

KULATTHA, A NEUTRACEUTICAL PULSE HAVING MULTIPLE THERAPEUTIC EFFECTS –A REVIEW***Dr. Subha Bose Banerjee**

Asst. Prof., in Physiology, Post Graduate Dept. of Physiology Hooghly Mohsin College, Chinsurah, Hooghly.

***Corresponding Author: Dr. Subha Bose Banerjee**

Asst. Prof., in Physiology, Post Graduate Dept. of Physiology Hooghly Mohsin College, Chinsurah, Hooghly.

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ABSTRACT

Kulattha is an underutilized and unexplored food legume. Kulattha is popularly known as Horse gram. Kulattha with the botanical name *Macrotyloma Uniflorum* (previously termed as *Dolichos Biflorus*) is a plant from the Leguminosae family. Kulattha or horse gram seeds are rich in flavonoids, urease, glycosides, lenoleic acid, polyphenols. Some other important constituents are Collidin and Genistein. It also contains calcium and traces of phosphorus. Kulattha leaves can be used for curing Vitamin C deficiency. Its rich content of amino acids makes it even better than soyabean when it comes to nutrition. It also contains Vitamin A. Kulattha seeds are useful for removing stones from the gall bladder, kidney and urine. It breaks down the stones and helps in easing the flow of urine. It is also helpful in treating the problem of painful urination. It is rich in urease enzymes which help in reducing urea by converting it into ammonia. Using this herb keeps the kidneys healthy. It has hepatoprotective effects. Kulattha seeds have anti hypercholesterolemic, anti diabetic, anti helminthic, anti microbial, anti inflammatory effects. The antioxidants present in this plant reduce free radicals in the body which are responsible for many diseases. Kulattha is believed to treat asthma, breathing issues and respiratory disorders. The consumption of Kulattha seeds help in maintaining a regular menstrual cycle. It increases the flow of blood during periods. It also control constipation. Kulattha can be used as a neutraceutical that should be included in our diet on a regular basis.

KEYWORDS: Kulattha, Neutraceutical, Kidney stone, anti diabetic, anti oxidant, anti inflammatory.**INTRODUCTION**

Food legumes, an essential component of balanced human diet are recognized as the second most important group of crops after cereals.^[1] Nutraceuticals are those foods or parts of foods that provide health and/or medical benefits including prevention, protection and treatment of a disease. Kulattha is one of the legumes which are having high nutritious values in the developing countries. Besides nutritional importance kulattha has been known to its excellent remedial values due to presence of non-nutritive bioactive substances. So kulattha can be used as a neutraceutical. The seeds of kulattha contain bioactive substances such as phytic acid, phenolic acid, fiber, enzymatic/proteinase inhibitors which have significant metabolic and physiological effects. Kulattha with the botanical name *Macrotyloma Uniflorum* (previously termed as *Dolichos Biflorus*) is a plant from the Leguminosae family. It is found in Asia and Africa. In India, it is grown in southern states like Andhra Pradesh, Maharashtra and Karnataka.

The seeds of this shrub are generally very useful. This plant looks like most of the bean bearing plants. It has a tap root with nitrogen nodules. Kulattha is popularly known as Kulattha or Kulatthika in Sanskrit and its

common name is Horse gram. It is a perennial plant and its seeds resemble moong dal in appearance but have a yellow colour. Seeds of kulattha are rich in protein, carbohydrate, fat, dietary fibre, micronutrients and antioxidants.^[2] Kulattha is a storehouse of polyphenols, flavonoids, and potent antioxidants that keep your body strong, vibrant and young.

Phytochemical screening studies reveal the existence of flavonoids, urease, glycosides, lenoleic acid, polyphenols, beta Sitosterol, amino acids- glycine, alanine, cysteine, serine, isoflavones, genistein, isoferririn, cumesterol, psoralidin, galactosidase, glucosides and streptogenin.^[3] The seeds of Kulattha contain extractable total phenolics and tannins. Dry heated samples were found to have considerable amounts of phenolics and tannins than in raw samples.^[4,5] Phenolic acids are isolated from the ethanolic extract of the seeds of Kulattha by reversed phase HPLC. There were eight phenolic acids components and the most abundant was p-coumaric acid and p-hydroxy benzoic acid. The successive extracts of root, seeds of Kulattha have revealed the presence of alkaloids, flavonoids, glucosides, lignins, phenols, saponins, tannins and

sterols. Alkaloids are the lead molecules of curative importance from *Macrotyloma* species.

In Ayurveda, the seed of kulattha is used in the treatment of piles, pain, constipation, wounds, urinary calculi, cough, edema, asthma, etc. Soup prepared from seeds is also beneficial in enlarged liver and spleen. The seeds of kulattha have been reported to show antilithiatic,^[6] antihepatotoxic,^[7] and hypolipidemic activity,^[8] and are involved in lowering the level of blood sugar and total cholesterol.^[9] Two Ayurvedic preparations^[10,11] having kulattha as an ingredient, have shown their antinephrotoxic and free radical scavenging activity. The extracts from Kulattha seeds had significant activity against *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa*.^[12] Different parts of the Kulattha plants are used for the treatment of heart conditions, asthma, bronchitis, leucoderma, urinary discharges and for treatment of kidney stones. Kulattha powder does wonders in treating various health issues such as asthma, bronchitis, urinary problems, jaundice, peptic ulcer, haemorrhoids and even menstrual problems. The seeds of Kulattha have natural qualities that work as fat burners. It can reduce the LDL cholesterol and increase the HDL cholesterol. Studies have proven that kulattha seeds can directly attack the fatty tissues stored in the body. It is favourable in melting body fat and gives a proper shape to the body. The calcium, phosphorus, iron and amino acids in kulattha boost the sperm count. These minerals positively act on the male reproductive system, increasing blood flow to those organs, while the amino acids augment enzyme activity, which in turn assures optimal generation of sperms. The consumption of Kulattha seeds help in maintaining a regular menstrual cycle. It increases the flow of blood during periods. Menstrual disorders can be helped naturally with kulattha. Constipation can constantly trouble people and lead to several diseases like piles. One of the best ways to avoid constipation is to use the seeds of Kulattha plant. It not only avoids constipation but also provides relief from regular constipation. Indigestion and bloating can also be managed.

After critical assessment of nutritional and therapeutic aspect of Kulattha, it can now be concluded that-it is a rich source of nutrient and antinutrient content. The nutritional value of kulattha is comparable with other pulse crop. Kulattha has high levels of antioxidant and radical scavenging activities in addition to their traditional role of providing proteins and carbohydrates. It has rich source of various natural bioactive substances such as phytic acid, fiber, phenolic acid etc. These bioactive substances have immense potential for curing varieties of diseases such as common cold, throat infection, fever, urinary stones, asthma, bronchitis, leucoderma, etc. BBIs, the proteinase inhibitors have been identified to treat anti-inflammatory, obesity and several degenerative and autoimmune diseases. However, there is a dearth of information on the specific

health beneficial components in this lesser known legume. Thus, considering its immense potential as health benefit it needs to exploit as a source of nutraceutical and food industries.

Pharmacological activities of Kulattha

Kulattha can be used as a multifaceted treatment as well as a wholesome food that should be included in our diet on a regular basis. Kulattha can be used to treat a variety of ailments, originating through a multitude of causes. Seeds are having scientifically proven bioactivities such as anti-diabetic, antihyperlipidemic, diuretic, antioxidant and chemo modulatory. Therefore it can be beneficial in the management of the diseases such as diabetes mellitus, hyperlipidaemia, hypertension and stroke.

Anti-hypercholesterolemic effect

Kulattha seeds reduce serum cholesterol levels, inhibit the hepatic cholesterol genesis, increase excretion of fecal sterol and decrease insulin secretion activates lipoprotein lipase which leads to hypertriglyceridemia. Kulattha extracts have strong activities against hypercholesterolemia and obesity. Antihypercholesterolemic effect of Kulattha extract is examined in rats by assessing its effects on food consumption, weight gain, serum lipid profile, serum glutamate oxaloacetate transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT) and body fat.^[13]

Anti-urolithiatic activity

Kulattha was found to be effective in preventing the deposition of the stones in experimental rats. Kidney stones occur due to crystallization of calcium phosphate salts in the body. Kulattha seeds, being infused with powerful antioxidants, play a central role in inhibiting this salt hardening process. Thus, it is very efficacious in eliminating harmful free radicals from causing injury to healthy kidney cells. Kulattha is also a dynamic ingredient in promptly remedying kidney disorders. It has been reported the antiurolithiatic activity of aqueous and alcohol extracts of *M. uniflorum* seed on ethylene glycol induced urolithiasis.^[14]

Anti-helminthic activity

The seeds of Kulattha have anthelmintic activity which can be beneficial in eliminating worms.^[15] Alcohol extracts of Kulattha seeds were tested for their anthelmintic activity. These extracts exhibited potent anthelmintic activity against *Pheretima posthuma* and its activity was comparable with that of the standard, albendazole. Due to its anthelmintic properties, the seeds of Kulattha are useful in treating amoebic dysentery, bowel hemorrhage and colic pains.

Anti-microbial activity

The extracts from Kulattha seeds had significant activity against *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa*.^[5,12,16] A literature survey showed that Dolichin A and B,

pyroglutaminyglutamine along with some flavonoids were isolated from horse gram. The ethanolic seed extract of Kulattha showed potential free radical scavengers (antioxidant) with significant scavenging activity. Moreover, phytochemical studies revealed that Kaempferal-3-O- β -D-glucoside, β -sitosterol, stigmasterol and phenolic compounds were isolated from horse gram have the cytotoxicity and antimicrobial activities.^[2]

Antioxidant and anti-inflammatory effect

Phytochemical analysis of Kulattha showed that the presence of alkaloids, flavonoids, carbohydrates, proteins, and tannins, may contribute to its anti-inflammatory and antioxidant activity.^[17] Seeds of Kulattha are excellent sources of polyphenols. They are capable of removing free radicals, chelating metal catalysts, activating antioxidant enzymes, reducing tocopherol radicals and inhibiting oxidase. It has been reported that the aqueous extracts of Kulattha coat and pulp by invitro method for inhibition of human secretory phospholipase A2 (sPLA2) as a function of anti-inflammatory activity. The extract effectively neutralized indirect hemolytic activity and showed similar potency in neutralizing the in vivos PLA2 induced mouse paw edema.^[18]

Anti-diabetic activity

Kulattha seeds reduce blood sugar levels and post-prandial hyperglycemia, decrease absorption of the carbohydrate from the gut and abundant of soluble fiber. Therefore the seeds are useful in the treatment of diabetes mellitus. The antidiabetic effect of α -amylase inhibitor isolated from the seeds of Kulattha in streptozotocin- nicotinamide induced diabetic mice has been reported. The biochemical parameters such as serum total cholesterol, aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels have been determined.^[19] It has been found that *M. uniflorum* (Kulattha) α -amylase inhibitor (MUAI) inhibited both the mouse pancreatic and human salivary α -amylase. MUAI reduced the serum glucose level in the treated diabetic mice. Histological findings revealed minimum pathological changes in the treated diabetic mice as compared to the diabetic control.^[19]

Anti-choliolithic activity

It was found that *M. uniflorum* seed exerted antilithogenic influence by decreasing the formation of lithogenic bile in mice. Both the methanolic and acetone extracts (ME and AE) were capable of decreasing cholesterol hyper-secretion into bile and increasing the bile acid output. The maximum effect was found in the AE as it decreased the papillary proliferation of gallbladder and hepatic fatty degeneration. Antioxidant property of polyphenol and tannin in AE may provide its potential antilithogenic effect.^[20]

Hepatoprotective activity

The raw seeds of Kulattha are a powerhouse of potent plant substances, namely flavonoids and polyphenols.

These compounds confer hepatoprotective properties towards the liver and gall bladder, safeguarding their key roles in filtering and purifying the blood and detoxifying chemicals in the body. The significant hepatoprotective properties of Kulattha seeds against D-Galctosamine and paracetamol induced hepatotoxicity in rats has been discovered.^[21]

Anti-allergic and anti-anaphylactic activity

The seeds of Kulattha have been traditionally used in the treatment of cough and asthma. Based on the traditional claim, Kulattha extract possesses anti-allergic and anti-anaphylactic potentials that might be useful in the management of asthma. The seeds of Kulattha have been reported to show anti-oxidant activity and chemomodulatory effect. The phytochemical investigation of Kulattha showed the presence of proteins, flavonoids and glycosides. Flavonoids are known to possess anti-inflammatory and anti-oxidant activities.^[22] Furthermore the ethanolic extract of Kulattha seeds showed anti-histaminic activity by using histamine induced contraction on goat tracheal chain preparation and histamine induced bronchoconstriction in Guinea pigs.^[23] Thus, the presence of these phytoconstituents in the ethanolic extract of Kulattha may further contribute in anti-allergic and anti-anaphylactic activities in the management of asthma.

CONCLUSION

Administration of Kulattha can be used as a multifaceted treatment as well as a wholesome food that should be included in our diet on a regular basis. Kulattha can be used to treat a variety of ailments, originating through a multitude of causes. Seeds are having scientifically proven bioactivities such as anti-diabetic, antihyperlipidemic, diuretic, antioxidant and chemo modulatory. Therefore it can be beneficial in the management of the diseases such as diabetes mellitus, hyperlipidaemia, hypertension and stroke. Kulattha seeds reduce blood sugar levels and post-prandial hyperglycemia, decrease absorption of the carbohydrate from the gut and abundant of soluble fiber. Therefore the seeds are useful in the treatment of diabetes mellitus. Further Kulattha seeds reduce serum cholesterol levels, inhibit the hepatic cholesterol genesis, increase excretion of fecal sterol and decrease insulin secretion activates lipoprotein lipase which leads to hypertriglyceridemia. Seeds are also capable to possess hepatoprotective and anti-hyperlipidemic activities. All the above-mentioned effects can contribute potentially toward reduction of hypercholesterolemia and obesity. Seeds of Kulattha are excellent sources of polyphenols. They are capable of removing free radicals, chelating metal catalysts, activating antioxidant enzymes, reducing tocopherol radicals and inhibiting oxidase. Due to its anthelmintic properties, the seeds of Kulattha are useful in treating amoebic dysentery, bowel hemorrhage and colic pains. However, there is a dearth of information on the specific

health beneficial components in this lesser known legume. Thus, considering its immense potential as health benefit it needs to exploit as a source of nutraceutical and food industries.

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