BELE

Botanical name: *Abelmoschus manihot* (Malvaceae)

Location specific common names: te nambere (Kiribati), bele (Tuvalu), nambelle, slippery cabbage (Pidgin: sliperi kabis, Solomon Islands), aibika (Papua New Guinea), pele, Pacific cabbage, edible hibiscus, hibiscus manihot, neka

Plant Characteristics: Bele leaves vary in shape from round and plate-like to long and narrow. The leaves and short succulent tips are usually cooked but can be eaten fresh. Slightly older leaves are best steamed, boiled, fried or baked. It is a suitable first food for infants when boiled and mashed with root vegetables. If boiling bele a relatively small volume of water should be used, as some minerals, especially potassium, magnesium, zinc, iron and calcium are lost in the water; any water should be consumed as soup. Bele leaves (along with other leaves) are ideally served with coconut cream, which increases the uptake of beta-carotene and conversion to vitamin A. **Medicinal:** Traditionally in many SouthEast Asian and Pacific countries bele is used to treat colds, sore throats, stomach aches, diarrhoea, diabetes, and to stimulate bone repair and milk production.

Availability: This plant can grow all year in most tropical locations but growth often slows with cooler, shorter days and drier conditions.

Propagation methods: Bele can be grown from seeds or cuttings; seed-derived plants are usually slower to establish and may vary from the parent plant. Cuttings of mature wood, from 20 to 60 cm long are the most suitable for propagation, and should be planted with at least one third under the soil surface. Cuttings can be stored or transported for a few days provided they are kept in the shade, and in a little water, which should be regularly changed to reduce the possibility of stem rots.

How to grow: Bele is not difficult to grow providing the soil is rich in organic matter and water is readily available. Plants can grow in full sun preferably with some shade in the afternoon, and indeed it is shade tolerant. Mulching the plants is recommended to keep the soil moist and free of grass and other weeds. To reduce bark rots the mulch must not be in contact with the immediate base of the plant. Regular pruning will encourage growth

Threats: Bele, unlike chaya, is readily attacked by pests, which include the shot-hole beetle (*Nisotra basselae)*, cotton semi-looper *(Anomis flava),* green coconut bug *(Amblypelta cocophaga),* spherical mealybug *(Nipaecoccus viridis),* corn earworm (Helicoverpa armigera), red cotton bug *(Dysdercus cingulatus),* red spider mite *(Tetranychus urticae)* and white fly *(Hemiptera species).* Insect pests are more damaging when the plants are growing in full sun and the weather is dry. Selecting healthy planting material and providing good growing conditions will reduce the occurrence and impact of these pests. Narrow-leaved bele varieties may be more drought tolerant than round-leaved forms (Webb, 1994).





Harvesting: Depending on the amount of bele being grown and the growing conditions, harvesting can be carried out daily. Selected leaves and even the growing tips back to the newest full leaf should be picked, ideally in the cooler hours of the day to prevent wilting.

Post harvest and storage: The leaves and tips should be washed carefully with water of drinking quality or clean seawater. They can be loosely bundled in damp paper, and if kept cool, should store for a day. If placed in an airtight container in a cool room or refrigerator, they can store for two or three days.

Project findings/nutritional value: Samples of bele for analysis were collected from Kiribati, Tuvalu, the Torres Strait Islands, Tonga, Samoa and Solomon Islands. Bele has good overall nutritional content. Two to three handfuls of fresh vegetable per person for a meal serving will provide useful nutrition.

Carotenoids: Bele had the highest levels of lutein, which is important for eye health (e.g. reducing risk of cataracts) in all of our samples, and was also high in beta-carotene (pro-vitamin A), important for vision, immunity and bone health. Carotenoids were not measured in the Kiribati and Tuvalu samples, hence their absence from the table below.

Protein: This is important in forming muscle, cell membranes, enzymes, blood components, antibodies, DNA and RNA. The nitrogen analysis of the Tuvalu sample in the table indicates a crude protein content of around 16%, which is not especially high, although well above the levels of other plants growing nearby. The bele samples from Kiribati averaged 20% protein.

Zinc: Important for immunity, growth, carbohydrate metabolism, and DNA and protein formation. Humans have around 600 different Zn-containing enzymes/proteins.

Calcium: The most important mineral for the growth and maintenance of bones and teeth. Calcium is also important for cellular physiology.

Magnesium: This mineral is important in bone formation, energy production, and nerve and muscle function.

This table compares selected mineral nutrients in leaves of bele, *Casuarina equisetifolia* and *Asplenium nidus* (bird's nest fern) growing near each other on the lagoon side of the airfield on Funafuti atoll, Tuvalu in 2014, 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).

	Fe	Mn	B	Cu	Zn	Ca	Mg	K	P	S	N%
Bele	56	9	26	9	**62**	**40000**	**7800**	12600	4000	3700	3.6
Casuarina	40	10	17	3	37	9000	1830	8300	1010	1450	1.7
Asplenium	13	8	**65**	3	22	17100	5400	**39000**	3100	1100	1.7
Cabbage	40	23	12	2	20	5700	1450	**29000**	3750	3750	2.8

Fe: iron; Mn: manganese; B: boron; Cu: copper; Zn: zinc; Ca: calcium; Mg: magnesium; K: potassium; P: phosphorus; S: sulphur; N: nitrogen. Asplenium, although low in iron, manganese and nitrogen, looked healthy with no chlorosis. Our other samples were similar. This plant appears to be, like hedge panax, very iron efficient.

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This fact sheet is one of a series produced for the Australian Centre for International Agricultural Research (ACIAR) funded activity "Improving soil health, agricultural productivity and food security on atolls: SMCN2014/089". It is based on fact sheet no. 3 in the series produced during the project ACIAR PC/2010/063.

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