

BITTER GOURD (KARAVILA) - A MEDICINAL PLANT AND A VERSATILE VEGETABLE.

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INTRODUCTION.

The popular vegetable *cum* medicinal plant known in botanical terms as *Momordica charantia*, Linn., (Family:CUCURBITACEAE), has been cultivated in Asia and Africa for a long period of time. The fruits are used as a vegetable although it has a bitter, though quite acceptable taste. When cooked with the ubiquitous tomato or cut into slices and deep fried, the bitterness is considerably reduced. It has long been utilized within the Ayurvedic as well as the Unani systems of medicine. It is known as Karaila or Karela in the Indian sub-continent and as pawikkai in the Tamil language. In Sinhala it is Karawila.

The plant is a much branched climbing annual, the stem is angled and grooved and the young tender parts densely hairy. The flowers are lemon yellow. The fruit itself, which is the vegetable, varies from pale greenish yellow to deep green depending on the variety. The seeds turn a bright vermillion colour when ripe with the skin reflecting a yellowish orange hue. The skin is ribbed with numerous triangular tubercles giving it the appearance of crocodile skin. Indeed the fruit itself resembles a miniature model of a toy crocodile. The unripe fruit contains a series of cream or greenish seeds, compressed, oblong and sub-bidentate at base and apex.

According to the traditional systems of medicine, such as Ayurveda and Unani, the bitter fruit is said to be cooling, and has anthelmintic, properties. It is said to be an appetizer, to cure biliousness, blood diseases, anaemia, urinary disorders, and ulcers. [1],[2].

Its use in diabetes was pre-eminent and this has now enabled it to be established as a significant medicinal herb.[3][4][5]

In the southern part of Sri Lanka another member of the same species is seasonally available and is known as Thumba-Karavila. Some regard this species as endemic, though it bears a close resemblance to the variety identified in Kerala as *Momordica dioica*. [6][7]. This variety, as a vegetable, is regarded as a delicacy, and is most popular. Its medicinal properties are not so clearly identified.

THE CHEMICAL CONSTITUENTS OF KARAVILA.

There are a number of chemical constituents isolated singly or in groups from the fruits of *Momordica charantia*. However there is no clear



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indication as to whether the constituent compounds work in unison to provide its established anti-diabetic effect. At least three different groups of compounds present are deemed to possess the potency attributed to the plant. These include a group of compounds of the steroidal, saponin category designated Charantin, an alkaloidal substance called, momordicine,, to which are attributed the characteristic property of suppressing neural response to sweet taste stimuli,; and peptide substances which are supposed to imitate the actions of insulin.[8].

HYPOGLYCAEMIC ACTIVITY OF KARAWILA.

Even though karawila is not mentioned in Sinhala traditional medical texts or in Ayurveda texts as a drug to be used in the treatment of diabetes, many people in Sri Lanka now use it for that purpose.

Investigations regarding the hypoglycaemic effect of karawila suggest that it has the potential to be developed as a hypoglycaemic agent. The ability of Karawila to reduce the fasting blood glucose level and improve the glucose tolerance of rats has been shown [9]. The hypoglycaemic effect of karawila on human subjects has also been demonstrated [10].

Investigations carried out by Sri Lankan scientists has also established that Karawila extract acts in two ways to improve the blood glucose levels. First, it has been shown, through in vitro experiments, that Karawila juice enhances the uptake of glucose by tissues without the intervention of insulin [11]. Secondly, the ability of the Karawila juice to stimulate the secretion of insulin by isolated mouse islets has been shown[12]. In vivo studies carried out subsequently using rats has established that the serum insulin level increases on oral administration of karawila juice [13].

As far as toxicity is concerned, feeding of large doses of Karawila juice to rats has failed to show any toxic effects in rats [13]. However caution must be exercised before recommending the consumption of Karawila juice to a diabetic in the absence of data from detailed clinical trials and toxicity studies on humans.

SOME QUOTED CLINICAL STUDIES ON KARAVILA [14]

Bitter gourd has been used in various Asian traditional medicine systems for a long time. Scientists have now proved these medicinal values.

The best-substantiated use of bitter gourd to date is for people with diabetes mellitus. Researchers have reported that at least 3 different groups of constituents in bitter gourd have hypoglycemic effects in diabetes mellitus.

Laboratory tests suggest that the two proteins in bitter gourd, named as alpha and beta momorcharin might be effective for treating HIV infection.

The discovery of an entity which suppresses the enzyme, guanylate cyclase will be hopeful for people who are suffering from leukemia and for cancer patients, since this enzyme is supposed to have a link with those diseases.

Also recent researchers have focused on the anti-tumour activity, antiviral activity, immunostimulant effect, antimicrobial effects of bitter gourd and antagonistic effect of the juice to protozoan like *Entamoeba histolytica*.

Clinical studies have reported the low oral toxicity of bitter gourd. Other studies have shown that fruit and leaf extract are safe when ingested orally during pregnancy.

Further studies, however, have cautioned users as the plant may reduce fertility in both males and females and therefore, is not to be used during fertility treatment. The seeds however can have the ability to induce abortions as shown in test rats and mice. The same part has shown the ability to reduce fertility in female animals and lessen sperm production in males.

The juice expressed from the fruit of *Momordica charantia* L. was found to significantly improve the glucose tolerance of diabetic patients[15].

It is believed that the hypoglycaemic effect does not result from an insulin-mediated mechanism[16,17], but from a gluco-corticoid mediated mechanism.

VARIED CULINARY USES OF KARAVILA

In the Sri Lankan cuisine karavila is utilized in several ways. The bitterness is removed by repeated washing in salt water and cooking with the pre-ripe local variety of tomato. Cooking is generally in the form of a curry with the usual ingredients that are used to cook any vegetable curry. Another variation is frequently done in local households. The fruit is cut, rid of the seeds and sliced thin. It is then either deep fried, or sun-dried, and consumed as a salad with lime juice and plenty of red onions sliced into it. The local chefs involved in the major hotels have evolved other variations for western-style preparations. Indian and Filipino cuisine too has many variations of karavila dishes.

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HERBAL HEALING - A THAI TALE OF A SUCCESSFUL VENTURE

- Annissa

The Lampang Herb Conservation Club (HCC) was the brainchild of a retired school teacher Manop Pralomrama. It is open daily and includes a herbal spa, medicines, cosmetic products and seedlings of medicinal and aromatic plants. The club which has over 100 members, cultivates over 150 species of herbs in the Muany district of Lampang.

Manop taught farming in the Lampang province for over 20 years in a non-formal education center. In 1997 having retired from teaching he and his wife Bunyarat started the HCC. The pair updated the knowledge of herbs and herbal healing. The HCC has in addition to spa treatment and medicines, a library of information on herbs. A 500 meter walkway which has been laid with stones of various kinds to provide a kind of foot massage, is lined on either side with medicinal plants all complete with their names. They believe that they could influence people to be interested in herbs, propagate knowledge of them and help conserve them. The center grew from a wooden house, and now has an added factory that produces the herbal medicines. The raw materials are produced by members of the HCC. The herbal products are processed and formulated as capsules, pills and teas.

NB :- The example is a splendid one and one which will incur laudable comment from all conservationists, and those believing in the benign efficacy of herbal health care. The Lampang example is a good one for simple entrepreneurs in Sri Lanka to emulate. But most important of all follow the example of Mr and Mrs Pralomrama, who took relevant scientific advice in their venture; Correct botanical authenticity and Good Agricultural Practices are crucial to success.

SOURCE:

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