Coconut cabbage:
An underexploited value added coconut product

Shameena Beegum, P.P., Niral V., Thamban, C.
ICAR-Central Plantation Crops Research Institute, Kasaragod

Palm cabbage, or heart of palm, is an underutilized, nutritious edible product of palm trees. It is also called palmito, or swamp cabbage. The coconut palm, called 'kalpavriksha", is known for its multipurpose uses from its root to the top. Though numerous value added products are obtained from coconut, one of the less well-known but underutilised edible products includes palm "cabbage" or "heart-of-palm". Coconut cabbage is locally known in Malayalam as' 'thengin kuruth 'or' 'thengin karimb' or 'thengin cabbage'. It is composed of the apical meristem of the palm along with part of the young or immature leaves emerging from the meristem. Generally, when the senile or old palms are cut down, the cabbage is extracted from the inner core by removing the leaf sheaths and fibers. It has a unique, mild, sweet taste and flavour when eaten fresh. With regard to its uses, it is used in its fresh form or as a component in salads, soups, and other gourmet dishes. It is sometimes referred to as the 'millionaire's salad' and is also used in vegetarian spreads. It is pickled and canned. Its use goes back to pre-Colombian times. In South Asia, palm cabbage is pounded and soaked to collect a starchy product that settles to the bottom upon standing. The starch is dried and used for bread making. In some countries, it is fermented and used as an alcoholic beverage. In countries like Brazil, it is considered a non-conventional vegetable and is even exported to many other countries. It is relatively rich in protein, low in fat and sugar, and an excellent diet.

If we deeply look into the parts of the cabbage, it can be observed to have three parts, the base, the cylinder, and the free top. The cylinder is a tube like leaf sheath enclosing the less developed petioles and leaflets. It is so called because it is shaped as an even cylinder until the point where it splits or opens and reveals the rachis and the free leaflets. The free top is the composite of the tender rachis and leaflets not enclosed or clasped by the cylinder. The base includes the enlarged bulbous mass of the tender portion up to the final curve at the beginning of the cylinder immediately after the last exposed heart base.

Extraction method: Palm hearts can be obtained from large mature trees as well as from juvenile palms. The palm is killed when the cabbage is extracted or harvested. It can be obtained from old palms and even younger palms with a minimum age of 3–4 years. When harvesting the cultivated young palms, the palm is cut and scrapped till the white fibres are visible. During processing, the fibres are

Fig.1 a. Canned form

b. Sticks as salad

c. As sea food substitute

removed, leaving the centre core, or heart of the palm. The centre core is attached to a slightly more fibrous cylindrical base with a larger diameter. The entire cylindrical centre core and the attached base are edible. The edible part usually has a length of 40 to 60 cm. The centre core is considered more of a delicacy because of its lower fibre content.

Major species used: Besides coconut, other palms have also been utilised for edible cabbage including *Phoenix Sylvester* (wild date palm), *Phoenix acaulis, Phoenix dactylifera* (date palm), *P. loureiroi, Euterpe olerace* (acai or Assai palm), *E. edulis. Bactris gasipaes* etc. Not all hearts of palm are edible. Some are very bitter, some are toxic (*Orania specis*). The three major palms used for the production of heart of palm are *Euterpe edulis* (*juçara or jussara*) from Brazil, *Bactris gasipaes* (*peach palm*) from South and Central America, and coconut (*Cocos nucifera*) from Southeast Asia (primarily the Philippines and Thailand).

Biochemical composition of heart of palm: Hearts of palm in general, are relatively rich in protein as they are immature meristems and contain 17 amino acids. They are low in fat and sugar and an excellent source of dietary fibre. They are also a moderate source of calcium. 88-91% of it is water. It has a surprisingly high concentration of vitamins and minerals. It can be used as a good alternative source of cabbage or vegetables. Fresh hearts of palm are good for a heart healthy diet because they are very low in fat, have no cholesterol, and are low in sodium. A 1-ounce serving of raw hearts of palm provides 32 calories, according to the U.S. Department of Agriculture's National Nutrient Database.

Post harvest management and processing of heart of palm: Since it is active meristematic tissue, it needs to be carefully processed immediately after cutting. It oxidises fast. Hence, it has to be soaked in a brine solution upon cutting. As mentioned earlier, it is consumed as fresh or processed into canned products. The preferred colour is white or yellowish. During harvesting, one or two protective sheaths covering the internodal hearts are kept to minimise the bruising damage during transit to the processing site. As the shoots are stored longer, they become more fibrous. Harvested shoots must be kept in cool places to minimise dehydration.

Canning: Following removal from the sheath and cutting into required sizes, the heart of palm is treated with a salt solution (generally 2.5% NaCl or a salt and citric acid combination), followed by filling in cans containing brine (2.5%) and citric acid (0.68%), exhausting, sealing, and cooling.

As a fresh vegetable, the cylinders and the bases are packed in plastic bags and refrigerated. In this manner, it can be stored for around one week.

Preliminary investigation carried out at ICAR-CPCRI

The five different accessions (including Straits Settlement Green Tall, Tiptur Tall, NiuLekha Green Dwarf, St.Vincent Tall, and Guam 3) in polybags were cut down and the outer leaf sheaths were removed using a sharp knife, followed by taking out the central core of the cabbage. Cabbage thus collected was immediately sealed in polyethylene pouches (LDPE) and used for the biochemical qualitative evaluation.

Biochemical quality evaluation:

Table 1 shows the proximate composition of coconut cabbage observed in five different accessions. The moisture content ranged from 84.5% to 90.58%, crude fat varied from 0.45% to 5.35%, total minerals or ash ranged from 2.09% to 3.99%, soluble protein ranged from 1.19% to 1.25%, and total carbohydrates varied from 1.18% to 8.89%. Way back in 1984, Martin and co-workers analysed the

Cutting 3-4 year old seedlings

Palm cabbage after removing the outer leaves

Extraction of palm cabbage

Extracted coconut cabbage or heart of coconut

Collected cabbage with outer leaves

Table 1 Proximate quality characteristics of coconut heart of palm

Accessions	Moisture (%)	Crude fat (%)	Ash (%)	Soluble protein (%)	Total carbohydrates
Straits Settlement Green Tall	85.9	5.35	2.84	1.25	4.67
Tiptur Tall	90.58	5	2.09	1.148	1.18
NiuLekha Green Dwarf,	87.05	0.45	2.62	1.19	8.69
St.Vincent Tall	86.38	1.05	2.47	1.21	8.89
Guam 3	84.5	3.75	3.99	1.24	6.52

(Source: CPCRI)

Table 2 Nutritional value of coconut cabbage compared to cabbage

Particulars	Coconut	Cabbage
Protein (g)	4.3	1.10
Carbohydrates (g)	5.6	4.3
Fat (g)	0.8	0.2
Thiamine (mg)	0.5	0.04
Vitamin A (units)	0.0	100
Riboflavin (mg)	0.3	0.04
Niacin (mg)	16	35
Calcium (mg)	33	45
Iron (mg)	0.2	0.3

(Source: Martin, 1984)

nutritional value of coconut cabbage and compared it with vegetable cabbage (Table 2).

The obtained cabbages were dipped in water in order to prevent enzymatic browning. To prevent browning and increase shelf life, it was cut into thin slices for salads and subjected to pretreatments such as blanching at different temperatures and time combinations ranging from 80 to 100°C and 30 to 60 second, salt treatments (1%, 1.5%, and 2% for 60 second), and sugar treatments (2%, 4%, and

6% for 60 second). The cabbage slices, after being exposed to different pretreatments, were packaged in Polystyrene cups (50 ml), covered with cling film and stored under ambient (33±2°C) and refrigerated (4±2°C) conditions. 12 g of coconut cabbage was used for each treatment.

Result: The result indicated that coconut cabbage slices packaged in cling film after the pretreatment with 4 % and 6% sugar solutions remained fresh in terms of appearance, colour, and taste in refrigerated condition for 4 days.

Conclusion

The heart of coconut palm, also known as palm cabbage or palmito, is considered a non-conventional vegetable presently underutilised in India, especially in Kerala. However, in countries like Brazil, the Philippines, Indonesia, and the UAE, it is widely used as a salad and processed into canned form, with some exported to countries such as the United States and France. Apart from senile and mature coconut palms, younger palms can also be utilised for harvesting hearts. It is low in calories, fat, and sugar and has a considerably good amount of protein, fibre, minerals, and amino acids. With the help of minimal processing using pretreatments such as blanching and sugar solution, its shelf life could be extended further.

Fig3: Minimally processed heart of palm salads

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