phytochemical analyses conducted for dietary purposes, the presence of these cyclitols is of interest due to the insulin-mimetic effect of d-chiro-inositol, which constitutes a novel signaling system for the control of glucose metabolism. According to research report, M. pruriens seeds used at a dose of 500 mg/kg reduced plasma glucose levels. These and other data demonstrated that the amount of seeds necessary to obtain a significant anti-diabetic effect contain a total of approximately 7 mg of d-chiro-inositol (including both free, and that derived from the hydrolysis of FP1 and FP2). The anti-diabetic properties of M. pruriens seed EtOH/H_2O 1:1 extract are most likely due to d-chiro-inositol and its galacto-derivatives

10. Anti-Oxidant Activity of Mucuna pruriens

Free radicals that have one or more unpaired electrons are produced during normal and pathological cell metabolism. Reactive oxygen species (ROS) react readily with free radicals to become radicals themselves. Anti-oxidants provide protection to living organisms from damage caused by uncontrolled production of ROS and concomitant lipid peroxidation, protein damage and DNA strand breakage. Several substances from natural sources have been shown to contain anti-oxidants and are under study. Anti-oxidant compounds such as phenolic acids, polyphenols, and flavonoids, scavenge free radicals such as peroxide, hydro-peroxide or lipid peroxyl, and thus inhibit oxidative mechanisms. Polyphenols are important phytochemicals due to their free radical scavenging and in vivo biological activities; the total poly-phenolic content has been tested using Folin-Ciocalteau reagent. Flavonoids are simple phenolic compounds that have been reported to possess a wide spectrum of biochemical properties, including anti-oxidant, anti-mutagenic and anti-carcinogenic activity. The hydrogen donating ability of the methanol extract of M. pruriens was measured in the presence of 1,1-diphenyl-2-picryl-hydrazyl (DPPH) radical. In a recent study, found that ethyl acetate and methanolic extract of whole M. pruriens plant (MEMP), which contains large amounts of phenolic compounds, exhibits high anti-oxidant and free radical scavenging activities. These in vitro assays indicate that this plant extract is a significant source of natural anti-oxidant, which may be useful in preventing various oxidative stresses. It has been reported that methanolic extracts of M. pruriens leaves have numerous biochemical and physiological activities, and contain pharmaceutically valuable compounds.

11. Mucuna pruriens in Skin and cosmetology.

The skin is one of the main targets of several exogenous insults such as UV radiation, O_3, and cigarette smoke, and all of these exert toxicity via the induction of oxidative stress. Several skin

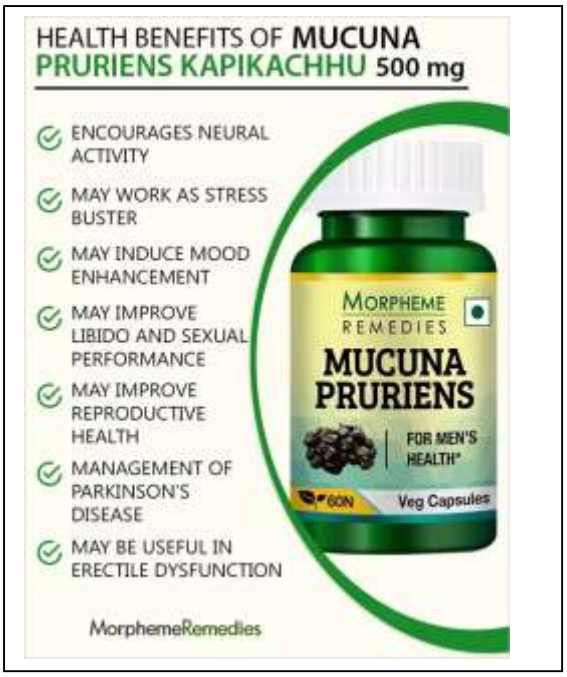


Fig. 7 various uses of Mucuna Pruriens

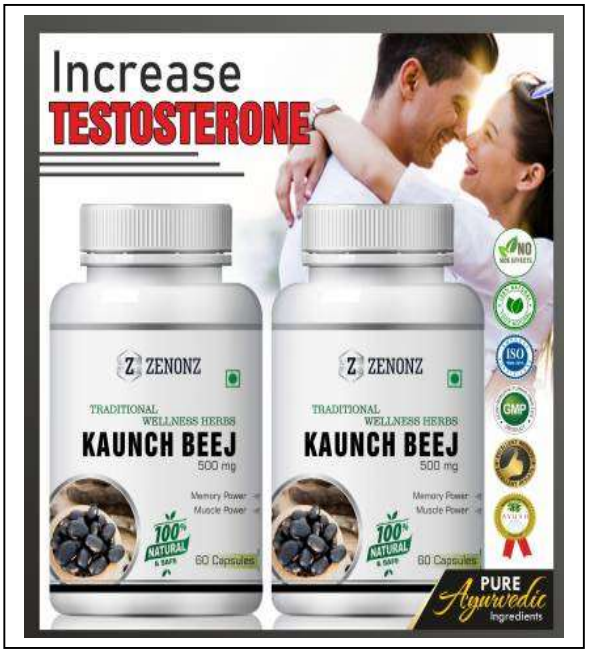


Fig.8 Mucuna Pruriens increases testosterone Level in male

pathologies, such as psoriasis, dermatitis, and eczema, are related to increased oxidative stress and ROS production, and research investigating novel natural compounds with anti-oxidant proprieties is an expanding field. As mentioned above, certain plant-derived compounds have been an important source of traditional treatments for various diseases, and have received considerable attention in more recent years due to their numerous pharmacological proprieties. Recent preliminary studies from our group have shown that human keratinocytes treated with a methanolic extract from MP leaves exhibit down regulation of total protein expression. In addition, treatment with MP significantly decreased the baseline levels of 4HNE present in human keratinocytes. This preliminary study suggests that evaluating the effect that topical MP methanolic extract treatment may have on skin diseases would be worthwhile, as would further work aimed at clarifying the mechanisms involved in such effects.

12. Aphrodisiac effect of Mucuna pruriens

The second most potential is aphrodisiac effect proved for this Mucuna pruriens. The M. pruriens ethanolic extract administered in either sex rats significantly increased the mounting frequency, intromission frequency and ejaculation latency, and decreased the mounting latency, intromission latency, post-ejaculatory interval and inter intromission interval. The potency test significantly increased erections, quick flips, long flips and total reflex. M. pruriens and its Major Constituent L-DOPA Recover spermatogenic loss by combating ROS, loss of mitochondrial membrane potential and apoptosis. The oral administration of 5g of Mucuna seed powder once in a day for men with decreased sperm count and motility ameliorated psychological stress and seminal plasma liquid peroxide levels along with improved sperm count and motility. The study also concluded that M. pruriens not only reactivates the antioxidant defense mechanism, but also helps in the management of stress and

improves semen quality. The results on sperm count found highly significant. It also showed good improvement in other seminal parameter like Volume of semen, pH of semen, motility of sperms etc. It showed mild significant result in Non progressive sperm (NP) and not significant in Slow linear progress of sperm (SLP). It also significantly increased the sexual desire, penile rigidity, erection and duration of ejaculation with orgasm. M. pruriens seed powder rejuvenates the harmonic balance of male reproductive hormones in infertile men and reactivates the enzymatic activity of metabolic pathways and energy metabolism. The treatment with M. pruriens significantly improves psychological stress and seminal plasma lipid peroxide levels along with improved sperm count and motility and also restored the levels of SOD (Super Oxide dismutase), catalase, GSH (Glutathione) and ascorbic acid in seminal plasma of infertile men which was found to be low before the treatment. Dose and time-dependent effects of ethanolic extract of M. pruriens seed produced a significant and sustained increase in the sexual activity of normal male rats at a particular dose (200 mg/kg) by enhancing the various sexual activity like mounting frequency, intromission frequency and ejaculation latency. Effect of M. pruriens on semen profile and biochemical parameters showed significantly inhibited lipid peroxidation, elevated spermatogenesis, and improved sperm motility. Treatment also recovered the levels of total lipids, triglycerides, cholesterol, phospholipids, and vitamin A, C, and E and corrected fructose in seminal plasma of infertile men. M. pruriens improves male fertility by its action on the hypothalamus-pituitary-gonadal axis. After the treatment with M. pruriens significant improvement were observed in Testosterone, Luteinizing Hormone, dopamine, adrenaline, and nor-adrenaline levels in infertile men and reduced levels of Follicle Stimulating Hormone and Prolactin. The sperm count and motility were significantly recovered in infertile men after treatment not only reactivates the anti-oxidant defense mechanism, but also helps in the management of stress and improves semen quality.

Fig.9 Mucuna Pruriens Beneficial for male and female fertility

Fig.10 Mucuna Pruriens used for Body Building in male and female

13. Mucuna pruriens Effect on Fertility

Mucuna pruriens improves male fertility by its action on the hypothalamus-pituitary-gonadal axis. M. pruriens significantly improved serum testosterone, luteinizing hormone, dopamine, adrenaline, and noradrenaline levels in infertile men and reduce the levels of follicle stimulating hormone (FSH) and prolactine hormone (PRL). Sperm count and motility were significantly recovered in infertile men. The quality of seminal

changes due to psychological stress was assessed after treating the case with M. pruriens seed powder at 5g/ day orally. For carrying out morphological and biochemical analysis, semen samples were collected twice, first before starting the treatment and second after 3 months of treatment. The results demonstrated the decreased sperm count and motility in subjects who were under psychological stress. Moreover, serum cortisol and seminal plasma lipid peroxide levels were also found elevated along with decreased seminal plasma glutathione (GSH) and ascorbic acid contents, reduced superoxide dismutase (SOD) and catalase activity. Treatment with M. pruriens significantly ameliorated psychological stress and seminal plasma lipid peroxide levels along with improved sperm count and motility. Treatment also restored the levels of SOD, catalase, GSH and ascorbic acid in seminal plasma of infertile men. M. pruriens not only reactivates the antioxidant defense system of infertile men but also helps in the management of stress and improves semen quality. The effects of M. pruriens on the gonads of male Guinea pigs were investigated and found to be the potential male antifertility agent even at a lower dosage of 70mg/kg. The methanolic extracts of M. pruriens significantly increased the relative weight of the testis, serum and testicular testosterone level, testicular cholesterol level, protein level in the testis and epididymis, and epididymal alkaline phosphatase activity

12. Conclusion:

Mucuna pruriens is an exceptional plant. On the one hand it is a good source of food, as it is rich in crude protein, essential fatty acids, starch content, and certain essential amino acids. On the other hand, it also contains various anti-nutritional factors, such as protease inhibitors, total phenolics, oligosaccharides, and some cyclitols with anti-diabetic effects. In fact, all parts of the Mucuna plant possess medicinal properties. The main phenolic compound is L-dopa (5%), and M. pruriens seeds contain some components that are able to inhibit snake venom. In addition, methanolic extracts of M. pruriens leaves have demonstrated anti-microbial and anti-oxidant activities in the presence of bioactive compounds such as phenols, polyphenols and tannins, and preliminary studies on keratinocytes support its possible topical usage to treat redox-driven skin diseases. Collectively, the studies cited in this review suggest that this plant and its extracts may be of therapeutic value with regard to several pathologies, although further work is needed to investigate in more detail the mechanisms underlying the pharmacological activities of MP.

Mucuna pruriens is an exceptional plant. On the one hand it is a good source of food, as it is rich in crude protein, essential fatty acids, starch content, and certain essential amino acids. On the other hand, it also contains various anti-nutritional factors, such as protease inhibitors, total phenolics, oligosaccharides (raffinose, stachyose, verbascose), and some cyclitols with anti-diabetic effects. In fact, all parts of the Mucuna plant possess medicinal properties. The main phenolic compound is L-dopa (5%), and Mucuna pruriens seeds contain some components that are able to inhibit snake venom. In addition, methanolic extracts of Mucuna pruriens leaves have demonstrated anti-microbial and anti-oxidant activities in the presence of bioactive compounds such as phenols, polyphenols and tannins, and preliminary studies on keratinocytes support its possible topical usage to treat redox-driven skin diseases. Collectively, the studies cited in this review suggest that this plant and its extracts may be of therapeutic value with regard to several pathologies, although further work is needed to investigate in more detail the mechanisms underlying the pharmacological activities of MP.

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