

NEPHRO PROTECTIVE FRUITS AND VEGETABLES – A REVIEW

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ABSTRACT

Nephrotoxicity refers to the damage to the kidneys, either in the convoluted tubule, collecting duct or whole of the nephron, which leads to the functional insufficiency of the kidneys. Nowadays, there are various food substances and the environmental hazards that deplete the effective functioning of kidneys and many other organs. There is a need to get an effective drug whose chemical entity should not interfere in any of the functions of kidneys. Herbal way of medicine should also be easily available and identifiable. There are fruits and vegetables which can prevent the damage and protect the effective functioning of the kidneys, which we are unaware. This review assures and contributes towards such kind of protection of kidneys.

KEYWORDS: Herbs, kidneys, Nephrotoxicity, Nephroprotection.

INTRODUCTION

Nephroprotection, the term has been widely used in recent years for the various preventive and therapeutic measures aimed at improving the prognosis and preventing deterioration of renal function, also decreasing the need for dialysis or increase the time of arrival to it, improve and optimize the management of patients at risk of renal injury. End stage renal disease incidences for about 152/million worldwide according to a demographic study.^[1] There are numerous drugs, foods, chemicals and environmental pollutants that are toxic to kidneys and many other organs in the body. Growing organ toxicities leads us to the way of exploring the herbal medicines, which on comparing, extremely safe and added with it a protective effect too. To protect the kidney from nephro toxicities, it is not necessary to go in search of rare unknown plants. To use plants therapeutically, identity is much important, which is little bit difficult in rare plants. Nephro protection can be provided from, well-known and common vegetables and fruit species which we come across in our daily life. This review portrays such kind of species, which are very familiar, but possessing a very effective nephroprotective activity in it.

Moringa oleifera

This belongs to the family moringaceae. **Common names:** Tamil-Murungai; Malayalam-Murinna; Telugu-Munaga; Sanskrit-Sigru Sigru-valkalum; English-Drum stick tree.^[2] **Habit:** Medium sized tree with soft wood. **Habitat:** Found all over India and Burma. **Leaves:** Usually 3-pinnate, sometimes 45 cm long; rhachis

slender, thickened and articulated at the base; pinnae and pinnules opposite, deciduous, their rhachides very slender, articulated and with a gland at the articulations; ultimate leaflets 12-20 by 6-10 mm., the lateral elliptic, the terminal obovate and slightly larger than the lateral ones; nerves obscure; petiolules of the lateral leaflets 1.5-2.5 mm., those of the terminal 3-6 mm. long. **Flowers:** White, in large puberulous panicles. Calyx- lobes linear-lanceolate reflexed, puberulous outside. Petals spatulate, veined. Stamens 5 fertile, alternating with 5-7 antherless ones; filaments villous at the base. Ovary oblong, villous; style cylindrical. Pods reaching 45 cm. long, 9-ribbed. **Seeds:** 3-angled, the angles winged. **Traditional uses:** Flowers are anthelmintic, expectorant, cure inflammations and biliousness, bronchitis, muscle diseases, tumours, enlargement of the spleen. The flowers often resorted to as an aphrodisiac by the native medical practitioners in southern India.^[3] **Nephro Protection:** Leaves of this plant possess anti-oxidant properties. It also alleviates all the proteins and sugar in urine, which was preclinically evaluated in diabetic rat models.^[4,5]

Daucus carota

This belongs to the family Apiaceae. **Common names:** Tamil-Manjal mullangi; Malayalam-Narikelam; Telugu-Gajjaragedda; Sanskrit-Gajara; English- Carrot. **Habit:** A biennial plant, 1-1.5 m. high or sometimes somewhat more branching from the base, scabrous. **Habitat:** Indigenous in bihar and the eastern himalayas. Cultivated throughout india and the tropics. **Leaves:** Triangular to oblong in outline, 2-3 pinnatisect into oblong-lanceolate,

incised-dentate segments those of the upper leaves linear-lanceolate. **Flowers:** umbel with very numerous rays, at length contracted into a nest-like form; bracts of the involucre, 3-fid or pinnate, of the involucre linear, white, margined, entire or 2-3 fid; petals radiating; central flower sterile, purple. **Fruits:** 4 mm. long, 3 mm. broad, including the prickles. Prickles setaceous, as long as the diameter of the seed or longer with 1-3 recurved barbs.^[6] **Traditional uses:** Carrot gives appetit, astringent to the bowels, anti-dysentric, carminative, cardiotoxic, aphrodisiac, expectorant, diuretic, stomachic, cures leprosy, pain, burning sensation, thirst, biliousness, tumours, good in inflammation and bronchitis, asthma, hiccough, corrects foul breath.^[7] **Nephro Protection:** This improves kidney function in a significant way on renal ischemia reperfusion injury in rats.^[8,9]

Hibiscus esculentus

This belongs to the family Malvaceae. **Common names:** Tamil-Vendaikkai; Malayalam-Venda; Telugu-Bendachettu; Sanskrit-Gojihwaka; English-Lady's finger.^[2] **Habit:** Annual plant grows about 1 m. **Habitat:** Cultivated throughout India and all tropical countries. **Leaves:** Cordate, 3-5 lobed; lobes oblong, coarsely toothed, scabrous; petioles 15 cm. long, hairy; stipules subulate. Pedicels about 2.5 cm. long. Involucral bracts 8-10, deciduous, equaling the calyx. **Flowers:** Yellow with purple centre. Stamina tube antheriferous throughout. **Fruits:** Pyramidal oblong, 6-8 ribbed, 7-9 by 2.5-3.2 cm. **Seeds:** Striate, hairy. **Traditional uses:** The mucilageous fruit is sour and tasty, tonic, cooling, stomachic, astringent, aphrodisiac, it enriches the blood, cures biliousness, useful in gonorrhoea and urinary discharges, in strangury and in diarrhoea. The mucilage from the fruit is useful in the irritation of the genito-urinary tract.^[10] **Nephro Protection:** The unripe fruits and the leaves of this plant both provide nephro protection.^[11] A study suggests that the leaves of this plant alleviates the renal tubular interstitial diseases, reduces proteinuria, thereby, improving the renal function.^[12]

Coccus nucifera

This belongs to the family Arecaceae. **Common names:** Tamil-Thengu, Tengay; Malayalam-Thenna; Telugu-Tenkayi-chettu; Sanskrit-Narikela; English-Coconut tree.^[2] **Habit:** Trunk 12-24 m. high, straight or curved, marked with ring-like leaf scars, which are not prominent, rising from an inclined swollen base which is surrounded by a mass of rootlets. **Habitat:** Tropical countries. **Leaves:** 1.8-4.5 m. long; leaflets equidistant, 60-90 cm. long, linear-lanceolate, coriaceous; petioles 0.9-1.5 m. long, stout. Spadix 1.2-1.8 m. long, stout, androgynous, simply paniced. Lower spathe 60-90 cm, long, oblong, hrd, splitting lengthwise. **Flowers:** Male flowers unsymmetric; sepals small, valvate; petals 6 mm. long oblong, acute, valvate. Female flowers are larger than the male, 2.5 cm. long, gbose, supported by broad bracteoles. Sepals 2.5. cm. diam., round, concave,

imbricate. Petals shorter than the sepals, convolute, with imbricate tips. **Fruits:** 20-30 cm. long, 3-gonously obovoid or subglobose, green or yellowish; albumen lining the endocarp, the cavity large, filled with a sweet somewhat milky fluid, known as coconut milk. **Traditional uses:** The fruit is tonic, laxative, aphrodisiac, diuretic, cardiotoxic, useful in leprosy, thirst, biliousness, piles, burning sensation, tuberculosis and intestinal worms. The dried fruit improves taste, aphrodisiac. The pulp of the young fruit is cooling and diuretic.^[13] **Nephro Protection:** Protective as well as regenerative effects were observed following the treatment with coconut water in the renal structure in the diabetic Wistar rats. Degeneration can be reversed if coconut water is given concomitantly. The reversal effect is partial yet much significant.^[14,15]

Phyllanthus embelica

This belongs to the family Euphorbiaceae. **Common names:** Tamil-Nelli; Malayalam-Nellikay; Telugu-Usirika; Sanskrit-Amalaki; English-Indian gooseberry.^[2] **Habit:** A deciduous small middle sized tree with crooked trunk and spreading branches. **Habitat:** Throughout tropical and sub-tropical india. **Leaves:** Subsessile, 10-13 by 2.5-3 mm., closely set along the branchlets, distichous, light green, glabrous, narrowly linear, obtuse, imbricate when young, having the appearance of pinnate leaves; stipules ovate, finely acute. **Flowers:** Greenish yellow, in axillary fascicles on the leaf-bearing branchlets, often on the naked portion below the leaves, with imbricate bracts at the base. Male flowers numerous on short slender pedicels. Sepals 6, oblong, obtuse, 1.2 mm. long. Disk 0. Anthers 3 on a short central column. Female flowers few, subsessile. Sepals as in the male. Disk a lacerate cup. Ovary 3-celled; styles connate at the base irregularly twice 2-fid with acute lobes. **Fruits:** 1.3-1.6 cm. diam., fleshy, gbose with 6 obscure vertical furrows, pale yellow, of three 2-seeded crustaceous cocci. **Seeds:** 6, 3-gonous **Traditional uses:** The fruit is acrid, sour, bitter, sweetish, cooling, alexiteric, carminative, alterative, laxative, tonic, anti-pyretic, useful in inflammations, constipation, biliousness, thirst, leprosy, anaemia, strangury, anuria, poisoning. The unripe fruit is cooling and laxative.^[16] **Nephro Protection:** It has a hell of benefits towards kidneys. Reduces oxidative stress in people with uraemia in renal dysfunction. It also prevents age related kidney diseases.^[17-19]

Carica papaya

This belongs to the family Caricaceae. **Common names:** Tamil-Pappali; Malayalam-Pappalam; Telugu-Boppayi; Sanskrit-Chirbhita; English-Papaya.^[2] **Habit:** A small soft-wooded, fast growing, and short-lived tree. **Habitat:** Indigenous in bihar and the eastern himalayas. Cultivated throughout india and the tropics. **Leaves:** Large glabrous palmatifid and palminerved leaves, 30-60 cm, across on hollow petioles, forming a round tuft at the top of the stem. **Flowers:** Flowers on axillary panicles, pale yellow, fragrant, generally dioecious, but occasionally a

few female flowers on a male plant. Male flowers in long drooping panicles. Female flowers in short clusters. Ovary 1-celled. Stigma sessile, 5-lobed, lacerated. **Fruits:** Succulent, indehiscient, 1-celled. **Seeds:** Numerous, black, enclosed in sweet mucous pulp, and covered with a loose hyaline skin or arillus; testa thick, brittle. **Traditional uses:** The ripe fruit is tasty, astringent to the bowels, aphrodisiac, stomachic, digestive, carminative, diuretic, cures insanity, inflammation, enlargement of the spleen. Relieves obesity, haemoptysis and in wounds of the urinary tract. Useful in ringworm, skin diseases like psoriasis.^[7] **Nephro Protection:** Both the fruits and the seeds in it possess the nephro protective property.^[11] Toxic induced renal failure may be prevented by papaya seeds.^[20]

Allium cepa

This belongs to the family Liliaceae. **Common names:** Tamil-Vengayam; Malayalam-Erulli; Telugu-Erragadda; Sanskrit-Pallandu; English-Onion.^[2] **Habit:** Perennial herb. **Habitat:** Cultivated everywhere. **Scape:** tall, hollow, inflated and leafy near the base. **Leaves:** In 2 rows, shorter than the scape. **Flowers:** Umbel globular, many flowered; pedicels 4-5 times as long as the flowers; spathe is composed of 2-3, reflexed valves; perianth white segments ovate-oblong, acutish; filaments longer than the perianth, connate with each other and the perianth at its base, and dialated, the outer toothless, the inner with a triangular, obtuse tooth on either side at the bases. **Traditional uses:** The bulb has a sharp taste, tonic, stomachic, appetizer, useful in malaria, ophthalmia, earache, piles, enriches the blood of women, applied to the eyes in night blindness. If eaten raw, they are emmenagogue. It is given internally in bronchitis, liver complaints, dysmenorrhoea, vertigo and migraine.^[13] **Nephro Protection:** Onion ameliorates diabetic nephropathy. Renal dysfunction caused by Cadmium can be prevented by the oral consumption of onion.^[21,22]

CONCLUSION

Even though we are surrounded with a handful of miraculous fruits and vegetables, we are blind with regard to its protective benefits. This review is aimed to protect our kidneys through easily available fruits and vegetables. Nephro protective action of this can be obtained by consuming these fruits and vegetables in our routine diet. Hence, our kidneys can be protected in a miraculous and a healthy way.

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