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## “FUNCTIONAL COMPOUNDS OF SOME TRADITIONAL GREENS AND ITS MEDICINAL PROPERTIES”

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### ABSTRACT

#### KEYWORDS:

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Nutrition and diet plays a vital role in healthy living. When we talk about healthy living we have to know about the uses of greens and its medicinal properties of consumption in our daily diet plan.

Traditional knowledge on greens is very vast in our country and effective utilisation of it is the need of the hour. The greens which have been mentioned in this review are most rarely used in our usual home cooking but if we regularly include these greens as a part of our diet will definitely pave ways for disease free life. The range of health benefits of the greens is so vast that it is not easy to consolidate them in a single article like the present one. However, we can cite here a few varieties of greens, its functional compounds and their respective medicinal properties.

## INTRODUCTION:

The world is now looking towards India due to its rich biodiversity of medicinal plants and abundance of traditional medicine systems (Salahuddin et al., 1998). Medicinal plants are natural sources of compounds that can be used against many diseases today (Kubmarawa et al., 2007). The medicinal values of these plants lie in bioactive phytochemical constituents that produce definite physiological actions on the human body. These bioactive phytochemical constituents in medicinal plant include alkaloids, flavonoids, phenolic compounds, tannins, anthracine derivatives and essential oils (Krishnaiah et al., 2009).

Phytochemicals such as the steroids and saponins are responsible for the activities of the Central Nervous System. Steroids and triterpenoids shown to have analgesic properties. The terpenoids have shown to decrease blood sugar level in animals studies (Liu 2003). The saponins possess hypocholesterolemic and antidiabetic properties (Rupasinghe et al., 2003). It has been found that more highly oxidized phenols are more inhibitory to microorganisms (Scalbert 1991; Urs, Dunleavy 1975). Flavonoid compounds inhibit multiple viruses. Many human physiological activities, such as stimulation of phagocytic cells, host-mediated tumour activity and a wide range of anti-infective actions have assigned to tannins (Haslam 1996). Saponins, terpenoids, flavonoids, tannins, steroids and alkaloids have anti-inflammatory effects (Liu 2003; Akindele, Adeyemi 2007). The present study is focused towards compiling some medicinal plants and its curative properties.

### 1. *Alternanthera sessilis* (Ponnanganni):

*Alternanthera sessilis* belongs to Amaranthaceae family. It is popularly known as "Water Amaranth". In India it is found throughout hotter parts, ascending an altitude of 1200m in the Himalayas and even cultivated as a pot-herb (Chadha, 2003). It is a weed and occurs in both wet lands and uplands and can grow on a variety of soil types. The plant spreads by seeds, which are wind and water dispersed and by rooting at stem nodes. It is a weed of rice throughout tropical regions and of other cereal crops, sugarcane and bananas.

Majorly the whole plant is used for medicinal purpose. It is accredited with galactogogue properties and antibacterial properties (Sahu et al, 1994) useful in night blindness due to its high carotene content. Siddha literature mentioned *Alternanthera sessilis* as Kaya Kalpa drug (i.e. drug which prevents and cures chronic diseases and rejuvenates the body) and as compatible diet. The antioxidant carotene is found in large amounts in *Alternanthera sessilis*. (Jerajon et al, 2004 and Chandrika et al, 2005). It is used for the treatment of biliousness, dyspepsia, sluggish liver in Sri Lanka (Gayathri et al., 2006).

The plant is also used traditionally as cooling, digestive, intellect promoting, in burning sensation, liver disorders, skin diseases and in children for overall development. Ayurveda and Siddha medical systems consider *Alternanthera sessilis* as Rasayana drug.

Phytochemical studies have reported the isolation of flavonols, triterpenoids, steroids and tannins;  $\beta$ -sitosterol, stigmasterol, campesterol, lupeol being few of its important constituents (Nayak et al., 2010). The herb has been reported to have antipyretic (Nayak et al., 2010), hepatoprotective (Lin et al, 1994), antiulcer (Purkayastha, 2006) antibacterial (Sahu and Chakrabarty, 1994), hematinic (Arollado and Osi, 2010), diuretic (Roy and Saraf, 2008) activities. The alcoholic and aqueous extracts of *Alternanthera sessilis* showed significant reduction in blood glucose levels of STZ induced diabetic rats and the activity. The Antidiabetic activity of *A. sessilis* can be attributed to the presence triterpenoids, phytosterols and glycosides (Raghavender Rao et al., 2011). The leaves are widely used as vegetable. Ponnanganni is cooked as keerai masiyal, poriyal, kottu and sambar (South Indian traditional cooking methods).

## **2. *Amaranthus spinosus* (Mullu keerai)**

*Amaranthus spinosus* belongs to Amaranthaceae family. It is commonly called as Pig weed, is an annual herb found in throughout India and also many tropical countries.

Phytochemical analysis revealed that *Amaranthus spinosus* contains a new coumaroyl flavone glycoside called spinoside (Singh et al., 1993), xylofuranosyl uracil, hydroxycinnamates, quercetin and kaempferol glycoside, betalains, betaxanthin, betacyanin ,phenolic compounds (Stintzing et al, 2004), maranthine and isoamaranthine (Suryavanshi et al., 2007), beta-sitosterol glycoside, campesterol (Odhava et al., 2007), chemical analysis of leaves and stem gave hentriacontane and a-spinasterol , linoleic acid, rutin and betacarotene (Barmines et al., 1998), as prime phytoconstituents.

Whole plant is used as laxative (D'y mock 1976; Varier's 1996), the root are regarded as highly specific for colic by Hindu physicians (Sivarajan & Balachandran 1994) and in Madagascar they are considered as laxative (Kirtikar & Basu 1987). Traditionally boiled leaves and roots of *Amaranthus spinosus* are given to children as laxative. However the drug is also used traditionally as diuretic, antidiabetic, antipyretic, anti-snake venom, antileprotic, and anti-gonorrhoeal (Kirtikar & Basu 1987; Varier's 1996). In Malaysia, *Amaranthus spinosus* is used as an expectorant and to relieve breathing in acute bronchitis. Some tribes in India apply *A. spinosus* to induce abortion (Grubben & Denton 2004). The *A. spinosus* is reported for its anti-inflammatory properties (Olumayokun et al. 2004). Effect on hematology (Olufemi et al. 2003), immunomodulatory activity (Tatiya et al. 2007). Antiandrogenic activity (Murgan et al. 1993a), anthelmintic properties (Assiak et al. 2002) and effect on biochemical changes in epididymis (Murgan et al. 1993b).

The juice of the root is used to treat fevers, urinary troubles, diarrhoea (Lin, et al., 2005), and dysentery (Bown, 1995). The seed is used as a poultice for broken ribs (Azhar et al., 2004). The roots are used as antimalarial (Hilou et al., 2006), antioxidant (Amin et al., 2006), anti-inflammatory, antimicrobial, and antidiuretic agents, and also in hepatic disorders. (Olajide et al., 2004, Stintzing et al., 2004 and Van Dunen 1985). The water extract of the plant showed significant immunostimulating activity (Lagos, 1986). Yellow and green dyes can be obtained from the whole plant. A red pigment obtained from the plant can be used as a colouring in foods and medicines. The leaves are widely used as vegetable. Mullu Keerai is cooked as keerai masiyal, poriyal, kottu and sambar (South Indian traditional cooking methods).

### **3. *Basella alba* (Pasalai)**

*Basella alba* belongs to Basellaceae family. Commonly known as Indian Spinach. Plant is reported to have Betacyanins, Carotenoids and Organic acids (Hebbar, et al., 2004, Banerjee, et al., 1992 and Glassgen, 1993). Triterpene oligoglycosides, Basellasaponins A, B, C, and D (Toshiyuki, 2001) having a dioxolanetype substituent, along with Betavulgaroside I (Yoshikawa et. al., 1998 and Murakami, et al., 1999), Spinacoside C (Yoshikawa, et. al., 1998), Momordins Iib, and Iic, (Iwamoto, et. al., 1985) had been isolated. The leaves also contain carotenoids, organic acids and water soluble polysaccharides, bioflavonoids and vitamin K (Khare, 2007).  $\beta$ -Sitosterol & Lupeol are also reported to be present in the plant and are reported to have anticancer, anti-inflammatory and antioxidant activities (Gupta, et. al. 2008). *Basella alba* also contains basellasaponins (Toshiyuki, et al., 2001), amino acid such as arginine, leucine, isoleucine, lysine, threonine and tryptophan (Khare,2007), peptide, phenolic compounds in various extracts (Maisuthisakul and Ritthiruangdej, 2008).

*Basella alba* has been used for the treatment of Anemia in women, coughs, cold (leaf with stem), cold related infections (Rahmatullah, et al., 2010). Maceration is taken orally for infertility, pelvic inflammatory disease, orchitis, epididymyitis, threatened abortion, spurious labour (Focho, et al., 2009). Leaves are used in constipation, poultice for sores, urticaria and gonorrhoea. It is also used in poultice local swellings, intestinal complaints etc (Yasmin, et al., 2009). The mucilaginous liquid obtained from the leaves and tender stalks of plants is popular remedy for headaches (Jadhav, et aal., 2008). *Basella* mucilage is viscous with low swelling capacity. Its pH is good for skin (5.3-5.4). The gel preparation of *Basella* mucilage provide good stability that serve for further development as cosmetic and medicine for skin diseases. For the pharmaceutical aid, the mucilage can be used as thickener, water-retention agent, gelling agent, suspending agent, and film former (Jani, et al., 2007). The purplish sap from fruits is used as a colouring agent in pasteries and sweets (Ramu, et al., 2011). Pasalai is cooked as keerai masiyal and Soup.

#### 4. *Centilla asiatica* (Vallarai)

*Centilla asiatica* belongs to Apiaceae family. The plant contains several valuable compounds viz., centellasaponin, asiaticoside, madecassoside and scelefoleoside (James and Dubery, 2009; Matsuda et al., 2001), pectin (Wang et al., 2005), castilliferol 1 and castillicetin 2 (Subban et al., 2008). The fatty oil isolated from the plant consists of glycerides of oleic, linolic, centoic, linolenic, lignoceric, palmitic, and steric acids; the leaves contain triterpene madasiatic acid as well as 3-glycosyl quercetin, 3-glycosyl kaempferol and 7-glycosyl kaempferol (Martin, 2004). A bitter principle vellarine, pectic acid and resin present in the leaf and root; asiaticoside and oxyasiaticoside shown to be active in the treatment of leprosy and tuberculosis (Chopra et al., 1980).

*C. asiatica* possesses a wide range of pharmacological effects, being used for wound healing, mental disorders, antibacterial, antioxidant and anticancer purposes. The plant is highly effective in ulcerpreventive (Cho, 1981), anti-depressive sedative and ability to improve the venomous insufficiency (Zheng and Qin, 2007). The plant is found to improve the power concentration, general ability and behavior of mentally retarded in children (Appa Rao et al., 1973) and to treat rheumatic disorders (Howes and Houghton, 2003). Asiaticoside is one of the prime triterpene saponin found in leaves in large amount is utilized commercially as a wound healing agent due to its potent anti-inflammatory effect (Pointel et al., 1987; Shukla et al., 1999) and showed the potential use as anti-gastric ulcers drugs (Cheng et al., 2004). It can cure stomach ulcers too. When it is eaten raw it can cure tooth decay, bad breath and mouth ulcers. Vallarai is cooked as thuvaiyal, soup and dosai.

#### 5. *Abutilon Indicum* (Thuthi)

*Abutilon Indicum* belongs to Malvaceae family. Phytoconstituents like  $\beta$ -Sitosterol (0.2%) (Gaind and Chopra, 1976, Baxi and Parikh, 1980), tocopherol oil (0.3%) (Baxi and Parikh, 1980), were isolated. *Abutilon indicum* is rich of fatty acids like linoleic acid, oleic acid, palmitic acid, stearic acid and capric acid along with vanillin, p-coumaric acid, p-hydroxybenzoic acid, caffeic acid and fumaric acid. p- $\beta$ -Dglucosycoxybenzoic acid, glucovanilloyl glucose, fructose, galactase, glucose, leucine, histidine, threonine, serine, glutamic acid and aspartic acid (Gaind and Chopra, 1976, Baxi and Parikh, 1981). Two sesquiterpene lactones Alantolactone, isalanto-lactone (Sharma and Ahmed, 1989). Gallic acid (Sharma, et al., 1989), it also contains flavonoids like luteolin, chrysoferiol, luteolin-7-O- $\beta$  gluco pyranoside, chrysoferiol 7-O- $\beta$  gluco pyranoside, apigenin 7-O- $\beta$ -glucopyranoside, Quercetin 3-O- $\beta$ -glucopyranoside, Quercetin 3-O- $\alpha$  rhamnopyranosyl adn  $\beta$ -gluco pyranoside (Matlawska and Silkorska, 2002). The phytochemical studies on *Abutilon indicum* revealed the presence of steroids, saponins, carbohydrates, coumarins and flavonoids (Sammia, et al., 2008).

The various parts of the plant (leaves, roots, seeds and seed oil) are widely used by various tribal communities and forest dwellers for the treatment of variety of ailments. A scrutiny of literature revealed some notable pharmacological activities of the plant such as antibacterial (Kumar, et al., 2006), analgesic (Ahmed, et al., 2000), antimalarial (Rahuman, et al., 2008), antifertility (Johri, et al., 2008), hepatoprotective (Porchezian and Ansari, 2005), and wound healing (Roshan, et al., 2008).

Extract of the whole plant is said to possess decreasing peroxidative damage in liver through free radical scavenging activity due to its flavonoids (Singh and Gupta, 2008). Petroleum ether extract of this plant is also a potent source of natural mosquito larvicidal agent (Rahuman, et al., 2008). The whole plant is studied for anti inflammatory, immuno stimulating effect, piles and gonorrhoea treatment. Root and bark are used as aphrodisiac, anti diabetic, nervine tonic, and diuretic. Seeds are used as aphrodisiac, in treatment of urinary disorders (Kirtikar and Basu, 1983). The plant is reported to have analgesic (Bagi, et al., 1985), hypoglycaemic (Seetharam, et al., 2000), hepato protective (Roshan, et al., 2004), hyperlipidemic activity (Ahamed, et al., 2000).

Leaves made into a chutney or *thuvayal* and when consumed this helps to relieve indigestion. Fresh leaves fried in ghee and consumed with cooked rice assist in curing piles. Fresh leaves are prepared to *poriyal* (a fry with sesame oil) without spices and chillies and consumed with cooked rice for the period of one to two months to help in the control of white discharge (Leucorrhoea).

#### **6. *Cardiospermum halicacabum* (Mudakkathan)**

*Cardiospermum halicacabum* (Linn) belongs to Sapindaceae family. It is popularly known as Balloon Vine. The whole plant contains saponins, traces of alkaloids, flavonoids, apigenin and phytosterols. Ethanol root extract of *C. halicacabum* was reported to contain active principle cardiospermine for its anti-anxiety activity (Ferrara, et al., 1996). Phytochemical constituents such as flavones, aglycones, triterpenoides, glycosides and a range of fatty acids and volatile ester have been reported from the various extracts of *C. Halicacabum* (Srinivas, et al., 1998, Wagner, et al., 1984 and Ecobichon, 1997).

The plant *Cardiospermum halicacabum*, was traditionally used as anxiolytic and as anticonvulsant. The whole plant is diaphoretic, diuretic, emetic, laxative, refrigerant, stomachic and sudorific (Kirtikar and Basu, 2001). It is used in the treatment of rheumatism, chronic bronchitis and stiffness of the limbs and snakebite (Gopalkrishnan, et al., 1976). The leaves are rubefacient and used in the treatment of rheumatism (Chopra, 1992). A tea made from them is used in the treatment of itchy skin (Nadkarni, 2005). Salted leaves are used as a poultice on swellings. The leaf juice has been used for the treatment of earache. The root is diaphoretic, diuretic, and laxative. The plant was reported to possess antiulcer (Sheeba and Asha, 2006),

Antiparasitic (Boonmars, et al., 2005), Antimalarial (Wakko, et al, 2005), Antifilarial (Khunkitti, et al., 2000), Antipyretic (Asha and Pushpangadan (1999) and Anxiolytic activity (Malaviya, et al., 2009). Experimental pharmacological studies have shown Analgesic, Anti-inflammatory, Antidiarrhoeal and Vasodepressant activities of this plant (Sadique, et al., 1987).

Mudakkatran is one of the important spinaches in traditional cookery. It is mainly included in the flour paste used in the preparation of *dosa* and also prepared the soup from leaves.

#### **7. *Cleoma gynandra* (Nallavelai)**

*Cleoma gynandra* belongs to Cleomaceae family. Oral administration of a decoction or an infusion of the boiled leaves or the leaf-juice has been recorded to facilitate child birth, to relieve stomach pain, beneficial in constipation, thread-worm infection, conjunctivitis, oral ailments, convulsions and in certain bilious disorders (Van den, Venter 2007; Oliver, 1983; Tabuti et al., 2003; Cano, Volpato 2004; Kamatenesi, Oryem 2007). Earlier investigations on the leaves have afforded certain flavonoids, triterpenoid saponins, sterols and fatty acids (Rastogi, Mehrotra 1996), a triterpene from the whole plant (Das et al., 1999), glucosinolates (Songsak, Lockwood 2002) and a number of anti-tick essential oil constituents (Lwande et al., 1999). Extracts of the leaves and certain isolated flavonoids have been reported to possess antibacterial, antifungal, antineoplastic and anti-arthritic properties and improved the levels of endogenous antioxidants and also modulated glucose metabolizing enzyme activity (Ajaiyeoba 2000; Pettit et al., 2005; Narendhirakannan et al., 2007; Sivanesan, Begum 2007).

The plant possess the activities like anti-inflammatory (Mule et al., 2008; Narendhirakannan et al., 2005), free radical scavenging (Anbazhagi et al., 2009; Kalaivani et al., 2010), anticancer (Asis Bala et al., 2010) and immunomodulatory effects (Arts, Hollman 2000). Phenolic substances and flavonoids presence in *Cleome gynandra* have been shown to be responsible for the antioxidant activity and have been ascribed to various properties like anticancer, antidiabetic, antiaging and prevention of cardiovascular diseases.

Nallavelai leaves are generally cooked with other greens as kalavai keerai (i.e it contains variety of greens). Nallavelai leaves are collected, fried in ghee or sesame oil and consumed with food. Leaves are also prepared to spicy *kuzhambu* and consumed with cooked rice to help cure headaches. It is also included in food preparations, especially for people suffering from fever and colds.

#### **8. *Coccinia grandis* (kovai)**

*Coccinia grandis* belongs to Cucurbitaceae family. It grows abundantly all over India, Tropical Africa, Australia, Fiji and throughout the oriental countries.



The root of *Coccinia grandis* contains Triterpenoid, Saponin Coccinioside, Flavonoid glycoside, Lupeol,  $\beta$ -amyrin, and  $\beta$ - sitosterol (Vaishnav et al., 2001, Vaishnav and Gupta, 1996, Vaishnav and Gupta, 1995, Khastgir et al.,1958, Sucrow and Reimerdes, 1968). Fruits contains Taraxerone, taraxerol, and (24R)-24- ethylcholest- 5- en- 3 $\beta$ - ol glucoside, Beta- carotene, lycopene, cryptoxanthin, and apo- 6'- lycopenal Beta- sitosterol and taraxerol (Kundu and Ray,1987, Basu and Ghosh, 1972, Bhakuni et al., 1962). Whole plant contains Aspartic acid, Glutamic Acid, Asparagine, Tyrosine, Histidine, Phenylalanine , Threonine Valine and Arginine (Rahman et al., 1990). Aerial parts contain heptacosane, cephalandrol,  $\beta$ -sitosterol and alkaloids cephalandrines A and B. Its root contains resins, alkaloids, starch, fatty acids and carbonic acid.

The roots, stems, leaves and fruits are used in indigenous system of medicine for treating diabetes (Nadkarni, 1976). Previous studies have reported that ethanolic extract of leaves possess hypoglycaemic and antioxidant properties. Root and leaves have antilipidemic effects (Kar Ajit, et al., 2003, Shibib, et al., 1993, Halim Eshrat, 2003 and Venkateswaran and Pari, 2003). Aqueous extract of fresh leaves had anti-inflammatory, analgesic, antipyretic (Niazi Junaid, et al., 2009) anti-nociceptive activities (Rao, et al., 2004). Hepatoprotective effects of diethyl ether extract of leaves (Shyam Kumar, et al., 2010) and antimicrobial effects of aqueous and organic solvent extracts of fruits and leaves have also been reported (Syed, et al., 2009 and Hussain, et al., 2010). Aqueous, methanolic and ethanolic extracts of aerial parts showed antihyperglycaemic and hypolipidemic (Balaraman, et al., 2010 and Mallick, et al., 2007) antitussive (Pattanayak, et al., 2009), antilithitic (Jayaweera, 1980) and antimutagenic activities (Kusamran et al., 1998). It is also used to cure ring worm, psoriasis, small pox, scabies, other itchy skin eruptions and ulcers activities (Perry, 1980 and Behl, et al., 1993).

Leaves of this plant are used in Indian folk medicine for treatment of number of ailments including diabetes, wounds, ulcers, inflammation, in eruptions of skin, fever, asthma and cough. Leaves are cooked as kottu, masiyal.

#### **9. *Moringa Oleifera* (Murungai Keerai)**

*Moringa Oleifera* belongs to Moringaceae family. A number of medicinal properties attributed to different parts of *Moringa* have been recognized by both Ayurvedic and Unani systems of medicines (Mughal, et al., 1999). The plant finds its wide applicability in the treatment of cardiovascular diseases as the roots, leaves, gum, flowers, and infusion of seeds have nitrile, mustard oil glycosides, and thiocarbamate glycosides as their chemical constituents which are suggested to be responsible for the diuretic, cholesterol lowering, antiulcer, hepatoprotective, and



cardiovascular protective property of the tree (Anwar et al., 2007; Pal et al., 1995; Dahot, 1998; Caceres et al., 1992; Ghasi et al., 2000; Dangi et al., 2002 and Mehta et al., 2003). The roots have been reported to possess antispasmodic activity through calcium channel blockade which forms the basis for its traditional use in diarrhoea (Caceres et al., 1992; Gilani et al., 1994). It also possesses antimicrobial activity due to its principle component pterygospermin.

The fresh leaf juice was found to inhibit the growth of human pathogens as *Staphylococcus aureus* and *Pseudomonas aeruginosa* (Das et al., 1957; Eilert et al., 1981; Caceres et al., 1991; Nikkon et al., 2003). Phytoconstituents from different parts of the tree as niazimicin, niaininin, various carbamates, and thiocarbamates have shown to exhibit antitumor activity *in vitro* (Murakami et al., 1998; Guevara et al., 1999; Bharali et al., 2003). The flowers show effective hepatoprotective effect due to the presence of quercetin (Gilani et al., 1994, 1997). Seeds are used as biosorbent for the removal of cadmium from aqueous medium and are one of the best-known natural coagulants discovered so far (Ndabigengesere et al., 1995; Ghebremichael et al., 2005). They are also considered to be antipyretic, acrid, and bitter and reported to show antimicrobial activity (Oliveira et al., 1999; The Wealth of India, 1960).

Leaves of *M. oleifera* are lopped for fodder (Sastri, 1962) and have been used as antiulcer, diuretic, anti-inflammatory and for wound healing (Kirtikar and Basu, 1935; Caceres et al., 1992; Udupa et al., 1994; Pal et al., 1995). Ethanolic extract of leaves have shown antifungal activity against a number of dermatophytes (Chuang et al., 2007), whereas methanol extract has a potent CNS depressant action (Pal et al., 1996). The aqueous extract of the leaves has been found to possess antifertility activity (Shukla et al., 1981; Prakash, 1998) and is very useful in regulating the thyroid hormone status in adult Swiss rats (Tahiliani and Kar, 2000). Its leaves are also used as nutritional supplement and growth promoters due to the significant presence of protein, Se, P, Ca, carotene and tocopherol (Makkar and Becker, 1996; Freiburger et al., 1998; Nambiar and Seshadri, 2001; Lakshminarayana et al., 2005; Sanchez et al., 2006). N-Benzyl thiocarbamates, N-benzyl carbamates, benzyl nitriles and a benzyl ester isolated from methanol extract of its dried fruit powder has been shown to stimulate significantly insulin release from the rodent pancreatic beta cells and have cyclooxygenase enzyme and lipid peroxidation inhibitory activities (Francis et al., 2004).

Leaves can be eaten fresh, cooked, or stored as dried powder for many months without refrigeration, and reportedly without loss of nutritional value. Moringa Oleifera is especially promising as a food source in the tropics because the tree is in full leaf at the end of the dry season when other foods are typically scarce. Murungai Keerai is cooked as poriyal, sambar, kottu, adai and soup. It is also cooked to combine with vadanarayanan keearai and Agathi.

**10. *Trigonella foenum* (Vendhaya keerai)**

*Trigonella foenum* belongs to *Leguminosae* family, commonly known as fenugreek, is a traditional Indian medicinal plant. Due to its strong flavor and aroma, fenugreek is one of such plants whose leaves and seeds are widely consumed in Indian subcontinent as well as in other oriental countries as a spice in food preparations and as an ingredient in traditional medicine (Annida et al., 2005; Bukhari et al., 2008).

Bioactive compounds isolated from fenugreek seeds include saponins (ie: fenugreekine, diosgenin), alkaloids (ie: trigonelline, gentianine, carpaine), amino acids, flavinoids, some of which act as insulin secretagogues (ie: 4-hydroxyisoleucine, arginine), coumarins, mucilaginous fibers (galactomannan), nicotinic acid and other vitamins and minerals (Marles 1995; Fetrow, Avila 1999). Literature revealed that saponins, glycoside-D and trigofenoside-A are the major components in the seeds (Yashikawa et al., 1997), while alkaloids, cardiac glycosides, and phenols are found in the leaves extract (Ahmadiani et al., 2001).

Fenugreek leaves is capable of reducing the body temperature since it is a natural coolant. It can be included as part of our diet plan once in a week to enhance vision and digestion besides curing mouth ulcers and reducing accumulation of fat in our body. It has rich iron content, a much needed nutrient for women. Reducing tiredness, curing cold and cough are the other healing powers of methi leaves. It can be added in dosas, curries and chapattis. It also normalizes the blood circulation thereby making the body active and energetic. Boil the methi leaves, mix the juice with honey and consume it to get rid of piles, stomach ulcers and to detoxify the system.

In humans, fenugreek seeds exert hypoglycemic effects by stimulating glucose-dependent insulin secretion from pancreatic beta cells (Ajabnoor, Tilmisany 1988), as well as by inhibiting the activities of alpha-amylase and sucrose (Amin et al., 1987), two intestinal enzymes involved in carbohydrate metabolism. Fenugreek seeds also lower serum triglycerides, total cholesterol (TC), and low-density lipoprotein cholesterol (LDL-C) (Stark, Madar 1993; Petit et al., 1993; Al-Habori et al 1998a; Al-Habori, Raman 1998b; Valette et al., 19984). These effects may be due to saponins, which increase biliary cholesterol excretion, in turn leading to lowered serum cholesterol levels (Stark, Madar 1993; Sauvaire et al., 1991; Varshney, Sharma 1966; Sidhu, Oakenfull 1986).

**CONCLUSION:**

Thus the green leaves encompass many medicinal and phytochemical effects which will be very useful in treating and preventing the many diseases. Especially the bioactive functional compounds like alkaloids, flavonoids, tannins and phenolic compounds are the reason for the

medicinal value of plants that produce a definite physiological action on the body. It would be beneficial for the humans to explore the traditional green varieties to include into their daily diet menu and can able lead a healthy life in a natural way.

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