



A Review On Phytoconstituents And Pharmacological Activities Of Potential Plant *Luffa Acutangala* (Roxeb)

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Abstract:

L. acutangula has been used extensively in Indian traditional system of medicines as diuretic, expectorant, laxative, purgative, hypoglycemic agent and bitter tonic. The phytochemical analysis of *Luffa acutangula* extracts showed that the fruits contained tannin, saponin, anthraquinone, sterols, glycosides, carbohydrates, reducing sugar, flavinoids, phenolic compounds, quinines. Terpenes, cucurbitacins, oil and trigens, Pharmacological studies showed that Cucurbitaceae possessed anticancer antiparasitic, anti-microbial. Antioxidant, hypoglycemic, hepato-, cardio-, nephro- and gastroprotective, anti-inflammatory and analgesic, immunomodulatory. Abortifacient, anticancer and behavioral changing effects. This review has been designed to highlight the chemical constituents and pharmacological effects of Cucurbitaceae. *Luffa acutangula* Linn. (Cucurbitaceae) has many therapeutic uses mentioned in ayurveda and therefore we aimed to study its anti-inflammatory and anti-cancer activity. This study aimed to determine pharmacognostic properties (macroscopic and microscopic fragments of crude drugs), chemical compound content, and pharmacological activity of Cucurbitaceae extract in literature studies. *L. acutangula* which contain various phytochemical compounds is most prominent to be further studied to develop its pharmacological benefits.

Keywords:

Anti-oxidant, hypoglycemic, hepato-cardio- nephro , gastroprotective, anti-inflammatory and analgesic, immunomodulatory. Abortifacient, anticancer, expectorant, laxative , purgative, diuretic ,bitter tonic.

Introduction:

Lacurangula i.e Cucurbitacea is a pan tropical climbing herb and cultivated throughout India which can grow in all types of soils and in natural tropics and subtropics and can be grown in summer or in rainy season. L.actangula is propagated by seeds and can be sown either in February-March or June- July Botanical characters.The entire plant of Luffa acutangula L is medicinally important and is used extensively in Indian traditional system of medicines. Various phytochemicals reported in L. acutangula were given . Chemical constituents of L. Acutangal. Mainly include carbohydrates, carotenoids", fat, protein, phytin, amino acids (alanine, arginine, cystine, glutamic acid, glycine, hydroxyproline,leucine, serine, tryptophan),pipecolic acid, flavonoids and saponins". Luffangulin, a novel N-terminal ribosome

Inactivating peptide was isolated from the seeds of 1. Acutangula Presence of sapogenin, olcanolic acid and a bitter principle, Cucurbitacin B were also identified from the seeds of L acutangala. Recent reviews revealed that the medicinal plants possessed central nervous cardiovascular antioxidant reproductive gastro-intestinal respiratory antidiabetic antimicrobial antiparasitic dermatological anticancer anti-inflammatory, antipyretic and analgesic immunological hepato and reno-protectives and many other pharmacological effects. The phytochemical analysis of Luffa acatangala extracts showed that the fruits contained tannin, saponin, anthroquinone, sterols, glycosides, carbohydrates, reducing sugar, flavinoids, phenolic compounds, quinines. Fignis, cucurbitacins, oil and triterpenes.

Taxonomic classification:

Kingdom: Plantae. Subkingdom: Viridiplantae. Infrakingdom: Streptophyta, Superdivision: Embryophyta,

Division: Tracheophyta, Subdivision: Spermatophytina, Class: Magnoliopsida, Superorder: Rosanac, Order: Cucurbitales, Family: Cucurbitaceae, Genus: Luffa, Species: Luffa acutangula"

Common names: Arabic: leef: Chinese: guang dong si gua: English: angled loofa, angled loofah, Chinese okra, Chinese squash,

Dishcloth gourd, ribbed loofah, ridged gourd, silk gourd, silk squash, sinkwa towelsponge, strainer vine, vegetable gourd: French: papangaye; German: gerippte Schwammgurke: India: jhinga tor, kalitori, turiya: Japanese: tokado-hechima; Malaysia: ketola, petola segi: Philippines: patola; Portugese: Bucha de purge, Lufa riscada, Russian, Ijufa; Spanish: espoja, esponja, esponja estropajo, muñeco, servilleta de pobre, Swedish: kantgurka; Vietnam: muop khian fo.

Traditional and medicinal uses :-

Luffa acutangula has diverse ethnomedicinal uses especially in Africa and Asia. The thawed fiber is used in Ghana for the filtration of water and palm wine. Leaf formulations are used topically for oedemas and for treating malaria in Togo. The fruit is used on tumor and inflammation in Guinea, while the pulp of the fruit is used as a desiccant in Guinea and Nigeria. There are culinary conifers cultivated in Guinea and Cote d'Ivoire. Zulu people in South Africa take a leaf decoction to treat stomach pain. The root formulation and leaf syrup were documented to be ingested in Tanzania to decrease the probability of pregnancy termination. The leaves are used for the stimulation of wound healing and abscess cognitive development. The leaves are grounded with water and the juice is used for stomach upset medication in Rwanda. Leaf decoctions are used to make childbearing smoother in Uganda. Pulverized leaves are anally inserted for enterobiasis therapy in the Central African Republic. Decoction of the leaves is fully viable against filaria and a colloidal solution of fresh leaves is used to combat whooping cough in Congo-Brazzaville. Root formulation is used in Gabon as medicine for nose cancer. A root and leaf aqueous extract is documented to be consumed and used as an aborticide in an enema in the Democratic Republic of the Congo. The seed is used in Egypt for managing diabetes. The pulp of the whole crop is often used

as a remedy for acid reflux in African indigenous medication. The traditional uses of *Luffa acutangula* in different parts of Africa are summarized. Production of edible forms has taken place in India and the Philippines where the crop is mainly bred. A brand of curry which is produced from the fruit is stripped, chopped and, fried in China and India. The fruit is consumed fresh or diced and processed in Japan for later consumption. The fruit is also employed as a therapy for the treatment of cynocytosis and flu in Asia. Traditional medicine practitioners in China use the seed and sponge of the old fruits of the plant as stomachic, antipyretic and anthelmintic medicine. In addition, dried fruit is used as therapy for abdominal, chest, muscle, and joint pains. Moreover, the fruits are employed in the treatment of Rheumatism, dyspnea, cough and skin inflammation in Chinese folk medicine. The fruit reduces Breast swellings and it is combined with other Chinese herbs as a remedy against cancer. The Fibrovascular bundle of *Luffa acutangula* dried fruit is officially listed as a treatment for paralytic Diseases in Chinese pharmacopeia. In Korea, *Luffa acutangula* fruit pulp is used to treat fever, Induce hemostasis, stimulate menstrual flow, strengthen the network vessels, invigorate blood And clear phlegm. In Japan, the water extract of the vascular bundle of the plant, Hechimasui” is Used as diuretic, antitussive and skin lotion. In Java-In Af juice is used for Amenorrhea, while it is used for treating snake bites and dysentery in fans..



Ethnobotanical uses :-

The ethnobotanical survey of the hilly areas in Maharashtra revealed that very fine powder of fruits of *L. acutangula* is used as a snuff to protect jaundice. It is also used traditionally in insect bites by tribes of Western Maharashtra. A powder of the fruit is used for rubbing on the swollen hemorrhoids. Kernel of the seeds is soft smooth and an efficient remedy for dysentery while the juice of roasted young fruit is applied to cure headache. Folklore claims Ribbed gourd has diuretic properties; used as an expectorant, laxative and purgative; hypoglycemic agent, bitter tonic; used in the enlargement of spleen.

The roots of ridge gourd added to milk or water is helpful in the removal of kidney stones. The roots of ridge gourd are added to cooled water, boiled and applied on skin in the swelling of the lymph glands. The leaves of the ridge gourd are useful in the treatment of dysentery. The leaves or juice of the ridge gourd are used as dressing in the diseases such as inflammation of spleen, ringworms, piles and even in leprosy. Pounded leaves mixed with

garlic are applied locally for a relief in leprosy. Oil is extracted from the seeds of ridge gourd and used in the treatment of skin diseases. Ridge gourd is also an effective home remedy for the prevention of premature greying of hair. Ridge gourd is chopped in small pieces along with the ribbed skin and completely dried in the sun. Once the ridge gourd is fully dried, made into a powder and used to prevent the premature greying of hair(16).

Phytoconstituents :-

Various phytochemicals reported in *L. acutangula* were given

● Chemical constituents of *L. acutangula*:

Mainly include carbohydrates, carotenoids, fat, protein, phytin, amino acids (alanine, arginine, Cystine, glutamic acid, glycine, hydroxyproline, leucine, serine, tryptophan), pipercolic acid, flavonoids and saponins. Luffangulin, a novel N-terminal ribosome inactivating peptide was isolated from the seeds of *L. acutangula*¹². Presence of sapogenin, oleanolic acid and a bitter principle, Cucurbitacin B were also identified from the seeds of *L. acutangula*. The oil characteristics of *L. acutangula* with iodine value, saponification value and acid value were 99.5, 190.8 and 10.5, respectively with the melting point range -3°C and -10°C was reported with its nutrient value.

Nutritional value:

The most common use of the ridge gourd fruit is cooked as a vegetable. It is very nutritive plant and has a bitter taste if taken raw. Ridge gourd acts as an appetizer and it is a healthy food and contains good amount of fiber, vitamins and minerals including Vitamin B2, Vitamin C, carotene, niacin, calcium, phosphorus, iron and small quantities of iodine and fluorine. Ridge gourd has a sweet taste, cooling in nature and easy to digest. They form a low calorie diet, which is considered good for diabetes. Both soft pulp and skin of ridge gourd are used in making various recipes, especially in South Indian cuisine. Chutneys made from the pulp and the peel of ridge gourd is known for their health benefits(17).

🔍 Medicinal uses:

Ayurvedic literature revealed that fruits of *L. acutangula* are used in the treatment of vata, kapha, anaemia, leucoderma, tumors and also useful as diuretic and in splenic enlargement. Various biological activities reported on *L. acutangula*. In addition to its medicinal value, the fruit of *L. acutangula* are consumed as food in almost every part of India. Ayurveda has attributed ridge gourd with a number of health benefits which current clinical research is also supporting as well. From Ayurveda point of view, ridge gourd increases vata and kapha, but it cools down and pacifies the dosha pitta in the body. In spite of their bland taste, ridge gourds have many health benefits: **Weight loss:** Since the ridge gourd is low in saturated fats and cholesterol, it is an ideal diet for those who are looking for weight loss. Ridge gourd has a high water content which makes it a food with very less calories. **Jaundice:** The ridge gourd juice is a very good natural remedy for the treatment of jaundice. The juice which is prepared by pounding the ridge gourd or the seed powder is useful in controlling jaundice. The dried fruits are powdered and used as snuff in the treatment of jaundice. **Blood purification:** Ridge gourd has blood purifying properties. It helps in the purification, restoration and nourishment of the liver and is also helpful in the liver detoxification resulting due to alcohol intoxication. **Hypoglycemia:** Ridge gourd has certain peptides which are exactly like insulin, alkaloids and charantin chemicals which help in reducing the blood sugar and urine sugar levels. **Constipation:** the cellulose fibers present in ridge gourd are used in the treatment of constipation and are also effective in the treatment of piles. **Skin care:** Ridge gourd is allowed to dry and manu 8 of 42 sponge has been used traditionally as an exfoliating product while bathing. They are considered and it can be harvested as a sponge. This to be useful in removing dead cells from the skin thus making the skin smooth and conditioned. The

blood purifying properties of ridge gourd are helpful against pimples and acne problems. Lufa sponge is also effective in fighting off foot and body odor Immune system booster.

Pharmacological Activities :-

● Antioxidant activity:

The methanol and chloroform *Luffa acutangula* extract exhibited antioxidant property via enhanced scavenging of DPPH and superoxide radicals in a dose-dependent fashion. Similarly, its methanol extract displayed free radical scavenging ability against hydrogen peroxide, hydroxyl and nitric oxide radicals. Ethanol extract of the fruit of *Luffa acutangula* was earlier reported to possess strong antioxidant activity against DPPH radical. Methanol extract of *Luffa acutangula* vegetable thermally processed by different methods was recently found to show varying degrees of antioxidant properties as measured by thiobarbituric acid, DPPH, ferric thiocyanate and ferric reducing antioxidant power radicals scavenging assays. Similarly, Bulbul et al. using DPPH scavenging assay obtained IC₅₀ values of 50.32, 56.27 and 61.24 µg/ml for ethyl acetate, n-hexane and chloroform extracts of the leaves of *Luffa acutangula* respectively as compared to an IC₅₀ value of 43.22 µg/ml obtained for ascorbic acid, which was used as a standard. In vivo, antioxidant capacity of the fruit extract of *Luffa acutangula* was recently demonstrated in a rat model of cataract. The extract delayed the initiation and inhibited the progression of H₂O₂-induced cataract by inhibiting lipid peroxidation and modulating cellular antioxidants and antioxidant enzyme activity (18,19).

● Anti-inflammatory activity:

Anti-inflammatory activity was exhibited by chloroform extract of *Luffa acutangula* whole plant through marked reduction of carrageenan-induced rat paw edema in experimental animals that received 50 mg/kg body weight of the extract. Ethyl acetate and ethanol extracts of *Luffa cylindrica* peel and pulp displayed anti-inflammatory action against LPS-induced inflammation in RAW 264.7 cells by modulating NO, IL-6, PGE₂, iNOS, p38 and p-ERK expression. Moreover, two fractions from the petroleum ether and benzene extracts of the seed exhibited anti-inflammatory activity in the same experimental animal model. Lucyoside B, a triterpenoid saponin extracted from the fruit of *Luffa acutangula* also exhibited anti-inflammatory effects through subduction of proinflammatory mediators such as iNOS, IL-6 and MCP-1 at the transcriptional and translational levels (22).

● Anticancer activity:

The aqueous-ethanol extract of *Luffa acutangula* leaves displayed anticancer effects against MCF-7, BT-474, and MDA-MB-231 cell lines which epitomize three sub-types of breast cancer: Luminal A, luminal B, and triple-negative. The observed effect was attributed to the presence of phytochemicals such as apigenin and luteolin. The hot water extract of *Luffa acutangula* whole plant also exhibited anticancer activity against circulating tumor cells of hepatocellular carcinoma especially the cells subpopulation CD133⁺/CD44⁺ with little effect among CD133⁺/CD44⁻ subpopulation. Aqueous-ethanol extract of *Luffa acutangula* leaves showed anticancer activity on three different subtypes of breast cancer including luminal A, luminal B and Her2/neu enriched through reduction of total cell viability, CD44⁺/CD24⁻ and total CD24⁺ cell sub-populations percentages after treatment with the extract. More recently, the anti-cancer activity of hydro-ethanol extract of *Luffa acutangula* against CD34⁺/CD38⁺ and CD34⁺/CD38⁺ leukemic stem cells obtained from patient 10 of acute myeloid leukemia was investigated by Yehia et al. The extract effectively induced cell cycle arrest and apoptosis in both populations of cells as well as exerted inhibitory effects against proliferation and clonogenicity of leukemic cells. Aqueous extract of the whole plant displayed cytotoxicity against blood-derived.

Anti-viral effects:

The *L. Acutangula* vine demonstrated 66.7-80% protection against Japanese B encephalitis virus when given pre-treatment to mice before viral infection, while the protection diminished when given 210 minutes post-infection to the virus. Luffin P1, a ribosome-inactivating peptide isolated from *Luffa acutangula* seeds displayed anti-HIV-1 activity in infected C8166 T-cell lines by binding HIV reverse response element and possibly via charge complementation with cellular or viral proteins. Recently, in silico analysis revealed that four saponins namely lucyoside H, lucyoside F, 3-O-8-n-glucopyranosyl-olcanolic acid and 3-O-B-n-glucopyranosyl-spinasterol from air-dried fruits of *L. Acutangula* showed strong affinity for the substrate-binding pocket of SARS-CoV-2 Mpro with docking energy scores of 7.54, 7.47, -7.29 and -7.13 kcal/mol, respectively as compared with the binding ability equivalent of N3 protease inhibitor (-7.51 kcal/mol), which is an established inhibitor. Therefore, suggesting that *L. Acutangula* and these aforementioned compounds could find application in the prevention and treatment of SARS-CoV-2(24).

● Antifungal activity:

The ethyl acetate extract of *Luffa acutangula* leaves displayed antifungal activity against *Candida albicans*, *Candida tropicalis*, *Trichophyton rubrum* together with four clinical isolates of *C. albicans*, *C. tropicalis*, *Microsporum canis* and *Epidermophyton floccosum*. Some compounds isolated from the benzene and petroleum ether of *Luffa acutangula* seeds also displayed anti-fungal properties against *Candida albicans*. The petroleum ether crude extract of *Luffa acutangula* fruits exhibited anti-fungal property against *Candida albicans* and *Aspergillus niger*, The butanol extract displayed profound antifungal action against *Trichophyton longifusus* and *Fusarium solani*, while the ethyl acetate fraction of the crude methanol extract markedly inhibited the growth of *Microsporum canis*. In vivo antifungal activity was also exhibited by crude ethyl acetate extract of *Luffa acutangula* leaves in laboratory animals by promoting plodding healing of the infected skin of experimental animals (25,44).

● Antibacterial activity:

The petroleum ether extract obtained 11 of 42 *Luffa acutangula* fruit showed potent antibacterial activity against bacteria *Bacillus cereus*, *Bacillus megaterium*, *Bacillus subtilis*, *Staphylococcus aureus*, *Sarcina lutea*, *Escherichia coli*, *Salmonella typhi*, *Pseudomonas aeruginosa*, *Salmonella paratyphi*, *Shigella dysenteriae*, *Vibrio mimicus*, and *Vibrio parahemolyticus*. Crude methanol and n-hexane fraction of *Luffa acutangula* also exhibited antibacterial activity against *Bacillus subtilis*, while the butanol fraction exhibited relative activity against *S. flexenari*. The chloroform and n-hexane extract of *Luffa acutangula* leaves showed potent antibacterial activity against gram-positive and gram-negative bacteria(26). *Phytoconstituents And Pharmacological Activities Of Potential Plant Luffa Acutangula (L) Roxb.*

● Anthelmintic activity:

Both crude ethanol and methanol extracts of *Luffa acutangula* leaves displayed anthelmintic activity against *Pheretima posthuma*. In fact, the anthelmintic activity of the ethanol extract was comparable to the standard drug mebendazole(27).

● Anti-pyretic activity:

Methanol extract of *Luffa acutangula* leaves displayed antipyretic activity by decreasing the rectal temperature of experimental animals at the studied doses and also impeding the compression of abdominal walls in experimental animals, which were induced with agony sensation depending on the dose(28).

Hypoglycemic and anti-diabetic activity:

● **Sedative and anti-epileptic effects:**

Methanol extract of *Luffa acutangula* fruit exhibited excellent hypoglycemic properties in alloxan-induced rat models by decreasing blood glucose level. A significant reduction in blood sugar of glucose-loaded mice after administration of methanol extract of *Luffa acutangula* fruit further demonstrated the antihyperglycemic activity of *Luffa acutangula* fruit. Moreover, hydro and ethanol extracts of the fruits exhibited comparable B-cells regeneration with glibenclamide in the alloxan model of diabetes in rats. El-Fiky et al. also investigated the effect of oral administration of ethanol seed extract of *Luffa acutangula* on a streptozotocin rat model of diabetes. The results showed the extract drastically reduced blood glucose level in diabetic rats within three hours of treatment and the efficacy of the extract in reducing blood glucose was similar to a standard anti-diabetic drug, metformin. Tryptic and alcalase protein hydrolysates from the seed have strong inhibitory action against angiotensin-converting enzymes, α -amylase and α -glucosidase. The authors therefore opined that plant holds strong potential in the treatment of hypertension and diabetes(29)

Hepatoprotective activity:

Methanol extract of *L. Acutangula* leaves displayed hepatoprotective effects through the reduction of serum liver enzymes in a paracetamol model of hepatic injury. The hydroalcoholic extract of *Luffa acutangula* leaves also exhibited a similar hepatoprotective property in the Erythromycin estolate-induced model. Increased serum liver enzyme levels in paracetamol-induced rats reduced drastically on treatment with alcohol and aqueous extracts of *Luffa acutangula* fruits coupled with conservation of the structural integrity of liver membrane(30).

The sedative, anti-epileptic and anti-convulsant activities of alcohol extract of *L. acutangula* fruits were investigated in rats by Sunil et al. The results showed that the extract at 400 mg/kg body weight lessened the sleep induction time and prolonged the sleeping time in rats exposed to diazepam. At the same dose, the extract lengthened the latency time, but reduced the time of seizure in the pentylenetetrazole-induced model of convulsion, while it decreased total seizure time as well as clonic tonic time in the maximal electroshock model of convulsion. These effects were however lower than that of standard drugs, diazepam and phenytoin(31).

☑ **Skin protection:**

Umehara et al. investigated the effect of *Lacutagula* fruit extract on UVB-irradiation-induced mice model of dry skin and demonstrated that the extract and isolated phenylpropanoids inhibited trans-dermal water loss in hairless mice. The extract and p-coumaric acid isolated from the extract stimulated dome formation by MDCK I cells. Additionally, p-coumaric acid increased mRNA expression of water permeability and reabsorption protein, AQP3. The authors, therefore, concluded that p-coumaric was responsible for *L. Acutangula* related water permeability and that *L. Acutangula* could contribute to the treatment of disease relating to the inability to retain moisture including dry syndrome. Furthermore, an extract obtained from the fruit pulp prevented the development of atopic dermatitis-like skin lesions in mice exposed to *Dermatophagoides farinac*(32).

● **Anti- emetic activity:**

The ethanol extract of the fruit peel of *Lacutagula* showed significant anti-emetic activity in Young chicks at a dose of 150 mg/kg body weight. The ethanol and hexane extracts of leaves and male flowers of *L. Acutangula* exhibited anti-emetic effect against chick emesis facsimilia. The anti-emetic effects of hexane extract of male *L. Acutangula* flowers and leaves were at 71.5% and 43.5% inhibition of retches respectively, whereas the ethanol extract of leaves and male flowers of *L. Acutangula* was at 68.66% and 68.46% inhibition of retches respectively(33). ☑

Wound healing activity: Different parts of *L. Acutangula* have been reported to possess wound healing capacity. Chloroform extract of the whole plant showed wound healing activity in a rat model by reducing the wound area and time of epithelization. Diethyl ether, n-hexane, chloroform, ethyl acetate, butanol and methanol seed extract also promoted wound healing in rats. Diethyl ether extract showed the highest wound healing activity, while the weakest activity was displayed by chloroform extract(34). 14 of 42 .

☒ Effects on hematological parameters:

Raw and thermally processed *Luffa acutangula* seed meal fed to albino rats had no adverse effects on the hematological indices of the experimental animals. However, administration of methanol extract of *Lacutagula* leaves to rats produced an elevation in the hematological parameters in experimental animals(35).

Oxytocic activity:

Aqueous extract of *Lacutagula* leaves increased uterine motility in an isolated rat uterus. Thus suggesting that *Lacutagula* is oxytocic and giving credence for its use in Uganda to facilitate labour and treat postpartum issues(36,37).

Chemical Composition :-

Ferulic acid (9.31-49.6 µg/ml), ellagic acid (0-78.8 ug/ml), rutin (0-79.3 µg/ml), quercetin (45.18-55.42), myrecctin (20.95-35.79 µg/ml), catechin (66.24-77.87 µg/ml) from methanol extract of *L. Acutangula* fruits thermally processed by different methods. Furthermore, Hlel et al (2017) using HPLC/TOF-MS identified chlorogenic acid, gentisic acid, gallic acid, vanillic acid, salicylic acid, ferulic acid, 4-hydroxy benzoic acid, p-coumaric acid, naringenin, catechol and rutin in *L. Acutangula* fruits at different stages of maturation. The amount of quercetin, luteolin and myricitin in the sprout extract of *L. Acutangula* was quantified using UPLC-MS/MS as 32.5, 12.5 and 32.4 µg/g respectively. Meanwhile, five derivatives of cinnamic acid including 1-O-p-Coumaroyl-D-glucose, 1-O-feruloyl-, -D-glucose, 1-O-caffeoyl-D-glucose and p-coumaric Acid well as three flavonoids glycosides namely: apigenin-7-O-, -D-glucuronide methyl ester, Diosmetin-7-O-D-glucuronide methyl ester, and luteolin 7-O-D-glucuronide methyl ester) Were earlier identified in *Luffa acutangula*. A phenylpropanoid glucoside, 4-O-feruloyl-glucose Was isolated from a natural source for the first time in *L. Acutangula* fruit. Other Phenylpropanoid glucosides that were isolated from the edible part of *Luffa acutangula* are 4-O- Caffeoyl-glucose, 1-O-caffeoyl-B-glucose, 6-O-caffeoyl-glucose, 4-O-p-coumaroyl-glucose, 1-O-p-coumaroyl-p-glucose, 6-O-p-coumaroyl-glucose, 4-O-feruloyl-glucose, 1-O-feruloyl-p-glucose, 6-O-feruloyl-glucose. Other compounds there were recently isolated from the dried fruits of *Lacutagula* includes: 3,5-dihydi 5 of 42tone, phenanthrene, 1,2-naphthoquinone, cinnamic acid, (S)-dehydrovomifolo 2,6-dimethyl-1,4-benzenediol, litchiol B. pinoresinol phthalic acid, 4-(hydroxymethyl)benzene-1,2-diol, tridecan-7-one, apigenin and heneicosan-11- one.

Similarly, fifty-three volatile compounds including aromatics (10.1%), acids (15.1%), ketones (38.2%), alcohols (51.6%) and aldehydes/furans (66.2%) were recently identified by in young and matured fruits of *Luffa acutangula* using headspace SPME-GS-MS and UPLC-MS. Hydrocarbons including noctacosane, n-heptacosan, n-hexacosane n-tetracosanc, n-tricosane, tetraeicosane-6-ol, nanodecane-6-ol, dieicosane-6-ol and eicosane-6-ol have earlier been identified in the fruit of *L. Acutangula*. The diverse types of phytochemicals found in *L. Acutangula* have various biological effects (Table 2) and could account for its wide pharmacological activities(38,39,40).

Conclusion:

Overview of *L. acutangula* revealed that the plant is the source of many nutrients and therapeutically important chemical constituents. Ethnobotanical and folklore claims indicated its traditional use in indigenous and traditional medicinal systems of India. Studies have exposed that it has hepatoprotective, antidiabetic, antiulcer, antiproliferative and antiangiogenic. Anticancer, antioxidant, CNS depressant, fungistatic, anticataleptic, analgesic, antimicrobial, larvicidal and immunomodulatory activity. Due to its high nutritional value and proven medicinal importance, some nutraceutical products could be developed from *L. acutangula*, since it is already being consumed as vegetable throughout India. Further, studies should also be focused on its bioactive principles of *L. acutangula* which are responsible for the health benefits offered by this plant, so that the bioactive compounds could give some leads for new drug discovery to various chronic diseases.

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