

DRUMSTICK TREE

Botanical name: *Moringa oleifera* (Moringaceae)

Location specific common names: te turam (Kiribati), saitani (Tuvalu), moringa, saijan, horseradish tree, mulangay

Plant Characteristics: This plant grows into a medium sized tree, 4 to 6 metres tall. It can be kept to a useful size by regular pruning, and can be trained to grow as a hedge. The name *drumstick* comes from the distinctive long tapered seedpods that hang from the branches.

Uses: Leaves are best prepared soon after picking. The leaflets can be eaten in salads after washing, although the somewhat strong flavour may deter some people. This is not an issue when the leaves are incorporated with soups, curries or stews. As with all of the nutritious leafy vegetables featured in the factsheets, it is recommended to include coconut cream or coconut oil in cooking: not only does this enhance the flavour, but it also increases the bioavailability of fat-soluble carotenoids, and increases the bioconversion of b-carotene (pro-vitamin A) to vitamin A. If no coconut cream/oil are available, palm oil and peanut oil are suitable.

Here is a simple recipe which provides a very tasty and nutritious dish: rinse 6 handfuls of leaves (just fully developed). Strip the leaflets from the wiry stalks, (these do not soften with cooking), and add to 1 litre of fish soup base, flavoured with 2 finely shredded lime leaves or lemon grass, add salt, pepper and chilli to taste. Bring to simmer for 1 minute. This will serve 4 people.

The drumstick tree is also used for livestock fodder, living fences, fertilizer/green manure and for purifying water (using seeds).

Medicinal: Drumstick leaves are probably unequalled among plants for their nutritional and medicinal properties. Traditionally in India, Pakistan and Sri Lanka drumstick has been used as an anti-inflammatory, anti-bacterial, anti-viral and anti-cancer agent. Strong evidence exists for its anti-diabetes and anti-heart disease activity, through mechanisms that decrease blood sugar, harmful blood fats and high blood pressure. This is especially relevant to Pacific Island countries and Northern Australia, with their high rates of diabetes and heart disease. Drumstick can also stimulate lactation.

Availability: Drumstick trees are common in Fiji, but can be scarce in other Pacific islands and in northern Australia. Seed was imported to Kiribati from Fiji in 1992/93. ALD nurseries in Kiribati are usually good sources of planting material, and seed is plentiful at ALD's Tanaea, South Tarawa headquarters.

Propagation methods: Plants can be produced from cuttings or seed; seed-derived plants are usually slower to establish but develop a stronger root system. Cuttings of mature wood, 200 to 600 mm long, planted with at least one-third of the cutting in the soil, are most suitable for propagation.



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How to grow: Drumstick trees are not difficult to grow. Once established, the tree is drought, salt and wind tolerant, can survive on shallow soil of poor fertility and will grow well in full sun. Grown plants need to be pruned to facilitate regular leaf harvesting. Indeed, established drumstick trees/bushes can be defoliated virtually right back to the stump/ roots and will readily bounce back when provided with some moisture. If growing conditions are poor, growth will be slower, and leaves smaller with a stronger flavour. For the first two years mulching is recommended, keeping the soil around the tree moist and free of grass and other weeds.

Threats: Pests and diseases are not usually a problem; however root rot can occur if the tree is grown in waterlogged soils.

Harvesting: Due to its vigour, drumstick can be harvested quite heavily and will recover rapidly. This is best done in the cooler hours of the day to prevent wilting.

Post harvest and storage: Full leaves (leaflets plus wiry stalks) should be washed carefully with water of drinking quality or clean seawater. Leaves can be frozen for later use. If bundle wrapped in moist paper and kept in a cool location they should store for a day. Leaves can last for up to a week, if placed in an airtight container in a cool room or refrigerator. If the leaves dry they will drop their leaflets and lose some food value.

Project findings/nutritional value: Samples were collected from Kiribati, Tuvalu, Torres Strait Islands, Solomon Islands and Samoa. About two handfuls (100 grams) per person for a meal serving will provide useful nutrition. The leaves are renowned for their high levels of minerals, vitamins (A, B, C), protein, carotenoids and other phytochemicals, including the anticancer compounds glucosinolates and isothiocyanates.

Protein: This is important in forming muscle, cell membranes, enzymes, blood components, antibodies, DNA and RNA. The mean nitrogen analyses of our drumstick samples indicated an excellent protein level of around 22%, similar to that of most legumes, which are nitrogen-fixers.

Carotenoids: A Solomons drumstick tree sample was the highest of all of our leaf samples for beta-carotene (pro-vitamin A), and was also high in lutein, which is important for eye health.

Iron: Important for healthy blood and energy.

Sulphur: This mineral is needed for production of the hormone insulin, which controls blood sugar level. Sulphur is also needed for the protein keratin, important for bone, cartilage and tendons. Drumstick tree leaves are usually 3-4 times higher in sulphur than leaves of other plants growing on the same soil.

Selenium: Important in antioxidant enzymes, for thyroid and brain function and for its antiviral and anticancer effects. Drumstick tree leaves are usually 10-12 times higher in selenium than those of other plants growing nearby. This table compares selected mineral nutrients and carotenoids in leaves of drumstick tree and bele (aibika) grown together at Burns Creek, Honiara, Solomon Islands in 2012 and English cabbage (average of samples bought from Honiara market, Solomon Islands and Nukualofa market, Tonga in 2012) (concentration in mg/kg dry weight, except N: % dry weight). Bele data: average of 3 varieties.

	Fe	Cu	Zn	Ca	Mg	S	N %	Se	lutein	alpha carotene	beta carotene
Drumstick	82	7	31	20000	3700	12300	5.1	2.0	773	0	427
Bele	73	8	44	23600	7100	4500	4.9	0.17	1006	31	358
Cabbage	40	2	20	5700	1450	3750	2.8	na	5	0	2

Fe: iron; Cu: copper; Zn: zinc; Ca: calcium; Mg: magnesium; S: sulphur; N: nitrogen; Se: selenium na: not analysed
Analyses conducted by Waite Analytical Services and the Mares Laboratory, University of Adelaide, South Australia

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