Health Series

Traditional Family Medicine

Leafy Vegetables

Sag, Chilly, Poy, Methi, Palak Bhaji, Bathua, Dals, Dhaniya, etc.

HEALTH SERIES :
TRADITIONAL FAMILY MEDICINE

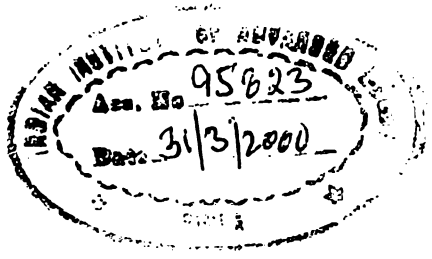
Leafy Vegetables

**Sag, Chilly, Poy, Methi,
Palak Bhaji, Bathua, Dals,
Drumsticks—Chaupatiya, Dhaniya,
Sahijana Ke Patte**

K.H. KRISHNAMURTHY

BOOKS FOR ALL
Delhi-110052

The information contained in these pages has been culled from various sources. This information is solely meant to create an interest about the wondrous qualities of our medicinal plants. On no account should this be utilised in a lay manner. Help of a trained physician is necessary.



Published by
BOOKS FOR ALL,
C-2/9, 3rd floor, Ashok Vihar,
Phase-II, Community Centre,
Delhi-110052.

Typeset by
ABC *for* **DTP**
6, Rajdhani Enclave, Delhi-34.

Printed at
D.K.Fine Art Press,
Delhi-110052

PRINTED IN INDIA

NUTRITION AND HEALTH

Almost every one nowadays is well aware of the need for a regular intake of green leafy vegetables or the greens along with the daily food in order to secure proper health.

Why is this so?

In order to appreciate this well, it will be useful to recall certain basic aspects of nutrition and health. Mere disease free state does not constitute health which actually is a sign of an all round harmony and balance. Nutrition is the process by which the constant wear and tear of the body that is concomitant to all life is made good by an assimilation of the extraneous material of food, equally constantly. The growth, the development and the maintenance of body in its natural rhythm is ensured thereby and whatever repair that becomes necessary is also attended to.

others are light like bread, greengram and pop corn. This also depends upon the condition of the stomach under which the food is eaten. Healthy stomach needs at least five hours before it can digest its fill. If fresh food is taken before the preceding food is digested, the portion of the food remaining still in the stomach is likely to undergo fermentation which will render the whole mass of the food intake unfit now for the nutrition of the body. In addition, this state of affairs fosters various disturbances of digestion. Ayurveda has a technical name for this type of eating - it is *adhyashana*, eating over the previous food. It considers this as a principle cause of many diseases of the body, a cause due to *pragnaparadha* or willful transgression of the rules of health. For, the individual knows fully well the deleterious consequences of this behaviour and still indulges in it. Ayurveda often asserts that almost all of our ailments are due to such wilful transgressions only. It is estimated that the length of time required for food to pass through the entire digestive process from mouth upto the small intestine is 12 to 14 hours.

Many authorities agree that the most complete foods from the nutritional stand point of view happen to be green leafy vegetables or simply the greens. They store food in their leaves in the form of pectin, sugar and some amount of fats. Cereals like rice and wheat or the pulses are the main suppliers of our calories, because of their richer amounts of carbohydrates and proteins. In this

light, the vegetables in general have a food value that is rather low because of their higher water content. However, they more than make up this deficiency by the abundance of their vitamins and mineral salts.

Vitamins are invaluable and infact indispensable accessory food factors. They act in general as body builders and are present in several important ingredients of our diet. They are invariably most essential to normal development of the young and also for the maintenance of health. A lack of them or a deficiency in their amount is itself a cause for bringing about many diseases, termed in general as vitamin deficiency diseases, such as xeropthalmia and scurvy.

Quite a large number of vitamins have been discovered now. Most of them though not all are also seen to be necessary for man, his health, development or disease treatment. At the initial stages of their discovery they were named after the alphabetical letters of English, such as A,B,C,D_2,D_3, E and K. Their chemical composition is however now well known. These vitamins respectively are riboflavin (A), nicotinic acid (B), pyridoxine (C), and pantothenic acid (D). Vitamin B_3 and Factor Y are now considered to be identical with pyridoxine itself. Since their chemical composition is so known, many of them have been synthesized not only in the laboratories but also in pharmaceutical concerns, to such a degree that there is a flood of such synthesized vitamins in the trade of the druggists.

However, it is very necessary to emphasise that we should always endeavour to obtain our vitamin supply not from drug stores but from the natural sources in our food. This is where the importance of the greens becomes great. They are available in our country in such abundance and in so many species and varieties and they also specialise in producing so many kinds of vitamins differentially that it becomes necessary for us to have a clear idea of the luxuriant amplitude of the greens of India, in order to profit from them to the maximum degree that is possible.

We hope to present an adequate preliminary idea of these nutritious boons of our kitchen gardens in the following pages. It is not merely the vitamins and the mineral salts that these humble plants provide us. The most important benefit they confer us is in the roughage value that all greens irrespective of any species or varieties invariably offer us. We mostly consume almost the whole of a leafy vegetable and also do so in a great bulk. Almost the whole of this bulk is constituted by a chemical that is typical of all plants, namely cellulose. And, cellulose happens to be a material that our digestive system simply cannot digest; it is only the alimentary canal of a termite or the white ant that has this remarkable property of digesting cellulose and also lignin, another hard chemical of the wood of the plants. Naturally therefore, the whole of this rough, coarse, undigestible mass of the cellulose of our greens will just come out as such, after the process of digestion.

What is the value of this rough bulk? We usually consume soft and highly cooked food that can be easily digested and absorbed. But this food has to move down in the alimentary canal. Such a movement takes place by peristalsis or a wave of contraction proceeding downwards once the morsel of the food enters the gullet. This wave however can start and be maintained only when it is stimulated by a physical contact of the roughness of food. It is here that the greens play a great role; their massive undigestible bulk of cellulose keeps this peristalsis in trim order and ensures the smooth progress of the food within. It is because of this reason all persons and specially those who have weak digestion are constantly urged to make it a habit to include greens in their diet.

Vitamins are produced mostly from plants. It is from them that even the milk-of a woman or of other animals, which has a high preponderance of vitamins making it a very valuable and complete food, secures its vitamin supply. There are many diseases besides the above two, caused almost solely due to the lack of the specific vitamins in the food intake. These are: rickets, pellagra, osteomalacia and so on. Absence of vitamins in food is such a serious matter that it may lead to death even. It has been remarked that lack of vitamins does tell heavily on one's physical as well as mental aspects slowly but surely and the deleterious affects are always progressive. It is important to stress that like carbohydrates and proteins, vitamins themselves do not supply energy

to the body. What they do is to facilitate its utilisation once it is released by proteins, carbohydrates, fats, salts and the like from the food. That is why they are aptly called food complementaries. Technically, they are enzymes or coenzymes in metabolic processes.

The best and the most proper source of all vitamins is a well balanced diet. As such, a healthy person having a proper nutrition does not need any special vitamin supplements - his food should consist of fresh vegetables in plenty. Deficiencies of vitamins are usually multiple, specially if they are of the vitamin B complex that are fat soluble. The preliminary signs of vitamins deficiency are rather vague, non-specific, mild and very usually misunderstood or just ignored.

Even in correcting such deficiencies, the better method is to utilise the more natural supply of vitamins such as the various leafy vegetables and so on—the crude source, rather than the synthetic and the pure vitamin tablets. It is this reason that makes a knowledge of our green leafy vegetables in all their richness and variety very necessary. They are all quite cheap, very common and can be easily cultivated in any small piece of land or even as pot herbs, a name which is quite often bestowed upon them.

Each vitamin plays a specific role in nutrition. For instance, Vitamin A is associated with the metabolism of lipoids (i.e. fat components) and calcium as well as most chemical reactions within

the body that are connected with growth and maintenance. Vitamin B is concerned with growth and maintenance. Vitamin B is concerned with the metabolism of carbohydrates as well as with the chemical reactions and functional perfection of all cells and specially the nerve cells. Vitamin C is necessary for the metabolism of calcium and in the physiology of the growing cells of the body. All the vitamins are concerned with establishing an orderly balance and harmony between the two alternative processes of the body viz. the constructive and the destructive. It is also important to note that one vitamin cannot replace another though its function itself may be interferred with, in case there is an absence of another vitamin. Every vitamin exercises its own unique influence in the adrenaline glands of our body that occur just by the sides of the kidneys and are concerned with the secretion of a hormone called adrenalin that has a great role in our emotional responses as well. Naturally therefore their deprivation easily tells on the function of these glands. Adrenal glands are considered to be the crux of our autonomic i.e. involuntary sympathetic responses. They are like brain to the cerebrospinal system. It forces our very kinetic drive. We can guess their importance when we note that there are thirty seven nerves that go through the adrenals alone.

It can be said in general that the vitamins markedly influence the production of hormones - the internal secretions of the body that on reaching

some part, exercises or stirs up a specific physiological action, as well as all external secretions. A cell's capacity to work is impaired in direct relation with the degree of the concerned vitamin starvation. Another boon that the vitamins confer is to aid all tissues to resist infection. Vitamins, specially of the B variety induce a desire for food. Actually, speaking, vitamins act as an important link in the essential requisites of our body for its harmonious regulation of chemical processes of a healthy cellular action. Any discordance here upsets thus the very harmony, leading to recognisable effects. They are concerned with the metabolism as a whole, and also with the other components of our food intake as well as the very organs and structures of digestion and assimilation and the relation of all these with the endocrine regulators on metabolic processes.

Minerals and mineral salts constitute the other valuable contribution from the green leafy vegetables to human nutrition and health. The total list of the elements found in our body is the following: hydrogen, phosphorus, chlorine, calcium, oxygen, carbon, magnesium, sodium, nitrogen, flourine, potassium, silicon, iron, iodine and manganese. All of these valuable elements are abundantly supplied in the natural foods of plants and we can have more than our requisite plenty specially from the greens unless we manage to destroy them when we prepare our food stuffs. It is very important to appreciate that we can *not* get them however, directly from a drug store or a

chemist's shop, as inorganic chemicals. We *have* to get them in the form in which they exist already within the bodies of plants and animals and mostly the former. These constitute what are called organic minerals which again come eventually from plants. Hence the need to take into consideration the diversity of the leafy vegetables as well as their rich variations botanically. Inorganic chemicals are dead in the sense that while they may stimulate an activity for the time being, they cannot be properly assimilated and are therefore almost value less as for as our health and life are concerned. It is the natural organic chemicals that are needed to maintain, cleanse and purify our constitutions.

Before we look into the details of the many individual leafy vegetables as are found in our country, let us briefly recapitulate the value of some of these important elements, their sources of supply and the role they perform in the harmony and rhythm of our life and its growth and health.

Potassium: Poor circulation and persistent constipation generally serve as an index to a lack or deprivation of potassium in our food. Gynaecological disorders of the women always need an abundant supply of potassium foods. All leafy vegetables are rich in potassium. A few examples in addition to them are: tomatoes, mustard leaves, spinach, endive and watermelon.

Sodium: This is a very solvent element. Persons suffering from rheumatism, hardening of the arteries or atherosclerosis, stones in the kidney

and the gall bladder, stiff joints, acidity of stomach and diabetes should consume plenty of sodium containing plant substances. Some examples of these are: spinach, ladies finger, cucumber, carrots, celery and beetroot.

Iron: Organic iron salts are very valuable in our body economy. They remove waste products and aid to a great extent in cleaning our blood stream. Inorganic iron should never be taken in the form of iron tablets because they always prove as irritant to the kidneys. Some of the plants that are rich in iron are as follows: spinach, red and green cabbage, beet root, lettuce, raw carrots and onions.

Sulphur: Organic sulphur is absolutely necessary in rectifying the diseases of blood vascular system, diseases of the skin in general, minor afflictions of skin such as eruption, boils, pimples, and also eczema and the fungal diseases of skin. Foods rich in sulphur are cabbage, mustard greens, raw celery, cauliflower, onions and radishes. Another function that the sulphur foods carry out is that they stimulate liver in general and as such promote the flow of bile secretion.

Chlorine: Organic salts of chlorine are a great help in destroying poisons as such and other toxic substances. They are beneficial in the diseases of pyorrhoea, Bright's disease and gangrenous conditions and ulcers. Chlorine foods keep the bowels cleansed. Raw green cabbage, spinach, radish, fresh greens like parsnips and asparagus,

raw cucumbers, raw carrots, lettuce, raw and cooked onions and turnips are a few examples of plants rich in chlorine.

Magnesium: This constitutes a laxative that nature has provided. The following categories of persons will need a heavy intake of organic salts of magnesium; those who suffer from recurrent constipation or acute intoxication and so also those that have stiff joints and cracking joints. Apples, potatoes, barley, cabbage, celery, coconuts, dandeleon, greens, radishes, watercress and rice are rich sources of magnesium.

Manganese: This is a strong and effective purifier and also a good neutraliser of the body acids. Peppermint leaves, parsley, endive, dandelion greens, mustard greens and water cress are rich in magnesium.

The substances mentioned above should be taken in abundance. This will keep the blood circulating system cleansed well. Some of the best vegetables are spinach, celery, parsley, tomatoes, asparagus, onions, red or green cabbage, radishes, lady's fingers, cucumbers, brinjals and so on.

In addition to their role in offering us valuable vitamins, organic mineral salts and also the inestimable roughage, the leafy greens are also useful medicinally and there again in a very multifarious facet of utility. They also aid in the tastiness of the food. Greens are thus nutritive, healthy and invaluable components of our diets

besides being medicative. A good knowledge of them is a valuable asset to what is often called as diet therapy. This is a system of curing diseases mainly by prescribing the requisite changes in the diet of the patients. The abundant varieties of our greens furnish enough material for a great range in such as diet therapy. This diet may range from one that is meant for just a slimming down of the body by removing the accumulated extra fat to that of rectifying errors in metabolism or in outright curing diseases. We can plan our diets for all of these nuances of our health needs.

THE GREENS OF INDIA

We shall now consider in some detail a few important green leafy vegetables of our country. Many of our greens come under two botanical families of plants called Amarantaceae to which the common *sag* belongs and Chenopodiaceae under which the equally common *Chilli* and *poy* as well as the famous *palak bhaji* come. *Chuka* is one more popular, much relished and quite a common green; but this a member of an altogether different family called Polygonaceae, a family of essentially semi acquatic or marshy reeds. All of these five plants are the common greens of the Indian kitchen but every one of them has a few other relatives often not much known but quite valuable in dietetics as well as medicine just like their more famous examples. We shall endeavour to consider all of them below. In addition to these, there is one more famous and very valuable green, the *methi*

which however belongs to yet another different family of plants, namely Leguminosae, the well known family of the pulses, the grams and the dals. To this list of our valuable greens, we should add another green whose value is getting realised of late viz. the drumstick and its leaves, rich in their iodine contents.

This short list does not by any means exhaust the wealth of our greens. The leaves of radish and the mustard, both of which are well liked and are equally valuable need to be considered as important greens. Lettuces and shallots are other such greens and so also are the celery, parsely and the water cress - the last three are essentially European greens though available here. There is one more typically Indian green, mentioned and praised well by so ancient an author as Sushruta. This is *sunishannaka* or *Marsilea*, a water fern, *chaupatiya* in Hindi which however happens to be a popular green vegetables only in Bengal now though the plant grows abundantly all over India. One more plant of this category, well referred as an article of diet in our classical works but forgotten as such in most parts of our country excepting a few regions happens to be the stalks of the lotus leaves. Though lotus grows well every where in India, these stalks seem to constitute articles of diet only in two regions now, viz. Kashmir and Kerala. The leaves of colocasias are also worthy of being called as green; they are actually used so in Konkan, Maharashtra, West Coast and also in Bengal. We can increase this host of greens of our

country much further. But we shall confine here to the six of them mentioned above and their few relatives.

It is very important to appreciate that almost every one of these six plants we have selected does present the existence of many other botanical relatives such as closely related but other species or variations in the same species that are brought about by man during his cultivation or those that exist in nature itself. For, then only we shall properly understand the real and full wealth that our country *does* have. We can then take all efforts that are needed to utilise them well and exploit. More important than all this is the fact that every plant species represent a valuable creation of nature which it is our duty to foster, cultivate and conserve. Such a caution is absolutely necessary in these days of commercial and competitive exploitation. This is particularly so for a plant that becomes reputed as a medicinal plant. Once a plant becomes established as a valuable medicine, it is likely to be consumed so rapaciously nowadays that it is likely to vanish away from the country itself. We should never allow this to happen to any of our plants, much less to the valuable herbs which frequently become endangered biologically.

Secondly, the rich botanical variations afford us the possibility of substitution i.e. of using any one of them in the absence of others of the series. For, all of these variations can be safely expected to be

similar as regards their biochemical constitutions as well as the physiological efforts. This is so, since all of them represent plants related together by common evolution.

The need for recognising the related species and varieties in this way enjoins on us the need to have an ability to distinguish them from one another, or in other words to identify them correctly in terms of their botanical features; otherwise, we are likely to confuse one for the other. Such a caution is particularly needed when we are dealing with very closely related variations which often differ only in but a few crucial identificatory features. It is under such circumstances, postulations of artificial keys for identifying them separately become invaluable. Such keys have been given below wherever felt needed. During their preparation it often becomes necessary to include the features of flowers viz. the details of their sepals, petals, stamens (the male organs producing the pollen) and pistil (the female structure developing the ovules), fruits and seeds. For, these are more resistant in evolution and hence, its better indicators.

Before we get into a detailed consideration of individual plants, we should note one more aspect that needs some attention undoubtedly. This concerns with the names of these plants in our regional languages. Most of these greens are common articles of use in many regions of our vast country. Unless we also offer a list of such names atleast in some important regional languages of

our country, the very purpose of this account of popularising scientific knowledge of our useful plants to all concerned is bound to be defeated. Quite often these names are well related to the Sanskrit terms by which the Ayurvedic Texts are likely to call them. It also seems sometimes that the existing Sanskrit terms are themselves taken as such from some Prakrit languages of those times. In giving our list of names this aspect is mostly kept in view. Botanical or Latin names are always provided and so also the name in English if there exists one. While giving the Latin names, their meanings in English are also given whenever relevant.

An important aspect of the plant names in Indian languages is as follows: Sanskrit name which often happens to be the basic terms for many of our regional languages most usually has a meaning. Such a meaning is also given below if found relevant. A point of frequent confusion is that different regional languages are likely to use the same name for two different plants. For instance Bengali calls *Amarantus paniculatus* as *Chuko* while *Chuka* in Hindi is *Rumex acetocella.* Examples of this type are many. One explanation is that this was because of a substitution of one for the other probably because of its absence or scarcity in the region concerned. Recognition of this confusion serves for clarity. Quite usually the number of names in Sanskrit for any particular plant are many. This is an indication of the study that has gone into its recognition, the names often

being diverse descriptions and thus a help in recognition.

With these points in view the account for every plant selected is given below under the following sections: Names, botanical description specially meant for identification and differentiation amongst the closely related species or varieties, geographical distribution in our country specially, and, the medicinal properties which also include dietetic specialities where felt needed. The readers are invited to specially note the abundance of the varieties as well as the dietetic specifications, wherever mentioned.

INDIVIDUAL PLANTS

To recapituate, the green leafy vegetables we shall consider below and the botanical families to which they belong are the following: (1) *sag* or *Amarantaus*, (Amarantaceae) (2) *chilli* or *Chenopodium* (Chenopodiaceae) and (3) *poy* or *Basella* (previously considered as belonging to Chenopodiaceae but now regarded as forming a separate family by itself viz. Basellaceae); (4) *palak* or *Spinacea* (Chenopodiaceae); (5) *Chuka* or *Rumex* and *revand chini* or Indian rhubarb or *Rheum* (both, coming under Polygonaceae); *methi* or fenugreek or *Trigonella* (Leguminosae); and, *sahinjan* or drumstick or *Moringa* (Moringaceae).

1. Sag. Amarantus. (Amarantaceae)

The genus *Amarantus* to which the common *sag* or *lalsag* belongs is widely cultivated all over India

and has many, very popular "varieties" which are often great favourites of the individual regions. Botanically, however they usually belong to separate species of the genus *Amarantus* and are therefore strictly speaking, not varieties at all. The following are some of the common species: A. *spinosus* Linn, A.*paniculatus* Linn. *A.gangeticus* Linn, *A.viridis* Linn and *A.blitum.* Linn.

Though their vegetative appearance is itself quite enough to distinguish them mutually, their principle botanical i.e. the technical criteria for differentiation is as below.

The key for separate identification of the common species of *Amarantus.*

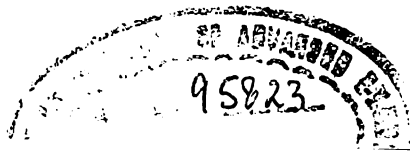
A. Stamens (the elongated structures within the petals of the flowers which bear anthers at the top containing pollen grains; these are the male organs of the flowers) are 5 in number. Sepals (the small leaf like structures below the petals of the flower, forming the calyx) are also 5.

I. Leaf axils (i.e. the angles that the leaf makes with the stem on which it is borne) has spines. *A. spinosus*

II. Leaf axil is found to be without spines.
A. paniculatus

B. Stamens are 3. Sepals are 3

I. Fruit is dry and breaking open at maturity horizontally or it is *cicumscissile.* Stem is



branching near the middle of the herb and the plant yields only one crop for the year.

A.gangeticus

II. Fruit is not breaking at all at maturity or it is indehiscent.

a. A low but a much branched herb *A.viridis*

b. A tall and a succulent herb *A.blitum*

(i) Amarantus spinous (the spiny) Linn

Names

It has many names in Sanskrit, *alpa marisha* (the smaller *marisha* as opposed to the bigger *marisha* which is *A.gangeticus*), *bahuvirya* (having manifold potentialities, virilities), *bhandira*, *ghanasvana* (densely leafy), *granthila* (having knots all along), *kantaka marisha* (the thorny *marisha*), *pathyashaka* (a very wholesome and an agreeable vegetable), *sushaka* (a good vegetable), *sphurjatu*, *tandula* (yielding small rice like seeds), *tandulanama*, *tanduleraka*, *tandulibija*, *tanduliya* (the so called *tandula* which is really an *A.gangeticus*, yielding seeds somewhat similar to the latter; *tandula* in Sanskrit and Marathi means rice grains).

In English, it is Prickly Amaranth.

In Bengali, it is *kantamaris*, *kantanate*, *kantanutia;* in Kannada, *mullu dantu*, *mullarive soppu*, *mulluharive* (the spiny *dantu* or *harive*, the latter two usually refer to *A.gangeticus*); in Gujarati, *kantalo dambho*, *kantanu dant*, *tanjalaja;*

in Hindi, *cholai, chaulai, kantenatia;* in Malayalam, *mullan chira;* in Marathi *chanalai, kante bhaji, kantemat, tandulja;* in Telugu, *ettamullu goranta, nalla doggali* and Tamil, *mullu kirai.*

There are different varieties of *chaulai* differing in the presence and absence of spines and the colour of leaves-green, red or mixed with blue.

Botany

This is an erect, smooth, non-hairy herb. Stem is hard, often reddish and with many grooved branches that sport almost throughout sharp, long, forking-out spines in the axils of the leaves. Leaf is ovate or lanceolate in shape with a tip that is obtuse and has a spine like apex. The margin of the leaf is entire; leaf blade is smooth and non-hairy above, some times scurfy (crust like scaly) below. The main nerves on the blade are many, slender and prominent below. The flowers are very numerous, stalkless and occur as arranged in dense axillary clusters or in terminal and axillary dense spikes which are often interrupted in between with leafy structures.

This plant is distributed throughout India and Sri Lanka and many other tropical countries as well. It is well cultivated on a commercial scale as well as in the kitchen gardens of the backyard.

Medicinal Properties

The plant is cooling, easily digestible, alexiteric, (warding off poisons), laxative and diuretic

(promoting much urination). It is good for the stomach and counter-acts fever. It improves the appetite as well as digestion. It is useful in *kapha* aggravations and biliousness. Blood diseases, burning sensations any where in the body, hallucination of the mind and also leprosy, bronchitis, rat bite, piles and leucorrhoea are the other afflictions where the plant, has been found useful. It is also employed so in household remedies. The root is generative of "heat" or *ushna;* it lessens the menstrual flow and is beneficial in leucorrhoea and leprosy.

The root is regarded as specially medicinal in gonorrhoea. It is used in checking excessive menstrual blood flow and eczema. As a poultice it is applied beneficially to bubae (inflammatory swellings of the glands, especially in the groins or the armpit) and abscesses. This hastens pus-formation and the process of healing. Its consumption by ladies soon after childbirth increases their milk content. It is also a specific medicine for colic or the twisting pains of stomach and intestinal disorders in general. The boiled leaves and roots are given as laxative to children. They are applied as an emollient (i.e. softening and thus healing) poultice to abscesses, boils and burns.

In Cambodia, the roots are used internally as a diuretic, sudorific (to cause sweating and thus relieve feverish heat) and a febrifuge or a cure for fever. South African tribes employ it as an enema

for stomach upsets and also in curing piles. In Madagascar the root is considered diuretic, laxative and galactagogue (promoting milk production in women). Its decoction is beneficial in curing urinary retention and gonorrhoea. The root ground in water is applied over chancres (the hard swellings that constitute the primary lesions in syphilis) that are also infected with fungi, in addition.

There are two other closely related species: *A.oleraceus* (the pot herb called *marasa* in Hindi and *tandalja* in Marathi; a well liked pot herb growing at all times of the year; only the leaves and top shoots are eaten) and *A.polygamous* wild. (called *chaulai* or *chaurai* in Hindi). The latter is a small sized spinless herb growing as if lying on the ground. It is a well known and popular *sag* all over India. The names are: Sanskrit, *tanduliya, alpa marisha;* Bengali, *chaupanate, kshudenate;* Gujerati, *tandalji;* and Marathi, *tandulja.*

The parts used in medicine are leaves, seeds, root or the entire herb.

Yunani physicians regard this as being second degree cold and viscous. The hakims of Lucknow however regard it as first degree cold and viscous. The herb is considered to be capable of removing the heat from the body, stop bleeding and eminently diuretic or promoting to urination. The herb is cooked and eaten. It is not much nutritious but it is easily digestible and most importantly it quietens down the heat of the body and the thirst.

This is a good diet for patients of consumption, fever due to heat and gonorrhoea. The seeds and roots are used as a medicine to stop bleeding in menorrhoea, bleeding piles, vomiting of blood and spitting of blood. Literature says that a drink of the freshly extracted juice of this herb is beneficial in curing snakebite.

The dosage is 60 mili litre to 120 mili litre (fresh juice); 5 to 7 grams (seeds and roots); its substitute when not available, is the spiny *chaulai* or *A.spinoces*, itself.

Ayurveda regards this herb as sweet in *vipaka* or post assimilation, cold in poteny, rough in quality and stimulative. This is an appetising pot herb and wholesome as a diet. Many authors like Charaka, Sushruta and Bhavamishra regard it as useful in any intoxicated state, lessening the heat due to the disorders of blood and toxic conditions. The leaves are cold in quality, sweet in digestion and a remover of heat and thirst. The roots are hot, destructive of *kapha* and are useful in stopping excessive bleeding in menstruation and also plethora (or *rakta pitta).*

A.polygamous has an unusual use in ayurvedic pharmaceuticals. The black *vajra* variety of *abhra bhasma* or ash of mica is burnt in a fire of cowdung cake and while red hot, it is dipped in cow's milk. Its layers are then separated and soaked in the juice of this plant, together with some acid preferably *kanji* (vinegar) for eight days. It is then called *shodita* or purified mica. *Abhra*

bhasma is considered a tonic and in combination with iron preparations used in many chronic diseases, such as diarrhoea, dysentery, diabetes, anaemia and jaundice.

This is given in seminal debility, leucorrhoea and menorrhagia. The whole plant is used as an antidote to snake poison and the root is a specific cure for colic or twisting stomach pains. Root is regarded as specific for gonorrhoea and is also advised for eczema.

(ii) Amarantus Paniculatus Linn

Names

In Sanskrit, this is *rajagiri, rajasa kini.*

In Bengali it is *bathu, chuko;* in Gujarati, *rajgaro;* in Marathi, *rajgira;* in Kannada *kiresoppu, raj gira;* in Hindi, *chuamarsha, ganhar, kalgaghasa.*

Botany

This is a tall, handsome herb. Stem is stout, grooved and striate, smooth and hairless or slightly hairy. Leaves are elliptic-lanceolate; tip, acute or acuminate; base, wedge shaped, main nerves are many, slender and they prominently stand out on the under surface. Flowers are numerous and are arranged in dense thyrsus like (as in *tulasi*) gold coloured or red spikes (rather conical in shape) the central spikes being the longest. Seeds are small, subglobose, white, red or black.

Usually there are two varieties: red and green. In the latter, the seed-plume is deep crimson and the stem and leaves are also tinged with crimson; otherwise, the varieties do not differ.

This is cultivated all over in India and is grown as a vegetable in the gardens at any time of the year.

Medicinal Use

The leaves and seeds are laxative, suporific (inducing sleep or stupour) and narcotic. Taken with food it improves the appetite and is found useful in biliousness. Its excessive use however, leads to *kapha* vitiation.

The plant is employed for purifying the blood and also in piles. It is beneficial as a diuretic in retention or painful discharge of urine. It is given in scrofula (the tuberculosis especially of the lymphatic glands) and also used as an external application to scrofulatous sores.

The parts used are seeds, leaves and tender shoots.

Seeds contain all the food constituents in standard ratio and as such form an ideal food. This is much eaten during the days of fasting in the form of cakes or *vades* made of the flour of the dried seeds. These grains are also roasted like popcorn and then made into *lahis* (Marathi) or *laddus*, the favourite diet during fasting. The plant is thus cultivated for its leaves and tender shoots

which are the favourite *sags* and also for these valuable seeds. This is a perfectly wholesome food article useful in purifying blood as well. It is found to be beneficial for patients of piles and stones in urine. For scrofula, it is applied locally and also given internally as a fresh juice.

This happens to be one of the most important articles of food specially of the hill tribes for instance, the Mawlas of Maharashtra.

(iii) Amarantus gangeticus (of the gangetic plains) Linn

Names

This is *marisha* in Sanskrit.

In English, it is Red cocks comb or Love lies bleeding.

In Bengali, it is *bamspatanatiya;* in Hindi *lalpatiya, rajkiri marasa;* in Marathi *ranmath;* in Kannada, *harive sophu, dantu soppu;* in Tamil, *tandu kirai.*

This is an erect herb with a stout succulent stem, branching above the middle and often, tinged with a fine purple hue. The stem is grooved and striate on the surface, smooth and hairless or nearly hairless. Leaves are variable in shape such as rhomboidal or ovate or lanceolate or deltoid-ovate. The tip is obtuse and provided with a fine pointed projection, or it is apiculate or often notched. Leaves are not hairy but smooth. The base of the leaf blade is long, tapering and

decurrent or running down a little along with the stalk. The nerves are many and pointed beneath. Flowers are clustered in the axils of the leaves and form long, terminal, more or less interrupted spikes. Seeds are small, lens shaped or lenticular (i.e. biconvex), smooth, shining and black.

This is found throughout India and largely cultivated in South India as a very much liked and tasty herb. It is very famous and popular as *lal sag* in Marwar.

Medicinal Importance

The leaves are sweetish in taste on cooking. They are expectorant (help in ejecting phlegm by coughing), helpful in healing the wounds and they are also known to counteract fever. They restore menstrual disorders and are emetic (cause a vomiting). They stop pus formation and are useful in biliousness, fleshy tumours, cooling down burning sensations and in liver complaints as well as in inflammations in general. Their docoction is beneficial for gargling in tooth ache and more importantly for the recurrent inflammations at the mouth.

The whole plant is astringent and highly recommended as beneficial in excessive menstrual flow, diarrhoea, dysentery and blood flow (haemorrhages) from the bowels. It is an ideal dietetic article for patients of these disorders. The plant is a reputed antydysenteric drug.

It is quite efficacious on an external application as an emollient (softening and thus healing) poultice and in ulcerated conditions of throat and mouth and also as a wash for ulcers and sores. In skin peels of throat and mouth, gargling with its decoction is beneficial.

There is a variety of this plant called *Amarantus gangeticus* var. *tristis* Prain.

Names

This is *ganna, mekanada* and *tanduliya* in Sanskrit. In Bengali, it is *champanatiya, lalchampanatiya;* in Hindi, *chowli ka bhaji, chumlisag;* in Marathi, *churi ki bhaji;* in Tamil, *kappi kkirai, kuruvi kkirai, siru kirai;* in Telugu, *doggalikura, sirru kura* and in Santali *pondgundhare.*

Botany

This is an erect herb, very much branched near the ground. Leaves are rhomboid oval; emarginate i.e. its tip is deeply notched. Flowers are clustered in axillary and terminal spikes.

This is much grown in the garden any time in the year. There are two varieties in turn here; green and red.

Medicinal Importance

The roots are considered demulcent, i.e. cooling and soothing.

The whole herb is used as a diuretic along with other drugs. In Annam in Myanmar the plant is used with success in round worm infection.

(iv) Amarantus viridis Linn.

Names

This is *tanduliya* (like *tandul*) and *vishaghna* (countering to poison) in Sanskrit. In Gujarati, it is *dhimdo;* in Marathi, *than mat* in Tamil, *kuppai kkirai* and in Kannada, *daglisoppu, chilikire.*

Botany

This is an erect, much branched, smooth, non-hairy herb. The stem of the branches are grooved on the surface, smooth, non-hairy and often purplish. Leaves are ovate or deltoid (i.e. triangular) - ovate. The tip is obtuse and usually notched at the apex. Leaf blade is smooth, not hairy and the base is truncate (i.e. abruptly cut off as it were) or wedge shaped. Flowers are pale green and arranged in small axillary clusters and also in slender, tapering, terminal and axillary much branched structures. Seeds are lens like in shape, small and shiningly black.

This is a common herb usually growing by itself almost as a weed specially near the cultivated areas all over India.

The plant is eminently edible and resembles in all of its dietetic properties, those of *A.spinosus.*

The herb is held in high esteem by many classical authors on Ayurveda as a remedy for

snake bite but modern investigations do not seem to support this claim. Vagbhata claims its efficacy in scorpion sting also specially for the leaves of this plant - alone or along with the root of another plant *jyotishmati* or *Cardiospermum halicacabum* Linn *(kanphata* in Hindi). It is also a reputed antidysenteric plant. The leaves are used as an emollient (to soften and heal) for wounds, in Brazil.

(v) Amarantus blitum Linn.

Names

This is *alpamarisha* in Sanskrit, the smaller *marisha.* In English, it is *Trailing Amaranth.*

In Hindi, it is *sadanatiya, vannatiya;* in Gujerati, *ukdi bhaja, varsadani bhaja* (the green of the rainy season); in Marathi, *tambada* (coppery) *math, pokia.*

Botany

This is a smooth, non-hairy, annual trailing herb. Leaves are small, with long stalks. In shape, they are oblong or ovate or rounded; usually 2 lobed at the apex. The leaf base is acute. Flowers are in axillary clusters.

This is a common weed throughout India and Sri Lanka, extending even to temperate regions of the neighbouring countries. This is a much used and favourite pot herb all over India. It is nutritious and easily digestible. Only the leaves and the tender shoots are used as a vegetable. In Spain,

the plant is considered as cooling, emollient and mildly astringent.

This plant has a variety called *Amaranthus blitum var. oleracea* (meant for kitchen use) Hook. This is the most famous among the Amaranth greens and called ***marisha*** in Sanskrit.

Names

In Sanskrit it is *marisha, bashpaka.*

In Marathi, it is *bhaji, dant, matha, pokla, tambda math;* in Hindi *marasa, vavada;* in Kannada *dantina soppu;* in Tamil, *kiraitandu, tandukirai;* in Telugu, *erra totakura, pedda totatura,* (the bigger garden green), *tota kura* (the garden greens).

Botany

This is a tall, smooth, non-hairy, succulent, erect herb. Stem is stout, grooved and striated on the surface. Leaves are ovate-oblong or rounded, usually notched at the apex; their nerves are prominent beneath. Flowers are arranged in axillary clusters and also in terminal, simple or branched spikes. Seeds are small, lens like, biconvex, dark brown and shining.

The plant is well cultivated throughout India and Sri Lanka and also elsewhere in warm regions. Dietetically it is a well liked, nutritious and highly valuable pot herb. The bigger varieties are quite succulent and possess a great roughage value as well.

Medicinal Properties

The herb is sweet and cooling. It is good to stomach and digestion. It is only the leaves and the top shoots of the plant that are eaten as a pot herb. The central stems are also eaten till they are tender and non-fibrous. It is considered to be very useful in biliousness or *pitta doshas* and given as a dietary article to persons of *pitta prakiti* or bilious constitution.

In Annam, the whole plant is regarded as a good remedy for round worm. In Guiana the leaves are used as an emollient (i.e. a soothing) enema. They are also ground into a paste and applied to blisters, as a healing poultice.

Chuka or *Rumex* is a valuable and well liked green vegetable which we shall see later; its speciality is that it is sour in taste because of an acid called oxalic acid. It is interesting to note that there is a species of Amarantus which is also edible, sour and contains oxalic acid. This is *A.caudatus* Linn. Because of this taste it is likely to be called a *chuka* as well. Its name in Himalayan regions is actually *kedari chua or chuka* of the Kedar ranges.

Another species of *Amarantus* is worth being noted. This is very interestingly named botanically as *A.hypochondriacus* Linn. Hypochondria is a nervous malady, often arising from indigestion and tormenting the patient with imaginary or illusory fears; its seat was once presumed to be in the abdomen. The term nowadays however, means

mostly a morbid anxiety about health or imagining illness which many people, particularly of the affluent society, do suffer from. There is a synonymous name for this plant which is also interesting; this is *A.melancholiacus* (the sad) Linn. In English it is called Red cocks comb in reference to its flamboyant red inflorescences.

This plant is found all over India and occurs mainly as a weed of the cultivated fields of *jawar* and *bajra*.

It is a small sized annual herb. Its branches are reddish green and rather sticky. Leaves are also sticky and they are reddish at the edges. A strikingly beautiful inflorescence springs from these herbs, rose red with a tinge or splashes of white and very tender to touch. From out of this, come extremely small, flat, sticky and shiny seeds in abundance, brown or black in colour. The seeds are medicinal and are called *tukhm surwali* in Yunani.

The tender leaves of the herb are prepared into a curry and this is given to persons in order to bring about a state of sleep. Ayurveda considers it as parallel to *shitivara* and *sunishannaka*, the latter being a very reputed sleep inducing herb—its very name suggests this value.

Medicinally, the plant is nourishing to semen, strengthening, astringent and antibilious. Because of its action on semen, the seeds are employed as a beneficial medicine in *shukra prameha* (where urine discharge is accompanied with semen).

Powdered seeds are given with milk. Because of its astringent property it contracts the living tissues and helps in healing. It is therefore beneficially employed in menorrhoegia, bleeding piles and also prolapse of the rectum.

Dishes prepared from the leaves are a wholesome diet to persons of *pitta* constitution; as well as the diabetics. It mitigates the aggravations of *pitta*. A drawback of this vegetable is that it is likely to cause an amount of nausea in some persons.

Amarantus mangostanus Linn. is one more edible species of the genus called *chulai* in Hindi and *pokla* in *Marathi*. It is grown as a pot herb in Maharashtra and well liked thus. It is the leaves that are eaten. This in turn has two varieties, green and red.

Chilli, *poy* and *palak*, the three famous greens of the Indian kitchens specially of North India belong to a family of plants called Chenopodiaceae. The family also includes beet root, *Beta vulgaris*, a favourite root vegetable and *Salsola kali* Linn called *sajjibuti* in Punjabi or *Chenopodium atriplicis* which is the source for manufacturing the *sajji khar* or barella (sodium carbonate) used in Medicine. Here however we deal with only the greens and therefore omit both *Beta* and *Salsola*. All of these three are also having quite a few aspects of medicinal value apart from their great significance in health, nutrition and dietetics. This aspect is also dealt with here.

2. Chilli is botanically Chenopodium album Linn. or White Goose foot in English.

Names

In Sanskrit, it is having quite a large number of names indicating its popularity as a kitchen herb from very ancient times. They are: *chilli, chillika, agralohita* (reddish at the tip which is what is often found in the leaves), *chakravarti* (the king of vegetables; whose corrupt forms appears to be the Marathi name *chakavat,) gauda vastuka* (the *vastuka* from Bengal), *kshara dala, kshara patra* (alkaline leaves, recall that *sajjibuti* meant for this purpose is another species of the same genus), *mahad dala* (with large leaves), *mridu patri* (leaves, soft), *panshu patra* (leaves crumbling and rather sandy), *shakaraja, shakarat, shakashreshta* (the king or the most excellent among the vegetables), *tuni, vastu, vastuka, vastuki* (whose corrupt from is the Hindi term *bathua).* The term *pamshupatra* is a specific name of this species viz. *Chenopodium album.* In Punjabi it is *bathu, bathua* and in Kannada, *hunchikke, huttchu chakkota.*

The genus *Chenopodium* has two other quite famous species, besides this *chilli.* The identificatory differences and the names of all these three are as follows:

The identificatory key for the three species:

A. Scentless herbs. Sepals (the structures in the flowers below the petals) are 5, soft and herebaceous. Embryo or the incipient plant within the seed, is perfectly ring like in shape. *C.album.*

B. Strongly scented, aromatic and glandular herbs. Embryo is incompletely ring like.

I. Lower leaves have stalks; they are ovate or oblong in shape and the margin is deeply wavy or divided into small lobes. The upper leaves are oblanceolate (i.e. lance like with the pointed end forming the base of the leaf). Margin of the leaf blade is more or less entire. *C. botrys.*

II. Lower leaves have short stalks. They are oblong or lanceolate in shape having an obtuse tip. The margin of the leaf blade is wavy and toothed. The upper leaves have entire, uncut margin. *C. ambrosioides.*

Of these, *C.ambrosioides* is the source of the medicinally and commercially very famous chenopodium oil and *C.botrys* can form a very good substitute for it.

(i) Chenopodium album, the *bathua sag.* Worm seed-a recognised drug of Indian pharmacopoea.

Botany

This is an erect or ascending herb, green or reddish in colour. It is not scented and the stem is often striped longitudinally. It is a small odourless herb occuring in many forms, wild or cultivated. Leaves are very variable in shape and size, reaching 15 cm long in cultivated species. The upper leaves are smaller and more entire at the margin than the lower ones. Shape of the leaf blade is oblong, rhombic, deltoid or lanceolate. The tip is

acute or obtuse and the margin, entire, toothed or thrown into irregular small lobes. Stalks of the leaf are long, slender. Flowers are in clusters; they form complex or loose and much branched inflorescences or panicles. In cultivated forms the flower clusters become thyrsoid or like the flower clusters of a *tulsi* plant.

The plant is very much esteemed as a pot herb for the kitchen all most all over India. It is usually cultivated in gardens everywhere but also grows by itself at the corners of rice fields as just a weed. Leaves are very rich in an essential i.e. an aromatic volatile oil and also mineral substances, particularly in potash salts. They also contain a considerable amount of albuminoids and other valuable compounds of nitrogen. It is easily digestible, rich in carotene and also vitamin C. The herb softens the chest and voice and removes thirst. It is very compatible to persons of hot constitution and is useful in diseases due to heat. Ayurveda considers this herb as a very good article of food, tasty, appetising, stimulative, light in digestion, promotive of strength, intellect as well as digestive capacity. In addition, this is capable of counteracting the aggravation of all the three *doshas* of *vata*, *pitta* and *kapha*. Naturally therefore, Sanskrit authors call this leafy green vegetable as *chakravarti*, the monarch and *shaka shreshta* the best among the vegetables.

The plant is grown as a pot herb in the Western Himalayas and also as a grain crop. It contains an ethereal oil, a substance resembling cholesterol

and ammonia as well as amines. Seeds have protein 15-16; fat 5-8; nitrogen free extract 47-50; crude fibre (the roughage material) 18-21; and ash 4-7 per cent. Carotene content of the plant is 7-9 milligram per 100 gram and vitamin C, 66-96 milligram per 100 gram.

The growth of the plant is greatly stimulated by magnesium. In fact the plant may serve as a field indicator for the presence of magnesium in the soil where it is found growing.

Medicinal Importance

The plant improves appetite. It is oleaginous (producing an oil), destroys worms, laxative, diuretic and stimulating to sex desire and also a tonic. It is useful in correcting billiousness or *pitta dosha*, abdominal pains, eye diseases, troubles of the throat, piles, diseases of the blood, the heart and the spleen as Ayurveda claims. Leaves are employed to reduce itching. It is also recommended in liver disorders and the enlargement of the spleen.

The Zulus of Africa use its infusion as an enema in curing intestinal ulceration. Its leaves are powdered finely and used as a dusting powder for the external genitalia in children.

The seeds are consumed by hill tribes as almost a staple food. Seeds are diuretic and are also used to form an ointment to clean the blemishes of skin.

(ii) Chenopodium botrys Linn

Botany

This is a strongly aromatic, glandular, hairy herb. The stem branches are numerous, spreading and recurved. Leaves are stalked; oblong in shape, the lower ones are thrown into lobes pinnately i.e. like the feathers of a bird, while the upper ones have a margin that is nearly entire. Flowers are clustered in many, short axillary panicles which in turn form large terminal panicles. Seeds are small and smooth.

The plant is essentially an European herb especially of Southern Europe and France but found in India from Kashmir to Sikkim at an altitude of 4,000 to 14,000 ft.

In France and many other countries of Europe it is used in treating common cold and asthma.

Its importance in India stems from the fact that it can from quite a good substitute for commercially the most famous of the genus *Chenopodium* viz *C.ambrosioides.*

We should note in this context that in India there are several species that are closely related to *C.botrys.* They are *C.blitum* HK.f, *C.album* Linn (*bathua sag,* seen above), *C.glaucum* Linn, *C.hybridum* Linn, *C.murale* Linn and *C.opulifolium* Schrad. All of them grow well in our hills and plains and are available plentifully near Calcutta. They also do have some local names and they do form useful dietetic greens there. However none of them excepting *C.botrys* itself yields the

therapeutically active oil, the chenopodium oil. This oil is almost a specific remedy for round worms which is what *C.ambrosioides*, the next plant that we shall be discussing alone, happens to be.

Chenopodium botrys is a strongly aromatic and glandular herb. The fresh plant on steam distillation yields 0.003 - 0.004 per cent of an yellow ethereal oil with a disagreeable odour. It is actually employed now a days as a substitute for *C.ambrosioides*. In France and Southern Europe it is reported to be used for catarrh (common cold) and humoral asthma. Two other species viz.*C.blitum* (called *kupald* in Punjabi) found in Kashmir and *C.murale* (called *bahu kurund, kharatua* in Punjabi) which occurs in most parts of India are also very well used as pot herbs of the kitchen.

Popular conception regards the green chenopodium as *bathua* and the red one, as *chilli* the latter being more effective medicinally. This vegetable promotes intellect, strengthens the body and stimulates digestive power. The red variety destroys *pitta;* it is tasty and nutritious and is useful in urinary difficulties and the aggravations of *kapha*. Yunani physicians regard *chilli* as useful in all affections due to heat, internal or external. It is particularly useful to persons of *pitta* constitution.

(iii) Chenopodium ambrosioides Linn.

Botany

This is a strongly aromatic, glandular, hairy herb. The stem branches are numerous, spreading and recurved. Leaves are stalked; oblong in shape, the lower ones are thrown into lobes pinnately i.e. like the feathers of a bird, while the upper ones have a margin that is nearly entire. Flowers are clustered in many, short axillary panicles which in turn form large terminal panicles. Seeds are small and smooth.

The plant is essentially an European herb especially of Southern Europe and France but found in India from Kashmir to Sikkim at an altitude of 4,000 to 14,000 ft.

In France and many other countries of Europe it is used in treating common cold and asthma.

Its importance in India stems from the fact that it can from quite a good substitute for commercially the most famous of the genus *Chenopodium* viz *C.ambrosioides.*

We should note in this context that in India there are several species that are closely related to *C.botrys.* They are *C.blitum* HK.f, *C.album* Linn (*bathua sag,* seen above), *C.glaucum* Linn, *C.hybridum* Linn, *C.murale* Linn and *C.opulifolium* Schrad. All of them grow well in our hills and plains and are available plentifully near Calcutta. They also do have some local names and they do form useful dietetic greens there. However none of them excepting *C.botrys* itself yields the

therapeutically active oil. The chenopodium oil This oil is almost a specific remedy for round worms which is what *C.ambrosioides*, the next plant that we shall be discussing alone, happens to be.

Chenopodium botrys is a strongly aromatic and glandular herb. The fresh plant on steam distillation yields 0.003 - 0.004 per cent of an yellow ethereal oil with a disagreeable odour. It is actually employed now a days as a substitute for *C.ambrosioides.* In France and Southern Europe it is reported to be used for catarrh (common cold) and humoral asthma. Two other species viz.*C.blitum* (called *kupald* in Punjabi) found in Kashmir and *C.murale* (called *bahu kurund, kharatua* in Punjabi) which occurs in most parts of India are also very well used as pot herbs of the kitchen.

Popular conception regards the green chenopodium as *bathua* and the red one, as *chilli* the latter being more effective medicinally. This vegetable promotes intellect, strengthens the body and stimulates digestive power. The red variety destroys *pitta;* it is tasty and nutritious and is useful in urinary difficulties and the aggravations of *kapha.* Yunani physicians regard *chilli* as useful in all affections due to heat, internal or external. It is particularly useful to persons of *pitta* constitution.

(iii) Chenopodium ambrosioides Linn.

Names

It does not seem to have any name in the ancient classics of Sanskrit though *sugandha vastuka* the fragrant *vastuka* is a recent coinage for it. In English, it is called American wormseed, Goose foot, Jerusalem oak, Mexican Tea, Sweet Pig weed.

It is *kadu oma* (the *oma* or *ajwan—Carum Carvi L* which is of the forest), *huli oma* (the sour *oma*), in Kannada; *katu ayamodakam* (the *ajamodakam* or the celery or *Apium graveolens L*, of the forest) in Malayalam; *chandan batwa* (the sandalwood like i.e. fragrant *bathua*) in Marathi.

The Latin name *ambrosioides* comes from the term ambrosia which was the food and nectar like drink to the Greek Gods (comparable to *amrita*) that would confer to them evertasting beauty and youth; it was also the anointing oil of the Gods.

This is an annual or perennial pot-herb and has generally six to seven related species in India occuring in South India, Bengal, Sylhet, Tamil Nadu, Andhra and Maharashtra States. The fruit from which the oil is expressed is rather globular, frequently more or less compressed and has a thin pericarp or fruit wall which is greyish brown in colour. The seeds are reddish, brown or black. Their shape is like that of a kidney. They are shiny and have a strong eucalyptus-like aromatic odour and a bitter, pungent taste.

Chenopodium is a large genus consisting of more than 250 species occurring all over the world.

About eight of them occur in India. *C.ambrosioides* var. *anthelmintica* Gray (previously called *C.anthelminticum* meaning counteracting helminth worms) or American wormseed is one of the most widely used worm killers at present. This was so used by the Red Indians of America, when Columbus visited it. Infusions from leaves and seeds have been employed as a household remedy in South America for a long time. This was introduced to Europe in 1880 and as a medicine for hookworm but the results were not very fruitful. The oil was originally a remedy against round worms but did not prove popular as it was also found to be toxic and even fatal, on occasions. This was tried again in Sumatra in 1931 against hookworms in 3 CC. doses along with castor oil and chloroform and found to be superior to thymol, betanepthol etc, the other drugs used for the same purpose during those times. From then onwards the drug began getting used more extensively and rapidly. World War-I when the supply of santonin and thymol, the anthelmintic remedies decreased, gave a great impetus to its much wider use. Many scientific workers have since then proved it to be a very valuable anthelmintic agent against many forms of intestinal parasites.

Official chenopodium oil is obtained from *C.ambrosioides var. anthelmicum*, the American wormseed more commonly known also as Mexican Tea. This was originally a native of Central America and the West Indies but is now cultivated in many

parts of the United States of America. The cultivated form does not grow so tall as the wild ones but yields more seeds. It is the seed covering that yields more oil than any other parts of the plant. As such, the cultivated forms give the highest oil yields.

The active principle of this plant is a volatile oil (.04 to 1 per cent) which is a mixture of various constituents in its turn. Its colour is quite variable- from pale yellow to bright golden yellow. The toxicity is also variable. Chemically it consists of the following substances: ascaridole (named after the round worms against which it is specific) which forms 60.77 per cent of the total oil, small portions of an isomer (a homologue) to this ascaridole, 5 per cent of the total oil, a mixture of various liquid hydrocarbons which is 30 per cent of the total and traces of lower fatty acid, chiefly butyric acid - what is found in butter and 0.5 per cent of methyl salicilate.

Though chenopodium is indigenous or native to Central America, it is found growing in a state of nature in India and also the Far East. In Philippines as many as 50 species are found to be occuring but only two have yielded the medicinal oil. Six to eight species occur in India. The one which is called Indian chenonpodium is *C.ambrosioides* Linn called in Malayalam as noted about as *katt ayamodicum* meaning, a wild *ajamoda*, *Apium graveolens* L, the celery which however belongs to an entirely different family,

Unbelliferae. The entire plant is aromatic with a camphor like smell. The volatile oil is found in the glandular hairs, specially of the pericarp of the fruit. Botanically this plant is closely related to *C.ambrosioides* var *anthelminticum*, the official Worm seed. A distinguishing feature between the two is that the spikes of the flowers in the former are leafy while this is not so in the latter. The Indian chenopodium oil is obtained from the former; it has an ascaridole content of 40-50 per cent and differs from the American oil in the nature of the hydrocarbons present. It is also lighter in colour and even the odour is slightly different. Its yield of oil is also rather less, but the clinical effects are satisfactory. The results tested against both hook worm diseases and round worm infestations were always satisfactory. Better cultivation procedures and distillation methods may definitely increase the oil yield. Consequently the plant can very well form a successful substitute. It is important to note here that apart from its use in medicine, it is employed largely in veterinary practices for eradication of intestinal parasites of many domestic animals and cattle. In view of all these, intensive efforts are now being undertaken for its cultivation on a commercial scale, for instance in the lower regions of Jammu and Kashmir State.

Botany

This is a tall, erect, much branched, highly aromatic herb with a camphour like odour. It has

small hairs all over and is glandular. Stem and branches are striate (lined) on the surface, more or less glandular and hairy. Leaves are often provided with glands; oblong-lanceolate in shape; tip, obtuse or acute; margin wavy and teeth like. The upper leaves are almost entire, their base, tapering and running down to a short but very inconspicuous leaf-stalk. Flowers are very small, clustered, forming slender axillary and terminal, simple or leaf mixed panicle like spikes. Seeds are small, round, smooth and shining.

Medicinal Importance

The plant is used in Europe for all chest complaints and nervous affections, particularly chorea, or St. Vitus's dance, a nervous disease that causes irregular involuntary movements of the limbs and the face. In Madagascar the juice of the plant is taken internally to kill worms and externally in convulsions, gangrenous (where certain cells have started dying) ulcers of the body and pyemia, which is an infection of the blood with bacteria, manifesting in the form of abscesses in different parts of the body. The Zulu tribes of Africa use this plants infusion as an enema for intestinal ulcers. The seeds are used as an insecticide, usually in a powdered form.

The fruits and the volatile oil secured by their distillation with steam or water are successfully used in many parasitic worms for eg. round worms and more importantly thread worms (ankylostomum) that infect the heels of persons

specially those who are habituated to use old wells.

The famous oil of chenopodium is a mixture of several constituents in varying proportions as noted above. It deteriorates with age and therefore cannot be stored for long and in addition may be easily adulterated, as it is often done. It is highly toxic and acts as a powerful poison for worms, specially the ankylostomes and the necators. Both the toxic and the vermicidal properties are present in the same active principle of this plant called ascaridol and as such cannot be separated. Moreover the accurate and the most beneficial doses differ from individual to individual. That is why the prescription of the medicine needs the guidance of an expert physician.

There are two important activities of chenopodium oil: one is, against the worms as detailed so far and the other is against convulsions. To get rid of the intestinal worms, this is best given before meals in the previous night as well as in the next day morning. This is to be given for two to three days. After administering this oil, it is advisible to give a purgative as well.

3. **Poy is called botanically Basella rubra** Linn. This is the Indian Spinach, the Indian counterpart of the more famous and more widely distributed Spinach which is *Chenopodium album* or *chilli* seen above but quite equal to it in excellence for the kitchen use and the nutritional value. Both of them however are well known favourites all over India.

Names

This has many names in Sanskrit: *upodika, upodaki* (growing along the watery regions), *madhu shaka, mohini* (a sweet, delicious and charming vegetable); *picchila, picchila cchada, kalambhi* (referring to its essentially mucilaginous leaves); *potaki, putika; vallipodaki* (referring to its climbing habit); *vishala* (widely spreading); *vishvatulasi; vrishchika priya* (scorpions abounding underneath).

Most of our regional languages have a name for it - a sign of its widespread popularity. This is called in Bengali, *puisak, ruktopui;* in Chinese, *ye chih;* in Gujerati, *pothi, pothinivel;* in Hindi, *bompoi, lalbachlu, myalki bhaji, poi, poikivel, sufed bachla;* in *Marathi, myalachivel, myalu, wahlea, velbondhi;* in Kannada, *basale, bilibasale;* in Tamil, *pachalai, vasala kkirai;* in Telugu, *allabatsalla, pedda bacchalai;* in Urdu, *poh.*

Botany

This is a much branched twining, fleshy, smooth, non-hairy herb. Stem is very long, slender, twining to the right and succulent. Leaves are simple, alternate, broadly ovate; tip acute or acuminate, thick; and the margin is entire. Leaf base is often heart shaped and rather narrowed down into the stalks. Flowers are white or red and stalkless. They are few in number and arranged in loose spikes. Fruit is of the size of a pea and is found well included within the fleshy perianth. The colour is red, white or black and much resembles

that of the *jamun* fruit. It grows particularly well in lower Bengal and Assam. This occurs throughout India, wild or cultivated. The plant is also found in Tropical Asia and Africa. This is a well liked green leafy vegetable for the kitchen every where. The entire herb is used as a vegetable, roots, leaves stalks and all. The most important part however is the leaf. The plant contains a great amount of mucilage or the slymy juice and also plenty of iron. It is used as a substitute of spinach and makes a wholesome and most easily digestible spinage which is also mildy laxative. The plant is a famous and extensively branching succulent herb; as such it yields a great quantity of edible material. the leaves are specially fleshy, thick, dark green and richly edible.

Medicinal Importance

The plant is acrid in taste and sweetish. It is heating (*ushna*), soporific (sleep or stupour inducing), narcotic, aphrodisiac (exciting sex urge), fattening and laxative. It improves the appetite and is useful in biliousness, leprosy and dysentery as well as ulcers.

The important actions of the plant are two: diuresis and demulcence (cooling and soothing).

Yunani physicians consider the herb as sour, but a tonic, a narcotic and an aphrodisiac. It is useful in reducing the heat of fever. It improves the voice and is applied to burns. The leaves are made into a pulp and used as a maturant to abscesses and boils to hasten their maturation and heating.

They are demulcent (i.e. cooling and soothing) and useful in gonorrhoea.

The fresh juice of the leaves is a popular external application to mitigate the heat and itchings and also the allergy due to dyspepsia or indigestion.

Leaves are mashed into a pulp and applied with great benefit curing boils, ulcers and abscesses. This hastens suppuration or pus formation. The rich mucillage content renders the herb a good healer. Leaves are also found to be useful in urticaria or allergic reaction due to the stinging hairs of the plant *urtica* or even other allergies and irritations. Juice of the leaves along with sugar candy has been found to be beneficial in catarrhal (eg. common cold) infections of children. This is also administered with great benefit for the patients of gonorrhoea and balanites. The juice of the leaves mixed homogeneously with butter constitutes a very effective cooling application for cases of burns and scalds. Infusion of the dried leaves of this plant forms a nice drink and the mucilaginous liquid secured from crushing the leaves as well as the tender stalks is a popular remedy for habitual head aches. This is applied to head about half an hour before bathing. Such a simple measure will generate a cooling sensation and brings about sound and refreshing sleep.

Basella rubra is also considered to be having an anti dysenteric properly. There are two cultivated varieties-one, perfectly green and the other is red

in its stem as well as the veins of the leaf. The former is called the white variety (*B.alba*) and the latter the red (*B.rubra*). Excepting for this, the varieties are similar in all respects.

Yunani physicians consider the plant as second degree cold. It removes severe fever and the temperature, quietens thirst and strengthens seminal fluid. To mitigate specially the fever due to vitiations of blood and biles, the leaves are ground in water, filtered and given as a drink. The same procedure is adopted to induce sleep; an external application on the head is also resorted to. If the crushed leaves are applied immediately in a case of burning with fire to the region affected, there will be an equally immediate quietening down and more importantly the usual blisters will not appear. The dried leaves are powdered and given in cases of seminal debility; or the juice of fresh leaves is filtered and given orally. Crush three fresh leaves and give the juice to a person stung by scorpion. The poison will become ineffective.

This leafy vegetable does not however suit well for persons of cold constitution. They should better avoid it. If however any deleterious effects are seen because of its use, the advised counteracting agents are almond oil and black pepper. The advisaible dosage is 7 gram to 12 grams.

Ayurveda regards this herb as an unctuous, strengthening, tasty, nutritious, wholesome and a very satisfying dietary article. All varieties of *poy* have similar properties. The stem and the side

shoots are white while the leaves are dark green in the white variety. In the red variety, the stem as well as the leaves are red. Both varieties climb well on walls, roofs, and other trees and supports profusely. The fruit is dark or blue in colour. There is a third variety which is small and whose span of spread is quite limited. It is somewhat like *lobiya or chavalia shak* or cowpea (*Dolichos catiang* Linn). There is a fourth variety, the *jangli* or the wild whose leaves are somewhat like that of *bisakhpara or Trianthema portulacastrum* Linn but larger and pointed. The taste is sour and the root is rather swollen like a betelnut.

This is a good diet to patients whose 'heat' has increased in blood or bile. Its preparations are light for digestion just like that of *palak*.

4. **Palak** is called botanically *Spinacea* (taken from its common name "spinage" in many languages of the world) *oleracea* (of the use in kitchen) Linn. This is a very esteemed herb for its taste, nutritive value and great popularity in many countries of the world, even from the ancient times.

Names

It has many names in Sanskrit, *churika, chirit chada; gramini, gramya vallabha* (of the village and liked by the country folk); *kshurapatrita, kshurita; madhura* (sweet, delicious); *palankya; snighdha patra* (with oily leaves), *supatra* (good leaves), *vastukakara* (somewhat of the shape of another famous vegetable, *vastuka* or *bathua* or the *chilli*).

In English, it is Spinach or Garden Spinach. Many names of foreign languages are related to this term. For eg. it is called *spinaji* in Afghanistan; *ispanaj* in Arabic; *espinach, espinaga* in Spannish; *spinat* in German; *espinafre* in Portuguese; *shpinat* in Russian; *isfinaj, ispanak* in Persian. In Chinese it is *po ling.*

Names in Indian languages generally follows the *palankya* of Sanskrit. It is *palang, pinnis* in Bengali; *isfanaj* and *palang* in Bombay; *isfanaj, palak, palki, pinnis sag, sag palak* in Hindi; *palak, palakbij* in Sindhi; *palak* in Urdu and Gujerati; *spinach* in Kannada; *mattur bachhale* (which is really the *Basella) and dumpa bacchale* in Telugu and *vasalai* (really the *Basella* again) *kkirai* in Tamil.

Botany

This is an annual herb with a stem that is erect, round, smooth, piped, succulent, occasionally reddish but generally green. Leaves are arranged alternately on the stem, the lower ones with very long stalks, variously lobed and with the lobes of an acute triangular shape, smooth on both the sides. Leaves are fleshy, big and rather triangular. Flowers are very small, either female or male. Male flowers are arranged on long terminal roundish spikes or on shorter axillary spikes; they are very numerous and stalkless. Female flowers are axillary, stalkless and crowded. Fruits in some varieties are spiny; in others, soft and smooth. Seeds are triangular, yellowish green and tasteless.

The herb is cultivated in the gardens throughout India and elsewhere also widely. But the native country from where it comes originally is not known; this is probably from Persia.

Medicinal Properties

The plant is sweet, delicious and cooling, and as a food, very wholesome though causing *kapha dosha* (on excessive consumption). It is also laxative and alexipharmic i.e. countering to poison. It is useful in the diseases of the blood and the brain; asthma and billiousness and also leprosy.

The parts used are the whole herb, the leaves and the seeds. Medicinally seeds are the best. The leaves are cooling; emollient (softening and healing) as a poultice, counteracting to the fever and its heat and also as a diuretic, a laxative and an anthelmintic drug. It is useful in urinary stones, inflammations of the lungs and the bowels, sore throat and sore eyes; pains of the joints, lumbago (rheumatic affections of the lions), cold and sneezing. Yunani physicians find them useful also in ring worm, scabies and leucoderma and in arresting vomiting tendency, billiousness and flatulence (swelling due to morbid gas collection). They use the seeds beneficially in fevers, leucorrhoea, urinary disorders, lumbago and also diseases of the brain and the heart.

Fresh juice of the green plant is given in urinary stones, as it is a good diuretic also.

The seeds are laxative and cooling. They are also used in breathing difficulties, inflammations of the liver and in jaundice.

Spinacia glabra is another species found in Bengal and called "*palam shaka*". Here even the seeds are smooth and succulent and when boiled and seasoned, form a pleasant and delectable, dish.

As a dietary article, *palak* is cooling, unctuous, very much agreeable, mitigative of thirst and heat and also destructive of oedematous swellings. Its preparations are always tasty and easily digested. Rajanighantu a famous lexicon of Ayurveda regards it as slightly pungent, sweet in post assimilation, very wholesome, cooling but somewhat constipative. It destroys the aggravations of bile and blood and is very satisfying, as a food article.

Palak has a rich percentage of vitamin A and also iron. It purifies as well as strengthens blood. Eating it raw gives a rather bitter taste but that is presumed to be more effective. Preparing a *raita* or a curds mix with such raw leaves will however render them very tasty as well as very beneficial. Among all the greens, *palak* is considered to be the best. If one drinks half a *ser of the leaves of palak* ground on stone without adding any water, that would render the stomach clean and clear. This is to be drunk in the morning.

A decoction of all the five parts of *palak* (root, stem, leaf, flower and seeds) is advised in all

diseases where fever is a dominant factor. This is also useful in cases of burning sensations of the gullet and throat, swellings of boils and eruptions, inflammation of the respiratory tract, and the like. The leaf juice is used as a gargle to ward off the burnings at the throat i.e. sore throat. Giving dishes of *palak* to an intestinal patient is most advisable for it does not contain anything to irritate the intestine unlike many other vegetables. As the leaves are diuretic, their fresh juice proves beneficial in urinary stones and gravels.

A type of alkaline substance somewhat resembling soda is found in *palak*. It also contains a poisonous principle in the form of arsenic. Seeds contain the thick chenopodium oil as well as folic acid whose availability is a necessity for the development of red blood corpuscles; its scantiness in supply leads to anaemia.

Yunani physicians consider it as first degree cold. It mitigates thirst and burning sensations associated with urination. This is excellent as regards the attack of common cold during the summer season and also the pains at the lungs. The jaundice and the coughings that are associated with summer respond well to its administration. It removes the dryness of the body and pacifies the pains at the waist. In short, it is very good for many other ailments as well, of the summer seasons such as chest pain, burnings at the throat and the like, for instance, the prickly heat. For most of these, the leaves of *palak* are also boiled and tied over the regions concerned.

The principal medicative action of *palak* are that it removes the heat of the body, mitigates the burning sensations wherever they occur and promotes profuse urination. This is particularly useful in chest pain, tuberculosis, jaundice and painful urination.

In cases of pains at the throat, gargling with the leaf juice as well as drinking it with a little amount of sugar will be useful. An adverse effect of this vegetable is that it is likely to cause headache. The means of over coming this reaction is to use almond oil, ghee and cinnamon bark or *dalchini.*

Fresh *palak* contains 84.00 per cent moisture, while the dried one contains ether extract 6.25, albuminoids 0.75, soluble carbohydrates 63.88, woody fibres (i.e. roughage material) 9.12 and ash 20.00 per cent respectively. It also has two other valuable substances, iodine and lecithin. The whole herb has a large quantity of mucillage-nitrogenous matter, alkaline nitrates, fat, sugar, fibres and ash. Both the succulent leaves and the stems are boiled and seasoned to form an excellent, nutritious, wholesome and demulcent dish. All the herbaceous parts of the plant are mildly laxative and are used as an emollient (soothing) poultice. As a decoction and infusion in the proportions of 1 in 10 and in doses of 1 to 2 ounces, it is a beneficial demulcent, diuretic and astringent drug much useful in fevers, inflammations of the lungs and bowels, hurried breathing, disorders of liver and in urinary stones.

The chenpodium oil derived from *palak* is a valuable drug in treating ankylostoma or the hook worm disease. But the employment of the drug in this condition needs some precautions, for, an over dose may prove fatal. It is advisable to give the drug in one single large dose (rather than three times a day) and then it should be immediately expelled from the intestine by using a laxative. The following is the procedure adopted in Central America, its native country. The intestines are cleared the evening before by magnesium sulphate. 24 drops of chenopodium oil are given in a gelatine capsule on an empty stomach, the next morning. This is the dosage for an adult and the capsule should have been filled with the oil recently. Two hours later, a similar dose of the laxative is given to complete the treatment. The important caution to be noted is that under no circumstance the oil of chenopodium should remain in the stomach longer than what is absolutely necessary. In case any repetition is needed, this should be done only after two weeks. With such precautions, the oil of chenopodium is a safe and reliable drug.

There are quite a few simple and household medicative uses of *palak*. A short list is as follows:

1. For plethora or *rakta pitta*

Take 20 *tolas* of *palak*, wash and clean well in water. Keep 5 *tolas* of cow's ghee in a small vessel, add 6 *mashas* of roasted cumin seeds in it and a few pieces of ginger. Then mix *palak* with these and a little bit of salt. When *palak* is fried well in

the ghee and cooked, add 2 *tolas* of pomegranate juice. This is a good and beneficial dish for a patient or *rakta pitta.*

Another simple recipe is to administer raw juice of the leaf mixed with honey or sugar.

2. In curing the effect of poison.

Take 20 *tolas* of *palak,* cut them into small pieces, add 3 *mashas* of salt, 6 *mashas* of pomegranate powder, 1-1/2 *mashas* of *haritaki,* 2 *mashas* of the powder of *nagakeshar,* 1 *masha* of turmeric, sandal wood powder and black pepper— 6 *rattis* each. Roast some garlic in ghee and add to it this whole mixture. Keep another vessel of water at the mouth of this container and cook.

This preparation is very beneficial for removing the poisonous effect of consuming toxic substances like opium, *dhatura, bhang, madar* and the like.

3. A dish for curing alcoholism - *madatyaya.*

Place one *tola* of ghee in a basin, roast cumin seeds in it and then add 20 *tolas* of *palak* to it. Add also 3 *mashas* of salt, 1-1/2 *mashas* of black pepper, 6 *mashas* of coriander, 1-1/2 *mashas* of turmeric, 1 *masha* of *saunf* and 1-1/2 *mashas* of *garam masala.* Remove the preparation into a porcelain vessel, add a few drops of the juice of *bijaura* lemon and serve to the patient along with wheat *rotis.*

It is important to note that no preparation of *palak bhaji* should be given to a patient of *vata or*

kapha aggravations. Their afflictions would then get augmented.

Another dish for the same purpose is as follows: Take 20 *tolas* of *palak*, clean and chop. Take 5 *tolas* of *mung dal*, boil in water, add 6 *mashas* of salt and 3 *mashas* of turmeric. Remove out the waters of *mung* first, thus making it thick. Add the *palak* mixture as above and cook again. This is a very tasty dish of *palak bhaji* and can be tried with any other *dal* as well.

It is very useful to note here that taking *palak* with gram, *tuwar* dal and other pulses or with vegetables like potato, cabbage, raddish, tomato and the like is very beneficial and nutritious. Its rich protein and vitamin A and B content will render the less useful proteins of the other vegetables more easily assimilable.

4. *Chuka* is called botanically *Rumex vesicarious* L and belongs to a separate family altogether, namely Polygonaceae. This is a pleasantly sour and quite a favourite vegetable.

The genus *Rumex* is a large genus consisting of about 100 species and is distributed mainly in North temperate regions of the world. They are perennial or annual herbs i.e. living more than one year or just for one year. Very rarely are they shrubs. Leaves are mostly radical i.e. arising as a clump at the base of the plant; sometimes however they are cauline i.e. occuring on the stem as it happens in other plants. In India there are about six species that have reached some importance

either as a dietary article or a medicinal material or as both. Since they are so many, it becomes necessary to distinguish among them. The following key of diagnostic characters will serve the purpose.

An artificial key to identify the several species of the genus *Rumex.*

A. Flowers are bisexual i.e. containing both stamens and pistils. The inner sepals in the flowers are leathery and become enlarged in fruit. Leaves are not hastate i.e. spear shaped, but with the basal lobes turned outward.

I. The inner fruiting sepals (i.e. those that are next to the fruit and persist with it) are having very narrow margins. *R.maritimus.*

II. The inner fruiting sepals have broad, much toothed wings.

a. These wings are irregularly toothed. The teeth are stout and straight. *R.dentatus*

b. The wings are pectinately (i.e. comb like) toothed. The teeth moreover are usually hooked at the tip (helping in fruit dispersal). R.*nepalensis*

B. Flowers are unisexual i.e. having only stamens (male) or only pistils (female) or they may be polygamous i.e. male, female or even bisexual—all kinds occuring in the same plant. The inner fruiting sepals are much enlarged, membranous and entire i.e. not toothed at all. Their midrib has a deflexed tubercle (or wart like structure) near the base. The leaves are hastate.i.e. spear shaped.

I. The plants are polygamous. R. *scutatus*

II. The plants are dioecious (male and female flowers occuring in different plants). R. *acetosa*

III. The plants are monoecius (male and female flowers occuring in the same plant). R.*vesicarius.*

C. Flowers are dioecious. The inner sepals are herbaceous i.e. soft and tender and hardly enlarged along with the growing fruit. Leaves are hastate. R.*acetosella*

In general, the roots of this genus act as tonic, astringent, antiscurbutic, refrigerant, anthelmintic, slightly aperient, laxative and diuretic.

The seeds of several species of the genus are used as antidysentric remedies in South Africa.

We shall now consider the individual species as below, but not in the order mentioned above.

(i) Rumex vesicarius. This is *chuka or chuka sag* in Hindi.

Names

There are many names for this, much liked leafy vegetable in Sanskrit often stressing the sourness of it. They are *amla, amla bhedaka* (the sour), *viramla* (powerfully sour), *amla nayaka* (the leader among the sour), *amlankusha* (penetratively sour), *amla sara* (the essence of sour),*amla vetasa vetasmla* (a soury bamboo); *bhedana, bhedi; chukra; gulmaha* (curing splenic enlargements), *gulma ketu; mahakshara* (highly corrsive, alkaline);

rajamla (the king of the sour vegetables); *rakta sara, rasamla* (having a soury juice); *sahasra jita, shatavedhi, phalamla* (the soury fruit); *varangi* and so on.

In English it is Sorrel, Bladder-dock. Sorrels are famous European herbs - the acid tasting species of the genus *Rumex*. There are many sorrels: Common sorrel (R.*acetosa*), Sheeps sorrel (R.*acetosella*), French or Roman sorrel (R.*scutatus*).

It is called *chak, chuk, chuka, chuka palang* in Bengali; *chuka, chuke ka shak, ambari* in Hindi; *khatta mittha* (sour sweet), *khatbiri, khattian, saluni* in Punjabi; *chok, choka, taluni* in Pushtu; *chuka* in Sindhi; *chukki soppu, sukke soppu* in Kannada; *chukka keera* in Telugu; *shakkan kirai* in Tamil and *chuka ka sag* in Urdu.

The Sanskrit term *chukra* seems to be the basic form for most of these names in regional languages.

Botany

The plant is an annual, smooth, non-hairy herb, branching from the very root level onwards. It is fleshy, pale green and branches forkingly. Leaves are elliptic ovate or oblong. The tip is acute or obtuse while the margin is usually entire. The leaf blade is 3-5 nerved with its base, wedge shaped, rarely heart shaped. The stalk of the leaf is as long as the blade. Flowers occurs in leafless racemes. Fruit is 1-3 cm in diameter, white or pink.

This is grown in gardens all over India any time of the year and forms a well liked leafy green vegetable of the kitchen. It is well distributed beyond India as well, as for instance, in Persia, Afghanistan and Africa.

Medical Importance

The herb is very sour, laxative and also good for stomach. This is useful in a long list of maladies viz. heart troubles, pains, tumours, constipation, alcoholism, diseases of the spleen, hiccup, flatulence, asthma, bronchitis, dyspepsia, vomiting and piles. It however causes biliousness.

Yunani physicians consider the herb cooling, tonic and analgesic or a pain killer. They use it in scabies, leucoderma, tooth ache and the bites and stings of poisonous animals. As an article of food, it promotes appetite and also arrests vomiting, besides being likable and nourishing.

The leaves are cooling and aperient viz. laxative and to some extent, diuretic.

The fresh juice of the leaf is presumed to lessen the pain of tooth ache, and because of its astringent nature, it checks nausea. It promotes appetite and allays "morbid cravings for unwholesome substances." It is also considered as very cooling and therefore beneficial in burning sensations within the stomach and externally as a liniment (a thin layer of ointment) to mitigate pain, specially those of the bites and stings of animals. The seeds are also said to be having similar

properties and are prescribed as a roasted administration in dysentery and also as an antidote in scorpion stings, specially. Charaka considers the leaves as an antidote to snake bite and the seeds for the scorpion sting, though modern investigations do not support the claim in either case.

The genus Rumex has many other species—R.*acetosella* Linn. and R.*maritimus* Linn and R.*scutatus* Linn that also find uses in kitchen and household remedies like *chuka.*

Popularly they are all often known as "varieties" of *chuka.*

(ii) R.acetosella Linn.

Names

This is *chukrika* in Sanskrit but its English names are many:

Cookoo's sorrel, Field Sorrel, Ranty Tanty and Souracks.

In Hindi, it is *chuck*; in Bengali, *chuka palam.*

Botany

This is a perennial, smooth and non-hairy herb, often bright red and therefore very prominent in autumn. It has a creeping root stock and the plant is much branched, the stem being slender, simple or branched from the base itself. Leaves are variable in breadth and shape. The lower leaves are

stalked. The leaf blade is lanceolate (lance like) or hastate (spear like, with the basal lobes turned upwards). The upper most leaves are stalkless. Sepals persist with the fruits as oblong erect structures closely appressed to the small triangular fruit.

This is indigenous to North India but well distributed in the East Himalayas and also quite common in Europe, North Africa and North Asia.

Medicinal Importance

The fresh juice of the plant is refrigerant, i.e. cooling and soothing and diaphoretic, helping in provoking sweating. It is used in Europe for urinary and kidney troubles.

The plant has been used in scurvy, a disease of vitamin C deficiency manifesting itself in tenderness and bleeding of the gums. But if one eats this in excess, the toxic effect of its acidity which is due to the oxalic acid may become predominant. This antiscorbutic activity (i.e. against the scurvy) is due to the potassium oxalate in the leaves.

Oxalic acid poisoning itself will ensue if this vegetable is eaten in excess.

(iii) R.crispus

Names

This is called *amlavetasa* (having soury bamboo like stems) and *sthula vedhichukra* (having stems

rather stout in comparison with the two species noted above). In English this is called Yellow Dock or Sour Dock. It is known as *chukkah* itself in Hindi and Bengali; *Chuka bija* (the *chuka* seed) in Marathi; *sukgu kire* in Tamil; and *shukku, kuraku* in Telugu.

The plant is quite common in grassy places and the road sides of large towns and also occurs in a semiwild state in the hills.

The root contains two characteristic active principles, rumicin and lapattin which are identical with chrysophanic acid, tannin; calcium oxalate, much mucilage and also starch. The other important constituents of medicative value are emodine, chryso phanic acid and an essential or volatile oil that is responsible for its smell.

Root is employed in the form of a fluid extract in doses of 1 drachm or as a decoction of the herb (1 in 10 part) in doses of 1/2 to 1 fluid ounce or as a tincture (i.e. an alcoholic solution; again 1 in 10 parts) in doses of 5 to 10 minims. This is an astringent and sedative drug like rhubarb and sarsaparilla, both of which are famous drugs on their own right. This is given in scurvy where it proves to be of very great merit since it contains a plentitude of óxalic acid. It is also administered in chronic skin eruptions as well as in many other afflictions such as dyspepsia (mild indigestion), syphilis, scrofula, hepatic disorders, irritation of the larynx or the voice box and also catarrh or the common cold. Root, in its fresh extract or dried

powdered form is utilised as a dental medicine for spongy, soft and often bleeding gums. The juice quietens the pains of tooth ache.

Seeds are astringent and are much employed in dysentry, as well as in checking nausea and in prompting appetite. Externally it is utilised as a thin onitment in quietening down the pain of bites and stings of snakes and insects. They are particularly supposed to be antidotes to scorpion stinging.

(iv) Rumex dentatus Linn.

Names

It is interesting to note that this plant is called *changeri* in Sanskrit, a term which is the name for two other quite famous plants *Oxalis corniculata* Linn and O.*acetocella* Linn. The sourness in all the three is the same and it is due to the presence of a specific acid called Oxallic acid.

In Hindi, it is *ambavati, amrule.*

Botany

This is an erect annual herb. Stem is usually red, grooved on the surface, smooth and non-hairy. Leaves are oblong, smooth, non-hairy. The tip is obtuse. The stalks of the leaves at the ground level have a heart shape or a rounded base. Fruit is acutely triangular and almost winged. The inner segments of the petals are much enlarged in the fruit, and have an irregularly toothed margin.

This is well distributed in Sindh, Khandesh of Maharashtra, South India and also Kumaon Hills.

Medicinal Importance

The plant is antiscorbutic i.e. useful in scurvy. The root is used as an astringent and also as a healing application in cuteaneous or skin disorders. The plant is also reputed to be having antiseptic properties of killing disease calling germs like bacteria.

(v) Rumex nepalenesis spreng.

The plant does not seem to have many names in regional languages.

Botany

It is a robust spreading herb with stiff branches. Roots are tuberous. Leaves are pointed. Their margin is entire. The lower leaves are stalked, oblong, ovate or larger and heart shaped. The upper leaves are nearly stalkless, smaller and narrowed at the base. The upper most leaves are stalkless and lanceolate. Fruiting sepals are broadly ovate in shape and their margin is well provided with comb like hooked teeth. The midvein of one of these sepals is much thickened and forms an oblong swelling or a tubercle.

This is from Nepal but grows in all temperate Himalayas at an altitude of 4,000 to 12,000 ft. and also in Western Ghats and Nilgiris and Pulney Hills of Tamilnadu.

Medicinal and Food Importance

The tuberous roots of this plant which grows abundantly in India are used as a substitue for rhubarb (another sour vegetable belonging to the same family of Polygonaceae, viz. *Rheum emodi* wall.) In Bengal. In *bazars*, they are called *rewand chini*.

In Madagascar, an infusion of the leaves is prescribed in colic (twisting pains of stomach) and as an external application to syphilitic ulcers.

Roots are purgative. In Bengal they are actively given for this purpose in constipation. Their purgative property is similar to rhubarb.

A strong decoction of the leaves is used by Europeans in Transval province of South Africa in table spoonful doses three times a day by the mouth for bilharziasis. It is said to be specifically effective there.

(vi) Rumex scutatus Linn.

Names

This is also called *changeri* in Sanskrit. In English, it is French Sorrel, as it is quite popular in France. In Bengali it is *amrula* and in Hindi *ambavati*.

Botany

This is a perennial, warty, somewhat spiny herb. Stem is creeping, well branched below, the branches being slender, much bending and

forkingly divided. They end in long lax panicles viz inflorescences that are much branched and elongated. All the leaves have long stalks, and they are hastate (spear shaped), base is heart shaped or sub lobed into 3, all the lobes being broad. The lateral lobes are rounded suddenly and contracted into the narrower midlobe.

This is found in Western Himalayas, Persia, Middle and South Europe and North Africa.

Medicinal and Food Importance

The succulent acidulous leaves contain potassium binoxalate and are eaten fresh as a vegetable. Dietetically it is quite comparable to *chuka* as well as *chukrika.* These leaves are succulent, nourishing, acidulous or soury and rich in potassium binoxalate. They are eaten fresh. The freshly extracted juice from the leaves given as a drink is prescribed as an antiscorbetic drug in scurvy.

The herb is refrigerant i.e. cooling and refreshing and also astringent or healing. It is given in some parts of France for dysentry and has also gained a good reputation as an antidysenteric drug.

(vii) Rumex maritimus Linn.

Names

This is Golden Dock, or small Water Dock in English.

In Hindi, it is *janglipalak, jal palam* (the wild *palak* vegetable); in Punjabi, *bijiband hulaobul, jungli palak, khattikan* (the alkaline or the soury), *zagueket*; in Urdu, *bijaband;* in Bengali, *bun palung.*

Botany

This is an annual herb with a stem that is angled and deeply grooved longitudinally on the surface. Leaves are lanceolate, base being always narrowed into the stalk. Fruiting perianths are all unarmed, or, in the same plant some are armed with spine and some unarmed. They are yellow brown when ripe; warts or the tubercles are smooth. Spines of the perianth are some times very large, their tip being straight or slightly hooked. The fruit varies much in size, number and length of the spines.

This is found along the marshes of Assam, Sylhet, Bengal, and also in Europe, Asia and in North and South America as well.

Medicinal Importance

Yunani physicians consider this as a tonic to the loins, and a remover of the pains of the back and the lumbar regions in general. It is a good cure in gleet or morbid discharge of mucus occuring often at the mouth or even elsewhere. The seeds have a bad taste but beneficial in removing pains at the waist and back as well as chronic urinary disorders such as *prameha.*

The plant is a good refrigerant, cooling and soothing.

The leaves are crushed and applied to burns and the seeds are sold in the bazaars as "bil band" and considered as an aphrodisiac, exciting the sex urge.

Popular conception regards this as a wild 'variety' of *palak* though botanically this is incorrect.

5 (i) Rheum emodi. wall.

Names

This is called in Sanskrit as *gandhini* (aromatic), *pita* (yellow), *pitimulika* (yellow rooted) and *revatchini.*

In English, it is Himalayan rhubarb.

In Afghanistan, it is called *chukri, rawash;* in Arabic, *ravan de hindi, rawind;* in Bengali, *bangla revanchini;* in Hindi, *revandi chini;* in Punjabi, *chukri, revand chini;* in Gujarati, *gamni revanchini;* in Tamil, *nattir revalchini;* in Telugu *nattu revalchinni, nattu pampuchina gadda;* in Urdu *rewanchini,* in Kannada, *reval chini;* in Marathi and Gujarati,*ladaki revanda chini;* in Tamil *variyattu.* Revand is the Persian name.

Botany

This is a stout herb with a large, woody root. Stem is leafy, very stout, streaked on the surface with green or brown lines. Leaves near the root

have long stalks and are very large often 60 cm in diameter, orb like or broadly ovate. Their tip is obtuse, the base is heart shaped and with 5-7 nerves, warty below and somewhat scaly above. Leaf stalk is also very stout and somewhat scaly on the surface. Fruit is ovoid-oblong and winged.

This is a herb of the Sub-Alpine or the Alpine regions of the Himalayas growing at an altitude of 11,000 to 12,000 feet. It occurs wild in Kashmir, Nepal, Sikkim and Bhutan.

Medicinal Importance

The tuber according to Ayurveda is pungent and bitter in taste and is a tonic and a laxative. It is useful in dysentery, loss of appetite and bad ulcers.

Yunani physicians regard it as of a sharp and bitter taste. They use it as a purgative, an emmenagogue (restoring menstrual flow) and a diuretic. It is also employed beneficially in biliousness, lumbago, sore eyes, piles, chronic bronchitis, chronic fever, asthma, pains, lesions and bruises as well as coryza or the common cold.

The root is a purgative and an astringent tonic.

Altogether there are four species of the genus *Rheum* in India which are also sometimes called as a variety of *chukri* or more commonly as varieties or rhubarb. They are all of medicinal value to some extent or the other. The genus *Rheum* consists of 20 species distributed in Temperate and

subtropical Asia.They are all stout herbs with woody and large roots. Leaves are also large, entire, toothed or lobed. Medicinally they are all bitter, tonic and purgative. Many of the species are officially recognised medicinal plants of several countries.

The key to their botanical identification is as follows:

A. Stemless: Flowers are in spike like recemes.
R. spiciformis

B. Stem is branched and the panicles bearing the flowers are leafy.

1. Flowers are dark purple in colour. *R. emodi*

2. Flowers are pale yellowish in colour.
R.webbianum

C. Stem is simple. Flowers are borne in branched panicles which are concealed in enlarged (bullate) bracts. *R. nobile*

Of these, *R.emodi* has been dealt with above. We shall now consider the three others below:

The crude drug of the Himalayan rhubarb consists of dried rhizomes or underground stems of the plant, either whole or cut into pieces of suitable length. But these modified stems are popularly referred to as "roots". They are dug up, usually cut up in a transerse way into short pieces which are then strung on a thread and dried in the sun or by heat.

Rhubarb was being obtained as an import from China, via many places which gave their own names to the crude drug supply, such as Turkey, Russian and East Indian rhubarb in the olden days of trade. These rhubarbs of international commerce was from two species *Rheum emodi* and R.*palmatum*, growing in South East Tibet and North-West China, where from it was imported in to India. However, rhubarb is now successfully grown in India, for instance in some parts of Assam. The root of the Indian form is darker, inferior in aroma, coarser, untrimmed and not decorticated (i.e. the outer portion removed away) in comparison with the Chinese supply. Its powder is also dull and brownish yellow unlike the bright yellow of the latter. Indian rhubarb is entering into drug trade now in quite a considerable scale.

The rhubarb root contains many useful substances; large percentage of chrysophanic acid or chrysophan which is chemically related to emodin, the famous drug. It also has a glucoside rhaponticin, a tannin called rhoeo-tannic acid, several resins, mucilage, tannic and gallic acids, sugar, pectin and calcium oxalate and a diverse variety of inorganic salts. The characteristic grittiness of the drug is due to the presence of calcium oxalate crystals. Medicinally however Indian rhubarb cultivated with due care is in no way inferior to the Chinese; its purgative principles are as rich. Leaves of the plant are rich in oxalic acid and hence quite sour in taste. The Indian rhubarb is now found to be quite satisfactory in trade as well as profession in USA and UK.

Rhubarb is mainly used as an effective purgative drug; this is because of the presence of anthraquinone derivatives. It is very safe, and is never attended with any adverse reactions of causing a sickness and the like. This is good for stomach, an actual tonic as it were and a cathartic i.e. strongly purgative. Its effect is however confined to bowels. As such, it is well suited to be used in simple diarrhoea, but not in constipation or in any complication where a continuous aperient or laxative action is needed. It is also not advisable in inflammatory or febrile (fever like) cases. It suits best the children and the aged and is actually used so. Infact, it happens to be one of the every day nursery remedy. If the bowels are sluggish and therefore slow to react, it may best be given along with some ginger. The usual dose of the powder is 5 to 20 grains. Persons who can chew the root are best advised to take the drug in that manner itself.

Rhubarb also forms an important ingredient in a variety of medicative compounds. Mixed with what is commonly called a Grey powder it is an excellent remedy for irritation of the bowels that is common among children during their teething stage. It is also useful in chronic dysentery, duodenal catarrh (discharge) or catarrh of the biliary ducts accompanied with jaundice and also in some kinds of skin diseases. To correct errors in the diet of children or diarrhoea due to undigested food, this is most excellently given along with a pinch of sodium bicarbonate or magnesia. As a result of its

use, urine becomes deeply coloured; this however need not alarm.

It is very important to note that rhubarb, like sorrels and tomatoes that are acidic and very soury because of their rich oxalic acid should not be eaten by persons who have a tendency to become susceptible for gout, rheumatism, epilepsy or any disease or uric acid.

In view of its well deserved reputation. *R.emodi* constitutes an important vegetable product utilised in modern Medicine, Ayurveda as well as Yunani systems of medicine. The roots of other species of this genus viz. *R.acuminatum, R.nobile and R.webbianum* are also used as substitutes in case *R.emodi* is not available.

Rheum emodi or *revand* has a history going to 2,700 years. The Chinese of those times had a good awareness of this plant and its use. Yunani physicians took it from them and the famous herbalist of the early European history, Diocorides makes a mention of this plant. Iranians were also aware of this by the name *revas*. Ibnsin mentions two plants *revas* and *revand* as being rather related mutually. Barbars had utilised it and the plant was therefore referred in those days as Rha barbarum viz. a revand utilised by the barbars. It is believed that the present name of rhubarb for this plant is a type of condensation of this Rha barbarum. Ancient Yunani physicians called it simply as *rha* (meaning a root) *vand* (of the barbars). The Hindi name *revand* is traced to this

Yunani appellation. A famous Muslim author Ibn Zazla distinguishes between two *revands* - one *khurasani* (from khorasan) and the other *chini* (from China). The former which was just *revand* was employed as a veterinary medicine, while the latter, *chini* or the Chinese was meant for man.

(ii) R.spiciformis Royle

Names

This is *chukri, rawash* in Afghanistan, *archu* in Garhwal, *lachu* in Ladakh and Spiti valley.

Botany

Here, the root is slightly thicker than the thumb. Leaves are all radical, thick, leathery, orblike or broadly ovate or heart shaped, smooth and non-hairy or with star like hairs beneath. The nerves on the leaf blade are prominent and radiating, red brown in age. Leaf stalks are very stout, smooth or minutely hairy. Fruit is broadly elliptic or oblong, the tip is rounded or notched and winged. Wings are quite large and the fruit has a stalk which is often as long as that of the fruit.

This is a herb of the Western Himalayas and Afghanistan growing at an altitude of 9,000 to 14,000 ft.

Medicinal Value

The root is reputed purgative.

(iii) Rheum webbianum Royle

Names

This is called *archu* in Garhwal, *lachu* in Ladakh, *padamchal* in Nepal and *lachu* in Spiti valley.

Botany

The herb is very variable in size. Stem is leafy. Leaves range from 10-60 cm in diameter, and in shape, they are orb like or kidney like. The stalk is quite long. Leaf blade is 5-7 nerved, warty or smooth and non-hairy. Fruit is broadly oblong or orb like, notched at both ends and is provided with wings as in R. *spiciformis*.

This is a herb of the Central and Western Himalayas growing at an altitude of 10,000 - 14,000 ft.

Medicinal Value

The root is laxative.

(iv) Rheum nobile, HK.t

Names

In Sikkim this is called *tchuka*.

Botany

The root is very long here. Stem is simple, quite thick, almost like that of the wrist, at the ground level, deeply grooved and densely clothed with

reflexed and inflated bladder like downwardly directed network of bracts which conceal the short axillary panicles of flowers. Leaves are ovate-oblong or rounded, very leathery and usually edged with red; the upper ones merging to the bracts; base of the leaf, wedge shaped or heart shaped. Stalk is stout and the stipules at the base of the leaf stalk are voluminous (15-20 by 10-15 cm), rose-red. Bracts are orblike, pale straw coloured and reticulate. Fruits are broadly ovoid and with 2-4 wings.

This is a noble and grand looking herb of the interior ranges of Sikkim Himalayas, at an altitude of 13,000 to 15,000 ft.

Medicinal Value

The root is medicinally the same as R.*emodi*. This is a good vegetable for persons who have lost hunger due to the troubles in the bowels. Yunani physicians regard the root as pungent and bitter. It destroys poison and is purgative in action. It regulates menstrual rhythm and is diuretic. it is useful in piles, pains at the waist, "heat" in the head, chronic burnings at the trachea or the wind pipe, asthma, shooting pains and abrasions.

6. Methika or methi is called botanically Trigonella (referring to its three lobed leaf) *foenum graeeum* (connoting it great prevalence in Greek medicine) and comes under the family Papilionaceae to which many other well known vegetables like pea, beans and pulses belong. This

is now a well known, and highly liked green leafy vegetable of the kitchen gardens in almost all over India. It is called *methi* in most of our regional languages, Hindi, Bengali, Sindhi, Gujarati and Marathi and *menthya mendhyam* or *vendayam* in Kannada, Telugu, Tamil and Malayalam, respectively a term closely related to *methika*. It is also known as *uluva* after its Arabic name *hulva*. Such a similarity in the name term indicates its familiarity all over India. Still however the plant appears to be a later introduction to Ayurveda as its name is non-Sanskritic and more importantly it is not referred to either in Charaka or Sushruta but is quite prevalent in later Ayurvedic literature.

The term *methika* is related to *Medicago* (a famous medicinal plant of the Middle East derived indirectly from Media, the country wherefrom alfalfa a famous forage plant originated) *sativa* (the edible) or lucerne the well known horse fodder or *ashwabala* which however is very well referred to in the ancient Samhitas. The plant is thus an index of a viable cultural contact between India and the ancient Countries of the Middle East, whose very names appear to be Sanskritic; for instance, Assyria (probably cognate with *asura;* compare the name of its famous King. Asurbanipal- *asura avani pala*—the protector of the land of the *asuras*) and Sumeria (cognate with Sumeru, a fabled mountain of Sanskrit literature). There are two other familiar plants of this category: Coriander and Castor. *Kustumburu*, the coriander or *kottmir* in Hindi is a Sumerian term made up of

buru which means a plant and *kushi*, the grain i.e. a grain yielding plant or *dhania* which is the other Indian name for this now common plant. Similarly *rubu* or *rubuyaka* is a Sumerian term for the Sanskrit *eranda* for castor; this is a clear translation of another Sanskrit equivalent for castor viz. *vardhamana* meaning "grand, growing luxuriously" which is what *rube* means in the Sumerian tounge.

The Plant: This is a small sized annual herb familiar all over India and provided with a characteristic smell which becomes particularly apparent, when the herb is squeezed. This is cultivated extensively in many places and also occurs wild occassionally. It is an erect, though often trailing herb that bears alternate leaves, each with three leaflets.The flowers are rather small, whitish or somewhat yellow, butterfly shaped (i.e. papilionaceous) like those of beans and pulses. This is a very common seasoning herb of the Indian Kitchen also used by itself as a green leafy vegetable or along with other vegetables like potato. Its hard, yellowish seeds are also an invariable ingredient of the kitchen, being used extensively as a condiment.

Besides being well praised dietary articles, seeds, pods and leaves of the plant are all used variously in medicine. Infact, the medicinal importance of this easily available herb is so much that the plant is considered to be a boon for human health and its maintenance as well as rectification.

Medicinal Importance

Ayurveda considers it as pungent and also bitter in taste, hot in quality, dry (*ruksha*) in effect, light in digestion and bitter on post assimilation (*vipaka*). It aggravates *rakta pitta* or plethora and obstructs *mala* or the wasteful residue (i.e. *mala rodhaka*). However, it is stimulative of digestion, good for heart and strengthening to the body. It is very usefully employed in overcoming fever, tastelessness, vomiting, gout, *kapha* and *vata* aggravation, cough, piles and also worm infections.

Seeds, pods and leaves are the parts of the plant. that are employed medicinally.

The seeds of *methi* are hot in quality, bitter in taste, nourishing and destructive of fever as well as worm infection. They augment hunger and bring about contraction of the intestines. They ward off vomiting, cough, *vata* troubles and are also useful in piles. They are beneficially employed in skin diseases and leprosy and diseases of the heart. They remove the feeling of foul smell at the mouth.

The leaves of *methi* are cooling, mitigative of *pitta* aggravation, easily digestible and act as good regulators (*amulomika*) of the digestive tract by being rather laxative. They destroy oedematous formations in the body. They constitute excellent dietary material for persons of *pitta* constitution especially in removing their constipative complaints. An application of the leaves over oedemas will lessen their burning sensations and the swelling will also get reduced. Giving the

freshly extracted juice of the leaves proves beneficial for cases of fever due to bilious or *pitta* affection; the violence of the fever will get calmed down and the patient will get rid of his restlessness.

In dysentry accompanied with blood *(raktatisara)* an infusion of the seeds of *methi* is administered. This will reduce the flow of blood, and the stools will regain their normal yellow colour. A cold infusion of the roasted seeds is commonly given in South India for this purpose. The seeds are cooked along with other aromatic substances and given following child birth. This will increase the hunger of the mother, render her digestive tract clean and clear, remove the foul smell of the uterus and clean that organ as well.

As a dietary article this leafy vegetable removes the disorders of bile or *pitta*. The leaves are made into edible balls (*modak*) and eaten as it destroys *vata* particularly after child birth and is also strengthening. This also wards of chronic fever as well as light fever. The green leaves are very nourishing. They are useful in cases of feeble digestion, dysentery and also in many diseases of *vata* such as rheumatism or *sandhi vata*.

Chemical analysis of *methi* reveals its richness of diverse values. Fresh *methi* contains 77.00 moisture, while the dried herb contains ether extract 4.80, albuminoids (which contain 2.61 nitrogen) 16.21, soluble carbohydrates (sugars, for example) 56.11, woody fibres 11.51 and ash 11.37

per cent. The globulin and albumin contents show the following interesting features. The globulin or the Fraction A, has a very high content of histidine which is four and a half times the average amount obtainable in other globulins seen in leguminous seeds or the pulses, which make them the valuable dietary articles that they are. In this regard, the protein has a close relation with the protamines and the histamines having a high content of the hexone bases - the valuable ingredients. The albumin or the Fraction B, has phosphorous and sulphur - the other two valuable ingredients and this composition is almost as that of the invaluable casein content of milk. Cells of the testa or the seed coat have a considerable amount of tannin - an astringent material that brings about a contraction of the living tissues and is thus of great use in healing. Cotyledons of the seed have a yellow colouring matter and no sugar. Seeds have a faetid or foul smelling fatty oil 6 per cent, resin and mucilage 28 per cent, albumin 22 per cent and the two characteristic alkaloids - the choline and the trigonelline. 100 *tolas* of the seeds yield one *tola* of *trigonelline*. The ash of leaves is 7 per cent and this contains 25 per cent of phosphoric acid. There are many other valuable alkaloids besides these two in *methi*. These are: methylamine, dimethalamine, trimethylamine as well as cholin, neurin and hetain - derived from the splitting up of lecithins. It is very important to note in this way that the chemical composition of *methi* resembles closely that of Cod-liver oils, specially because of the rich presence of phosphates, lecithin and

neucleo-albumin. It also shows the presence of considerable amount of iron in an organic form which renders it easily absorbable and assimilable. There exists another useful substance - saponin.

Seeds of *methi* which are also the very commonly stored dietary articles of the Indian kitchen are much mucilaginous - i.e. they are rich in mucilage, a substance which readily absorbs great quantity of water and forms a slimy material. Their important medicinal value springs from this property that they possess in great abundance. They are also demulcent (i.e. cooling and soothing) and diuretic (causing profuse urination). Other useful actions are: they are carminative (removing gas from the digestive tract), emmenagoguic (regulating menstrual disorders) and astringent. Just like the alkaloids of Cod liver oil, the *alkaloids* of the *methi* seeds stimulate appetite by acting on the nervous system and they also produce a diuretic or a ureopoietic (balancing the urination rhythm) effect.

Young plants, specially the tender shoots and the aromatic leaves constitute a very much liked green culinary preparation in the form of a *sag*. For this, the herb should be plucked out after the first two leaves are found and a little before the flowering commences; for, afterwards, the central portion of the stem becomes too fibrous and unsavoury. Seed constitutes an ingredient of curry powder or it is also usually employed as a seasoning material but always in a small quantity as otherwise it is likely to render the dish bitter.

The seeds are always used sparingly as an article of food. Medicinally however they find great many uses. They are employed in colic (twisting pains at the stomach), flatulence (gas collection and bloating at the abdomen), dysentery, diarrhoea, dyspepsia (or indigestion) specially when accompanied with a loss of appetite and tastelessness or anorexia, diarrhoea in puerperal women (i.e. women in labour), chronic cough, dropsy (or morbid water collection in the body) and also in cases of the enlargement of liver and spleen. Seeds are fried in ghee, mixed with the seeds of anise and salt, and made into a paste and given to check diarrhoea. Quite often the seeds are roasted, powdered and given in infusion or a weak decoction - this constitutes a healthy drink much beneficial in dysentery. If an equal quantity of powdered and fried wheat is added to this infusion it would become a good substitute for coffee and also as a cooling and soothing drink. The seeds of methi are boiled to a consistency of gruel and this is seen to be a good dietary preparation to increase the flow of milk.

In fact there are many recipes for preparing confections or sweet balls or *modak* for use in dysepepsia, in the diarhhoea of puerperal women and also in rheumatism. Here is a method extolled in a reputed classic called Bhaishajya ratnavali:

Take three myrobalans, ginger, long pepper, black pepper, tubers of *Cyperus rotundus* (*musta* in Sanskrit or *korehi jhar* in Hindi), nigella and cumin seeds, coriander, bark of *Myrica nagi* (*katphala* in

Sanskrit and *kaipal* in Hindi), *ajawan*, rock salt, black salt, leaves of pine, flowers of *Mesua ferrea (naga keshar)*, *teja patra*, cinnamon bark, cardamom, nutmeg, cloves, sandal wood powder and camphor - all one part each. Then take *methi* seeds equal in quantity to all of these ingredients together. Mix them all, powder and prepare the confection or *modak* with old treacle or the molasses as the medium. The advisable dosage is one to two drachms to be taken in the morning with clarified butter and honey.

Another important use of methi seeds is that it constitutes a very good substitute of Cod liver oil as noted above. The beverage of the roasted seeds also mentioned above is given in doses or two teaspoonfuls daily in broth, milk or jam in all those conditions where Cod-liver oil is advised generally. A few such specific cases are: lymphatism (enlargements of lymph glands), scrofula, rickets (a disease of children characterised by softness of the bones caused by deficiency in the Vitamin D); anaemia (lack of sufficient blood in the body) and debility or weakness following most infectious diseases or also in neurasthenia and diabetes (in which case it may be combined with insulin and given).

The ground seeds of *methi* converted into a paste are frequently rubbed on the face to increase the lustre of the skin. It is thus a cosmetic article like the turmeric. It is also applied to the head in order to promote the growth of hair and also prevent their premature falling off. Flour of the seeds is

The seeds are always used sparingly as an article of food. Medicinally however they find great many uses. They are employed in colic (twisting pains at the stomach), flatulence (gas collection and bloating at the abdomen), dysentery, diarrhoea, dyspepsia (or indigestion) specially when accompanied with a loss of appetite and tastelessness or anorexia, diarrhoea in puerperal women (i.e. women in labour), chronic cough, dropsy (or morbid water collection in the body) and also in cases of the enlargement of liver and spleen. Seeds are fried in ghee, mixed with the seeds of anise and salt, and made into a paste and given to check diarrhoea. Quite often the seeds are roasted, powdered and given in infusion or a weak decoction - this constitutes a healthy drink much beneficial in dysentery. If an equal quantity of powdered and fried wheat is added to this infusion it would become a good substitute for coffee and also as a cooling and soothing drink. The seeds of methi are boiled to a consistency of gruel and this is seen to be a good dietary preparation to increase the flow of milk.

In fact there are many recipes for preparing confections or sweet balls or *modak* for use in dysepepsia, in the diarhhoea of puerperal women and also in rheumatism. Here is a method extolled in a reputed classic called Bhaishajya ratnavali:

Take three myrobalans, ginger, long pepper, black pepper, tubers of *Cyperus rotundus (musta* in Sanskrit or *korehi jhar* in Hindi), nigella and cumin seeds, coriander, bark of *Myrica nagi* (*katphala* in

Sanskrit and *kaipal* in Hindi), *ajawan*, rock salt, black salt, leaves of pine, flowers of *Mesua ferrea (naga keshar)*, *teja patra*, cinnamon bark, cardamom, nutmeg, cloves, sandal wood powder and camphor - all one part each. Then take *methi* seeds equal in quantity to all of these ingredients together. Mix them all, powder and prepare the confection or *modak* with old treacle or the molasses as the medium. The advisable dosage is one to two drachms to be taken in the morning with clarified butter and honey.

Another important use of methi seeds is that it constitutes a very good substitute of Cod liver oil as noted above. The beverage of the roasted seeds also mentioned above is given in doses or two teaspoonfuls daily in broth, milk or jam in all those conditions where Cod-liver oil is advised generally. A few such specific cases are: lymphatism (enlargements of lymph glands), scrofula, rickets (a disease of children characterised by softness of the bones caused by deficiency in the Vitamin D); anaemia (lack of sufficient blood in the body) and debility or weakness following most infectious diseases or also in neurasthenia and diabetes (in which case it may be combined with insulin and given).

The ground seeds of *methi* converted into a paste are frequently rubbed on the face to increase the lustre of the skin. It is thus a cosmetic article like the turmeric. It is also applied to the head in order to promote the growth of hair and also prevent their premature falling off. Flour of the seeds is

made into a paste or a poultice to be applied for inflamed parts to cool them down and also as a cosmetic treatment to the whole of skin and not merely face. Poultice of leaves is useful in external and internal swellings because of their cooling and soothing nature. Leaves are boiled, freid in butter and given internally to cure bilious or liver troubles. The seeds ground in milk, sieved and administered into the paining ear in a luke warm condition is known to check its discharge and pain. A drink of the decoction of the seeds prevents excessive haemorrhage or blood flow in piles.

Chronic chest diseases get cured by drinking a decoction of the *methi* seeds mixing it with honey. The seeds of *methi* and the barley flour are mixed with vinegar; this forms a beneficial application to bring down the inflammation at the throats. Leaves are fried in ghee and eaten to check dysentery. Fresh injuries heal well by an application of the poultice of the leaves. Cold infusion of these leaves constitutes a good drink to mitigate internal heat of the body, while their cold anointment calms down external burnings.

Yunani physicians regard it as second degree hot and dry. The properties attributed are: slimming down the body, dissolution of oedema and swellings of the wounds, strengthening the body, aphrodisiac or stimulative of the urge of sex and invigorative to the nervous tissue. It is quite effective in expelling heavy *kapha* or phlegmatic deposition from the lungs. It is stimulative to

stomach and intestine and regulates their activity satisfactorily. It is stimulating also to uterus, promotes regular menstruation and mitigates the uterine pains.

Methi is particularly beneficial to patients of diseases due to cooling or *shita*. External application of *methi* alone or along with other useful drugs is taken recourse to in removing freckles, decolourations and other disfigurments of skin. The mucilage finds some use in a few diseases of the eye such as conjunctivitis and eye sore that continues to discharge. In cough and dyspnoea or breathing troubles, a decoction of *methi* is given as a drink along with honey. This decoction is also useful in stimulating menstrual flow and is employed in addition to take a hip bath by women having such pains. Excessive use of *methi* is however deleterious to testicles. The two leafy vegetables that can counteract these adverse effect of *methi* are *palak* and *kulfa* (*Portulaca oleracea*) Linn. The advisable dosage is 3 to 5 grams.

A decoction of *methi* is employed to wash the head in order to get rid of dandruff and dryness. For patients of *pitta*, the leaves constitute a good dietary article to remove their constipative complaints and render their bowels clean and clear. Such a use will remove the foulness of the stools and also restores the normal yellowness. In all pains of the body, taking 1/2 a *tola* of the seed powder will prove beneficial.

The green as well as the mature stalks of *methi* constitute a good fodder to form animals. There are many a household tips in using *methi* in various advantageous manners in addition to what has been indicated above. A few of them are given below.

The aromatic leaves and tender shoots of the herb can enter into many tasty preparations of the kitchen: *sambar*, curry, *roti* or *dosa*. Using such dishes of *methi* regularly will ward off the diseases of liver, lungs, heart and brain. Instead of boiling these greens, it is better to cook them in steam and use. This is a very good article of food for patients of rheumatism. For all persons who suffer from frequent pains all over the body, back ache, pain at the waist, dishes of this green vegetable will be invariably beneficial. A particularly effective preparation to remove such pains is to make *dosas* of this green and eat them along with a curry of the *methi* leaves, cooked in steam.

Eating this leafy vegetable raw for e.g. as a salad increases the power of memory. One such side-dish is prepared as follows: chop the *methi* leaves and radish into small bits, mix them up well, add salt according to taste, season this mixture with pepper powder and cumin seeds fried in ghee. This is very tasty and wholesome and best taken along with *rotis* or *chapatis*.

Take two teaspoonfuls of *methi* seeds, soak them in water for about four hours and then prepare a decoction of these seeds by boiling them in the

same water. Add a requisite amount of honey to this decoction now. This forms a very beneficial tonic useful in any disease. Consuming it daily during night will obviate the disease quickly.

Prepare a gruel or conjee out of roasted seeds of *methi*. Add milk and sugar. Consuming this will augment the quantity of milk and is therefore of great benefit to mothers feeding their babies with breast milk.

A few tips of how to use *methi* cosmetically and medicinally:

Grind the leaves in water or the seeds in coconut milk into a fine consistency. Apply this over the head and take bath. Such a simple measure will ensure a prevention of premature and profuse hair fall. Dandruff will not occur. Hairs will grow long and dense. They will also retain their dark colour as well as the smooth, silken and shining nature for a long time. Occurence of baldness is also avoided thereby. Another recipe is to soak the seeds in coconut oil and use such a medicated coconut oil regularly for the care of your hairs. This ensures the health of hair in all ways. Or, one can keep the *methi* seeds always soaked in the coconut oil used for hair dressing.

Grind the leaves of *methi* to a fine degree with but a little quantity of water. Apply this as a face anointment before you go to bed in the night. Wash the face next day morning in hot water. This will remove the possibility of pimples on the face. The

lustre of the face increases. The skin will remain taut and wrinkle free. Black freckles on the skin will vanish away. Another alternative towards the same purpose is to soak the seeds in water, grind soft, mix the paste in boiling milk and then apply as a face cream.

Take a teaspoonful of the seeds of *methi*, mix them well in good quality curds and gulp in. This is a good and simple medicine for diarrhoea.

In case there is a persistent burning sensation at the soles and the palms, soak the seeds in water, grind fine and apply. The burning will soon get mitigated.

Roast the seeds and powder. Mix a teaspoonful of this powder in a cupful of butter-milk and keep consuming it twice a day. This proves distinctly beneficial in the complaints of diarrhoea, dysentery, piles, indigestion and bloated stomach.

A method to get rid of itching, scabies and biliary spots of the skin is to take equal parts of the sprouts of guava, turmeric, bitter gourd, *Coleus* leaves, and the seeds of *methi* and coriander. Grind them all together in cow's urine or curds to a fine consistency, anoint one's own body with this paste, massage and take a bath after a short interval in luke warm water. One should not use either soap or soapnut powder. A regular bath like this for three to four days will secure complete freedom from these ailments.

A decoction of *omum* and *methi* along with honey and taken thrice a day will destroy all phlegmatic complaints.

Modern Work

An important reason why *methi* has drawn the attention of modern medical scientists is its nearly well proven efficacy in diabetes and as an article of food for a diabetic patient. Diabetes is a chronic disorder in the body's metabolism of food intake whether it is in the form of carbohydrate, fat, or protein, these three constituting most of what one consumes as food. Energy derived from this food is supplied to all parts of the body through the blood circulation in the form of glucose sugar which in turn is made assimilable by the action of a substance called insulin - a hormone secreted by pancreas. A diabetic patient precisely lacks this insulin, due to varied reasons. As a result, normal assimilation of glucose is interfered with, and this sugar consequently remains in the blood more than in its normal quota. This is therefore a case of *ama dosha* according to Ayurveda, created due to the morbid remaining of unassimilated food material. This gets manifested here as hyperglycemia or presence of more sugar in blood than normal. Another place where this excess sugar becomes clearly visible is in the urine which consequently attains a sweet taste, the disease then getting called therefore as *madhumeha* sweet urine or diabetes melitus.

In its full manifestation the disease is characterised by many clear symptoms: absolute or relative insulin deficiency, fasting hyperglycemia (excessive sugar, even in a fasting individual), glycosuria (sugar in urine), tendency towards atherosclersis (thickened blood vessels, reducing the lumen for the blood flow), microangiopathy (morbidly fine blood vessels) and other pathological conditions of the blood vessels and also distrubed kidney and nervous tissues. Two broad types of diabetes are recognised. Type I which is insulin dependent (where, cure can be affected if insulin is supplied) and type II (where such an insulin supply will not be useful because disruptions are probably in the body tissues which are to utilise this insulin).

Importance of diabetes in human health can be understood by noting that this constitutes the third commonest disease in the world. The first place goes to cancer, next is the heart diseases and then comes diabetes. More importantly its control needs long term planning, constant vigilance and has much to do with diet controls. The diets are often to be devised in reasonable concerdance with the idiosyncracy of each individual patient!

Conventional insulin and oral glycaemic drug treatment achieves normal sugar level in the blood alright. But this does not prevent microvascular and neurological complications common in a diabetic. Besides, insulin also increases cholesterol synthesis and secretion of very low density

lipoproteins. Both of these products unfortunately are causative agents for atherosclerosis. In addition, strict adherence to carbohydrate restricted diets which is what is usually advised to the diabetic patient also leads to the development of insulin resistance itself.

It is here that this ancient and humble plant of *methi* promises to come to our help crucially. Patients of diabetes are substantially benefitted if they include greater quantity of dietary fibre or roughage in their food. Prevalence of diabetes is definitely lower in populations with a higher fibre intake than in westernised people with lower fibre intake. For instance, in Japan, India and West Indies, where consuming such fibre content is high, some common and specific complication of diabetes such as myocardial infarction - a heart disease where a part of the living heart almost dies out, and also gangrene (or rotting wound) are less common.

Methi contains abundant mucilaginous fibres useful in this way. Administration of its seeds has been found out now to reduce excess sugar in blood. It is also seen to have improved many of the usual symptoms of the disease. All of these effects seem to be due to its fibre content. A disadvantage in taking the seeds as such is its bitterness in taste. Nowadays therefore it has been such that one can debitterise (i.e. remove this bitterness) the seeds without compromising on its other therapeutic effect. More importantly, such

debitterised seeds are rich in protein and lysine. As such, they can very well replace pulses in the diabetic deit. In fact, such seeds can be made into a soup, a curry and a candy and thus incorporated in bread or *chapati*. It is thus a very valuable supportive therapy.

7. Shigru or Shobhanjana or Sahijana or Drumstick

We shall conclude this account of green leafy vegetables with the illustration of drumstick wihich however is not a typical greens vegetable in the sense that it is not a herb like all the others we have studied so far but a tree yielding profuse amount of edible and highly valuable leaves. The reason for doing so is that its leaves very well qualify for being called a leafy vegetable. More importantly this aspect of the tree is not much well appreciated by us to the extent that it is deserves though the plant is common all over India. It is also well referred in ayurvedic texts for many medicinal uses besides being an edible dietary article.

There is one more tree like this in India which is also well referred, quite common but still not much used and therefore needs to be better familiarised. This is *Sesbania* or *Agati grandi flora* or *jayanti, jait*, and *agastya* in Hindi or *agastya* or *vaka* in Sanskrit. Agastya is distinctly referred as a tree yielding a leafy vegetable by so ancient an author as Sushruta. Still, using these leaves as dietary

article is not very popular. Though there are many uses of this plant, we just mention its dietary value alone. The plant is very common all over India and can be easily grown in any house garden. At the very outset we should note that its leaves, fleshy flowers as well as the long tender fruits are all edible and are actually eaten so in some parts of our Country. Using them in greater profusion is an additional and valuable support to our health and nutrition. They contain many invaluable substances besides offering a great amount of roughage. The leaves are particularly rich in vitamin C which is indispensable for a healthy development of bones. This also renders the gums and teeth hard and durable. Eating the leaves after boiling will offer us rich amounts of calcium, phosphorous, iron, besides the vitamin-A. Regular use of this vegetable will ward off all deficiency diseases of these substances. It is advisable to use this vegetable at least once in a fortnight. It may be recalled that using this vegetable is a religious ritual on the days of *dwadashi* that comes once in a fortnight and immediately succeeding *ekadashi* or the day of fasting. There does exist a scientific background to our ritualistic regmens which we are apt to dismiss as just superstition.

We shall however confine here only to the drumstick.

Names

The plant has many names in Sanskrit: *shigru, shhobhanjana, krishna gandha, akshiva.* English

calls it horse radish and drumstick. In Hindi, it is *sahinjan, segve:* in Bengali, *sojna;* in Gujarati, *surgavo, sekto;* in Marathi *shevga;* in Kannada, *nugge;* in Tamil, *murungai* and *mariha murunna* in Malayalam; in Telugu, *munaga, mulaga.*

Botanically it is called *Moringa* (after its Tamil name *murungai*) *pterygosperma* (with seeds that are winged).

The plant belongs to a family called Moringaceae itself. This is a rather big sized tree with a soft wood. The tree yields a useful gum. The leaves are alternate but very characteristically compound to a great degree, that is, its main axis is branched many times, ultimately bearing thin, small and numerous leaflets. Such leaves are called decompound leaves. The leaves fall down during cold seasons. The leaflets are opposite and they have oil glands that are responsible for the characteristic smell. Flowers are white in colour and occur in large clusters. Fruits are long, rather woody but having a delicious edible pulp and seeds, which are consumed after boiling.

The tree is fairly large and has a very graceful appearance. It occurs wild in the Sub Himalayan ranges but is well cultivated all over India as a kitchen vegetable. It can be very easily propagated by cuttings which show a rapid growth. The entire tree has a very fragile stem and is frequently susceptible to catter-pillar attack. Flower and fruits are produced in abundance, two or three times a year.

The parts used are: bark, gum and root, medicinally and also flowers. Leaves, pods and seeds are employed as dietary articles with many medicinal overtones. This is one of the plants that are of all round utility.

Medicinal Importance

Moringa is also one of the official drugs i.e. those that have been included in the official Pharmacopia of India and Britain, that grow in a state of nature in our country and can very well be exported. Ephedrine is a famous alkaloid of modern medicine derived from mainly a Chinese plant Ephedra. An alkaloid similar to this occurs in *Moringa.*

The seeds are called *shweta maricha* the white pepper; these are acrid and pungent in taste - they are used externally to remove joint pains of acute rheumatism. The corky grey bark has coarse fibres used in preparing mats, paper or ropes. The roots are pungent and have a taste of Horse radish; hence the name of the plant as a Horse radish tree. Young roots are prescribed in many ailments such as intermittent fever, epilepsy, hysteria, palsy, chronic rheumatism, dropsy, enlargement of spleen and liver. Hakims recommend them for treating soreness of throat and pain in the gum due to dental caries. In spiritious extracts, root has been seen to be a successful drug for treating fainting, giddiness, nervous debility, spasmodic aflections of the bowels, hysteria and flatulence (gas collection and bloating of the belly). Gum is a popular remedy for rheumatism in Punjab. Hakims

advice using fruits for liver and speen complaints, joint pains, tetanus and nervous debility as well as paralysis.

The young leaves are used as the green leafy vegetable, They are also used in treating dog bite and scurvy as well as in common cold. The long pods are very favourite vegetables for the kitchen and are also reputed to be a preventive of worm infection. The flowers are also commonly used as food. Sometimes they are boiled with milk, sugar is added and this is presumed to be an aphrodisiac. Yunani physicians regard flowers as hot and dry and beneficial in cold and swellings. They are also considered as tonic, diuretic and promotive of the flow of bile. Their juice with milk is prescribed for urinary stones and gravels and also for asthma.

The whole plant is a cardiac (or heart) stimulant, a circulatory tonic and antiseptic, destroying bacteria. The vegetable bases isolated from this plant have been shown to act on sympathetic nurve ending all over the body producing a rise in blood pressure, acceleration of heart beat and constriction of the blood vessels. Its action on the heart is mainly through this sympathetic system though myacardium or the membranous cover of the heart may also get stimulated directly. It also inhibits the tone and movements of the involuntary muscles of the gastrointestinal tract and the bronchioles or the fine branches of the wind pipe.

Leaves, flowers, tender fruits and even roots are eaten as vegetables in curies. Grated European

radish eaten frequently during the day and also along with meals will destory the irritating cough that persists after influenza, since it has much sulphur content, it is recommended for ascites, venomous bites, and also applied as a poultice in neuralgia or nervous pain of the face. Seeds yield an important oil which the perfumers praise as capable of absorbing and retaining even the most fugitive odours. This oil is also used with or without groundnut oil as an application to relieve the pain of gout in acute rheumatism. Bhavaprakasha, a reputed ayurvedic classic of the medieval times extols the use of a paste made up of equal parts of the *moringa* seeds, rock salt, mustard seeds with goat's urine as a snuff for rowsing comatose as well as drowny patients. The oil finds an application in curing syphilitic wounds.

Moringa is hot, destructive of *kapha*, diuretic and wards off convulsions and fits. The bark of its root is very much burning when applied to the skin. A decoction of *moringa* given along with *hing* and *saindhava* salt proves beneficial in cases of rheumatism, convulisive fits and epilepsy. The decoction also proves effective in paralysis of the limbs, as well as in enlargements of spleen and the liver.

Economically the most important part of the plant is however the oil present in its seeds. These seeds yield on simple pressure a clear, limpid, almost colourless oil, rather thick at ordinary temperature. It is almost odourless and sapoinfies

or thickens up rather slowly and does not turn rancid or get spoilt. It is one of the best lubricants for fine machinery and is highly valued by watch makers. This oil as well as the one from another species *Moringa aptera* Fuss are commercially known as Ben oil. It is a remarkable but an unfortunate fact that though the tree is extensively cultivated in India and the available crop of these seed is amply abundant, this esteemed oil is rarely extracted in India and the article simply has no place in our export trade. Technical experts opine that India can supply the whole world with this article of value in modern trade but our enterprenuers have totally ignored this aspect of our wealth.

Moringa as a leafy vegetable: We shall however restrict ourselves to indicate some aspects of the food value of the leaves of *Moringa*.

A chemical analysis of the leaves shows the following rich contents: protein 6.7; fat 1.7, carbohydrates 13.4, vegetable fibres 0.6, mineral matter 2.3, water content 75.0 percentage; calcium 440 milligrams, phosphorus 70 milligram, iron 7.0 milligram, copper 1.1 milligram and, *importantly*, iodine 51 in every 100 grams. These leaves also have carotene (provitamin A) 11300 international units (I.U.) and vitamin B 210 milligram (in every 100 grams). Leaves are valuable because of its rich carotene, ascorbic acid and iodine content. The pods also contain all of these constituents and have 184 I.U. of carotene and ascorbic acid, 120

milligram (in every 100 gram). Pods contain rich amounts of lucine, a nitrogenous compound. They also contain a few alkaloids. The ash of flowers shows considerable percentage of calcium and potassium. The seed residue after oil extraction is a very good farm manure. One can easily appreciate the value of Moringa by this analysis.

Here are some household tips to a profitable use of drumstick in the kitchen.

The pods and the leaves are both excellent, tasty as well as medicinally valuable green vegetable. Tender pods cut into small pieces from a favourite article for *sambar* along with *tuvar dal*. Raw pieces of these pods can be added to lemon pickles and they become very tasty when ripened. Consuming the pods this way or with curds or buttermilk preparation as a *cuddy* common in North India or in any way whatsoever is always salutary for health and its improvement.

Add a fistful of tender drumstick leaves to two cups of boiling water, close the lid of the vessel and let it simmer for five minutes. Keep the vessel then in cold water and cool it down; decant the juice into a separate vessel. Add to this a pinch of salt, pepper powder and lemon juice.Taking a cupful of this juice will ward off general debility in the body, sexual weakness, nervous debility as well as common cold, bronchitis, ill nourishment and anaemia. Consumption for a few days even will show appreciable improvement.

To the juice in which the leaves have been boiled and taken out, add milk and sugar to taste. This forms a good beverage for children to purify their blood, improve their health and also confer a general disease resistence in them.

The soup of the leaves is a very nutritious drink for pregnant ladies as well as feeding mothers. It is also very healthy and nourishing to all persons ranging in age from the infants to the very aged.

Drinking such a soup in which the drumstick leaves are well boiled and taken out after squeezing a piece of lemon within is a sure remedy to the dizziness of head. A cupful of this is to be drunk for a week.

In cases of one sided heache, place a few drops of the leaf juice in the ear opposite to the side of the head which is paining. This is to be done once a day for three days together. Recognisable improvement occurs quite soon.

Take the leaves of drumstick and *Calotropis* (*madar*). Grind them fine and apply to the painful outgrowths of the piles. They will soon get destroyed.

When there is an injury and a consequent swelling, roast some leaves of drumstick, place them in a ball of cloth and give a hot fomentation with it for the regions concerned. The swelling will subside and the pain also will get mitigated.

A simple remedy for headache is to grind a few grains of pepper in the leaf juice of drumstick and apply at the temples, followed by a little massaging if needed. The relief is sure.

Flowers can be used along with the leaves. Flowers boiled well in milk and taken with honey is a reputed aphrodisiac drug.

Consuming drumstick as a regular article of food at frequent intervals cures the following diseases: rheumatism, impotency, nervous debility and constipation. It is also an insurance against round worm infection.

SOME PROSPECTIVE SUGGESTIONS

1. The importance of green leafy vegetables as a necessary and almost daily component of food can never be overstressed. This is particularly so for women in India, for one of the most if not *the* important cause of premature maternal mortality in India is anaemia. This anaemia can be traced to many causes such as frequent child birth, excessive haemorrhage during birth and the many abortion and most importantly the traditionally poor diet of women, who for socio-cultural reasons generally take whatever that remains after feeding all. And, this state of affairs can be greatly rectified by making green leafy vegetables as an invariable component of their diet. Their rich iron content will stimulate blood production. Moreover, these vegetables are rather cheap, easily grown in kitchen gardens and in India, we have so many

varieties of them that we can choose what we like and almost grow them also as we like.

2. The diversity available with us are simply legion. They are so many species with us which are very valuable green leafy vegetable and quite a few of them have many varieties in turn. Besides all this, many new and invaluable plant forms can be successfully introduced to our country and exploited with great benefit.

Two such recent introductions are worth being stressed here.

One is: a variety of *basale* called Ceylon *palak*, or Ceylon spinach, a very recent introduction from Ceylon, which is coming into vogue only in recent years in the bazars of South India.

This is a herb of many rare virtues. It is a small sized, succulent herb, juicy, delectable and almost wholly edible, excepting the roots which are generally never removed from the soil. This is because the growth is so quick that it is only the aerial parts of the stem leaving just a little stump that are entirely harvested and used as the greens, including the stem, the leaves as well as the flowers. Its cultivation is very easy, a small patch of land will do or even some pots. Planting just a little twig with a few nodes will do —they will strike the root unfailingly to produce a fresh and rich growth, ready for another harvest.

The importance of this herb nutritiously stems not merely from the organic salt and the iron

contents common to many other leafy greens but more so, for the rich amount of protein that it contains - so rare among the greens. Besides, the plant is so succulent that nothing from it is non-edible and fibrous.

This is a plant that is worth being popularised more and more.

Lettuce is another known recent introduction to Indian kitchen. Though its species called *Lactuca scariola* is found wild on the Western Himalayas, its great use in the kitchen and the cultivation as a culinary herb itself is an introduction from the days of the British and the Europeans among whom this Mediterranean herb is a very common salad material. In fact, the plant is called in Hindi and many Indian languages as the Salad Greens. It is however now cultivated in many parts of India, specially the colder areas. The cultivation however is not easy in great contrast to Ceylon spinach.

There are many profits that one can secure by using lettuce.

This vegetable is best consumed in a raw state rather than after cooking it. Eating four to five leaves of lettuce along with carrot or cucumber daily after meals assures a good digestion, a clean and effortless as well as sure evacuation. This will also augment interest in sex.

This green is a boon to the health of the buccal cavity or in other words, oral hygiene. Gums will get strong, foul smell of the mouth will disappear,

pyorrhoea, the typical and classical disease of the teeth will be prevented and cured and the tongue becomes stimulated, the taste buds become efficient and the relish in food gets augmented. All this is assured if one makes it a habit to include this herb regularly in the meals. More importantly, the leaves can be eaten as such and can also be mixed with any other salad material, most harmoniously. It always adds to taste. Pregnant ladies should definitely take upto eating lettuce. Those who do so will have no lack of nutritious components and no fear of any possibility of abortion.

Ladies who are presumed to be almost barren do have a possibility of becoming fertile if they take upto lettuce eating for a long time.

3. The beneficial effect of the green leafy vegetables are so many and so diverse that they really constitute effective material for what is being often referred to as diet therapy now a days. This is a method of curing a disease mainly by regulating the diet the patient concerned consumes. A knowledge of the diverse dietetic values of our green leafy vegetables would help our physicians to device such a diet in close confirmity with the nutritious as well as medicative requirements of each and every individual. For, these vegetables are not merely of dietetic value; they also have many curative and rectificatory effects, as we have seen so far. An effective appreciation of this knowledge is thus valuable both to the physician

as well as to any body else who values his own health and nutrition.

4. The know—how available regarding these green leafy vegetables is in no way exhausted by the account given above. In fact, what has been given above is merely a hint of what exists already. Actually speaking, one can easily add much more to what has been stated above. This is so, for most of the varieties given.

Here are a few household tips not much covered above.

(i) *Amarantus gangetius or Lal sag* (Hindi), *tandukirai* (Tamil) *dantina sophu* (Kannada):

This is an excellent tonic, rich in iron. Cut the leaves and tender portions of the stem after sun set and cook only to an optimal degree and not more. By this measure you will not destroy the iron content.

A patient of ordinary fever when given a soup of this greens or a curry prepared from it is likely to get rid of the fever thereby.

For patients suffering from dysentery, this forms an ideal diet.

The herb is specially beneficial to persons who are suffering from anaemia, defective vision, repeated onsets of common cold, jaundice, ill developed growth and constitution, ineffective acts of sex and respiratory diseases.

Regular intake of this green increases the power of disease resistance.

Using it specially during menses assures freedom from excessive haemorrhage.

Crush this green, extract the fresh juice and apply to your hairs at intervals. They will grow in great abundance, become silky and soft in texture, turn to glossy dark lustre and you will also prevent premature greying.

(ii) *Spinacea oleracea or palak* (Hindi), *basale* (Kannada), *vasale kirai* (Tamil).

This is one of the most excellent and nourishing food with plenty of varied and valuable elements in it. It cools the heat of the body. It is a mine of vitamin-A and organic iron salts.

As such, it constitutes an invaluable and absolutely essential green for the pregnant ladies and the developing children.

A soup of spinach and house gram pulse in which some lemon juice is also squeezed in, is a most health promotive diet.

Making this green vegetable as an integral component of the diet of a patient suffering from any disease and already undergoing medical treatment, will hasten the cure.

5. One can go on adding to the list of the valuable green leafy vegetables of our country and extol upon their miriad virtues for specific aspects

of nutrition as well as effective medicinal use in the several ailments affecting man.

Four such examples of a great but not widely known value should suffice here.

(i) *Alternanthera sessilis* R.Br. This is known as *machhi or panachuni* in Hindi, *shalincha* in Bengali, *matsyakshi* or *matsyakshaka* (in Sanskrit, as Sushruta calls it, meaning, the fish eyed), *ponagonnai* in Kannada and *ponnanganni* kirai (in Tamil).

This belongs to the family *Amarantaceae* to which many famous greens belong.

This is a small sized herb common all over the warmer parts of our country growing quite often as a weed, specially along the waterways.

It is one of the very valuable green leafy vegetables in India, that has unfortunately not received the attention and appreciation it richly deserves. A great advantage of this vegetable is that it can be very easily cultivated in any way and is in fact actually cultivated so, specially for hedging flower beds and garden paths. The plant stands well a rich pruning and as such one can periodically secure a rich harvest of these valuable leaves and the tender shoots that form the "greens" without harming the basic stock—rather, promoting a better growth of the latter, instead.

This herb has a beneficial effect beyond expectation when cooked and eaten during eye diseases.

This constitutes an excellently salutary and wholesome diet for persons suffering from piles, of both the varieties - bleeding as well as dry.

Mixing rice with a soup of cooked *macchi* and eating will confer a great ability to resist the incidence of common cold and running nose.

The herb acts effectively in promoting bile secretion from the liver.

For the feeding mothers this is a sure measure for increasing their milk flow.

Its freshly extracted juice very quickly dries up the yellow fluid being discharged from wounds and sores.

Secure such freshly extracted juice from the herb, mix it with gingeley oil and cook together to such an extent that the juice gets completely absorbed and the oil alone remains. This oil is an effective cure for healing the wounds.

(ii) *Solanum nigrum* Linn. This is called *kakamachi* in Sanskrit; Black Night shade in English; *makoi, gurkamai* in Hindi; *kachmach* in Punjabi; *kachi sopu* or *ganike sophu* in Kannada; *manatakkali* in Tamil; *kachi or kamanchi chettu* in Telugu and *tudavalam* in Malayalam.

This is a small sized herb belonging to the family called Solanaceae to which the common brinjal and tomato belong.

The herb is well extolled in Ayurvedic classics. There are two varieties bearing red and black berries. These are small, spherical fruits quite edible but sometimes toxic or even fatal. Therefore they should always be eaten with caution.

The leaves alone are taken and cooked in the form of a curry.

Cooked leaves of this plant added with a little salt and eaten is a very effective agent for increasing digestive power. Those who have a weak digestion would find its regular use a great boon.

Dishes of this herb quietens the aggravation of *pitta.*

The herb is a sure cure for even incurable apthae of the mouth or the circular white color inflammations or even red eruptions on the mucous membrane of the mouth that have a tendency of frequent recurrence.

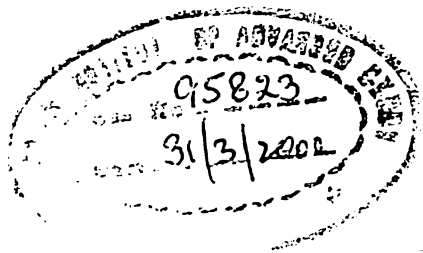
A caution is: the leaves should not be cooked too much.

6. Eating green leafy vegetables as an integral component of our meals has been extolled from ancient times in our country. For instance even one classical author, Sushruta mentions more than sixty types of green leafy vegetables in his chapter or Annapana vidhi or prescriptions for Food and Drinks. Their different dietary values as per Ayurvedic system are also recognised and extolled. In fact, we have forgotten some of these

ancient articles of value now. For instance, eating young sprouts of *Bauhinia* leaves as Sushruta states has gone out of use nowadays while others such as *sunishannaka* and *punarrava* are eaten regularly at present only in a few restricted areas of India. *Sunishannaka* (or *Marsilea*) or *chaupatia* in Hindi is a favourite vegetable mostly in Bengal while eating *punarnava* (or *Boerhavia repanda or mukkarattai* in Tamil) is quite common only in Tamil Nadu mostly. Two other such examples of restricted regional use though the plants are common almost all over India are the sprouts of Cucurbit (i.e. pumpkin and ash gourd) leaves and the tender stalks of lotus leaves. The former is a common deitary article at present in Bengal and Uttar Pradesh while the latter are favourite greens only in Kashmir and Kerala.

There is no reason however why the use of these vegetables may not be taken in other parts of our country as well. The only explanation is, lack of the knowledge of their edibility and use.

7. In view of the abundant availability, the rich diversity and the miriad utility of the green leafy vegetables of India, it is very necessary that all of us should appreciate this great wealth lying at our doors and profit from it much more than what we have actually done so far at present.



Handbook of Epidemiology : For Personnel of Primary Health Centres/*L. Ramachandran* **Rs. 75**

The book is specifically meant for the primary health staff. It seeks to equip them with necessary knowledge to understand diseases and take preventive action.

DISEASES: CURED BY YOGA
100% safe way to perfect health

- Asthma (*Damaa*) • Obesity (*Motaapa*) • Diabetes (*Madhumeh*) • Tuberculosis (*T.B.*) (*Tapedik*)
- Piles, Fissure, Fistula (*Bawaseer, Bhagandar, Nasur*)
- Improving Height • Blood Pressure Heart Diseases
- Rheumatic Arthritis (*Jodon ka Dard*) • Indigestion (*Badhasmi*) • Backache (*Peeth ka Dard*) and Spondylitis
- Urinary & Seminal Diseases (*Mootra Aur Virya Vikaar*) and Hernia • Constipation (*Kabz*) • Sweat Control (*Paseena Niyantran*) • Flatulence (*Pet Ki Gais*) • Skin Diseases (*Charam Rog*) • Worms (*Pet Ke Keede*) • Navel and Jaundice (*Naabhi Aur Peeliya*) • Women Diseases
- Hair • Throat Diseases • Eyes • Concentration (*Ekaagrata*) • Common Cold, Cough and Catarrh (*Zukaam, Khaansi Aur Nazla*) **Rs. 8/- Each**

Health Series : Diet to Cure

- Diabetes • Obesity (Motappa) • Peptic Ulcer
- Heart diseases • Kidney Stone (Gurde Ki Pathari)
- Respiratory Diseases (Saans Ki Beemariyan)
- Anaemia (Bloodlessness) (Khoon Ki Kami)
- Food Allergy **Rs. 20 Each**

Rs. 25 Each

- Harad and Baheda
- Gourds and Pumpkins
- Amalaka and Bhumi Amalaka
- Onion and Garlic
- Neem and its Relatives
- Banyan and Peepul
- Khas, Kesar, Nagakesar and Khaskhas
- Coconut, Supari, Kikar and Catha
- Bael, Wood Apple, Lemons and Castor
- Ginger and Turmeric
- Salts, Sugar, Jaggery and Honey
- Spices
- Isabgol, Gokhru and Brahmi
- Seasoning Herbs
- Fragrant Herbs
- Milk and Milk Products
- Leafy Vegetables
- Vegetables
- I

- Karkatash
- Nausadar