



clay, tannins and synthetic balsam (catechu), and mixing up of the genuine drug with imitation of ergot and nutmeg has been identified.

### Deliberate Adulteration

Deliberate adulteration means intentional addition of something by the supplier to the collected drug, which reflects on the quality.

- (i) **Artificially manufactured material:** The man-made material which resembles the drug in morphology (characters and appearance) is used in the adulteration of crude drugs. For example, nutmeg is adulterated with basswood prepared to the requisite shape and size, and the coloured paraffin wax is used as an adulterant of bees wax.
- (ii) **Inferior quality material:** The drugs are sometimes adulterated with substandard commercial varieties which resemble the original drug (material of inferior quality) as in Indian senna which is adulterated with dog senna and Arabian senna, and medicinal ginger substituted by inferior Japanese or African ginger.
- (iii) **Exhausted materials:** Many drugs are collected on a large scale for the isolation of active principles like volatile oils. The exhausted material may be used entirely or in part as a substitute for the genuine drug, e.g. umbelliferous fruits and cloves are often adulterated with exhausted (possessing no volatile oil) original drugs, exhausted jalap, exhausted saffron, exhausted gentian and Indian hemp (containing no resin) are also used as common adulterants.
- (iv) **Foreign matter:** The drug can be adulterated with foreign matter which is cheap, e.g. cochineal (a dye) is often adulterated with barium sulphate, barium carbonate and lead carbonate, etc. while myrrh is adulterated with quartz and other mineral material.
- (v) **Fictitious articles:** Drugs are sometimes adulterated with non-plant material which is of no use, but sometimes may prove harmful, e.g. pieces of limestone in asafoetida, synthetic benzyl benzoate in balsam of Peru, coloured glass in colophony, faecal matter of rodents in cardamom and lead shots in opium.
- (vi) **Excessive adventitious matter:** This type of adulteration involves the presence of an excessive quantity of adventitious material occurring naturally along with the plants like excessive amount of stems in *Lobelia*, leaves in *Datura stramonium*, mosses, liverworts and epiphytes in cinchona and cascara bark, etc.

### EVALUATION OF CRUDE DRUGS

The evaluation of a drug is defined as the identity of the drug and the establishment of its quality and purity.



published a lot of clinical data on the effects (energizer, revitalize and libido enhancer) of the Bulgarian variety of the plants with regard to sexual dysfunction since early 1980s. The plant has been used for centuries as a treatment for impotence and also as a stimulant to increase sexual drive and performance in Europe. In Southern Africa, the nutlets or the fruits have been used in homicidal weapons being smeared with the juice of *Acokanthera venenata* and stewn on a path which is likely to be used by the victim. It is used as PCT (postcycle therapy) after the completion of anabolic steroid cycle by some bodybuilders under the assumption that it will restore natural testosterone levels. The muscle building potential was developed by Jeffrey Petermann (1970s), the American IFBB body building champion. But technically, this is a myth than a fact. After Eastern European Olympic athletes said that tribulus helped to increase their performance, it became known in North America in mid-1990s.

### **Medicinal Uses**

The plant and the dried fruits are cooling, demulcent, diuretic, tonic and aphrodisiac. The fruits are used as diuretic in affections of urinary discharges and impotency. It is also used in the treatment of calculous affections and painful micturition. This is most often used as a potent drug for low libido and urinogenital tonic. The stem is astringent. The decoction and the infusion of the plant and dried fruits are used in spermatorrhoea, phosphaturia, diseases of genitourinary system such as dysuria, gonorrhoea, gleet, chronic cystitis, calculous affection, urinary disorders, incontinence of urine, gout, impotence, disorders after parturition, to ensure fecundity in cough and diseases of the heart. The plant is known to increase stamina, libido and sexual function for men and improve sexual performance and sensitivity for most women. It is also widely used by the athletes and bodybuilders as it is known to improve muscle building, stamina and endurance. It has also been found to alleviate the symptoms of the menopause like hot flushes, depression and emotional instability. The regular use by women during menopause can help against insomnia, hypertension, irritability and loss of sexual interest. It is also known to reduce cholesterol, enhance the mood, treat urinary difficulties, stimulate the liver, immune system and reproductive system. In males, *Tribulus* is known to enhance LH (luteinizing hormone) and testosterone while in women, it is known to enhance FSH (follicle-stimulating hormone) and estradiol and the effect on testosterone levels is mild. Such increased hormone levels also help in increase of libido and function. The noted benefits of the plant are its main use in the treatment of sexual deficiencies (Bulgarian variety appears to be most effective). It is known to restore and improve libido in men and improve and prolong the duration of erection, increase the number of sperms and their mobility. *Gochurati churnam* (a



arthritis. The starch from the stem, *guduchi satva* is nutritive and digestive. The tincture, infusion and the extract are used in general and seminal debility, fever, jaundice, torpidity of the liver, diseases of the skin, secondary syphilis, rheumatism, acidity of urine, urinary diseases, dyspepsia, affections of the spleen, chronic gonorrhoea, leucorrhoea, etc. It is also used as a febrifuge and tonic in gout. The fecula (starchy extract) is nutritious and is used as a medicine in cold fevers, seminal weakness, anaemia, and cardiac debility, sexual debility, disorders of the spleen and in urinary affections. The root is a popular remedy for snakebite and the extract in water is used in leprosy. *Satt-gilo* or *Palo* (the pure, white watery extract chiefly consisting of starch) is a medicine employed in chronic fevers and in diabetes. In the form of *rasayana* it is used to improve the immune system and also body resistance to infections. Many oils like *Guduchyadi taila*, *Vata guduchyadi taila*, etc. are used for external application in skin diseases, rheumatic affections and nervous complaints. The alkaloids possess curare-like activity. In larger doses, the root is a powerful emetic. The juice (fresh) mixed with rock candy speeds up the recovery in hepatitis. The oil is effective in gout and skin diseases and reduces pain and oedema. The bitter properties also help in preventing the swine flu and fibrosis and stimulation of hepatic tissue regeneration. It is also used to treat scorpion stings and bites of other poisonous insects and reptiles. In India, the plant is considered as one of the best psychotropic drugs and the extract is often referred to as 'Indian quinine'. It is not to be used by the patients with diabetes, about to undergo a surgery and during pregnancy and breastfeeding. The drug is considered to be traditionally safe and no side effects have been noticed.

### Adulteration

The drug is often substituted/adulterated with *T. sinensis* (Lour.) Merrill (= *T. malaberica* Miers. ex Hook. f.) and *T. crispa* (Linn.) Miers ex Hook. f. et (Thoms.).

### Bach

### Common Names

Calamus, Sweet flag, Acorus roseau, Belle angelique, Flag root, Beewort, Bitter pepper root, Calamus root, Myrtle flag, Myrtle grass, Myrtle root, Myrtle sedge, Gladdon, Sweet calamus, Sweet root, Cinnamon sedge, Sweet cane, Sweet case, Sweet myrtle, Sweet rush, Sweet sedge, Sweet root (English); Vetrāh, Vacha, Jatila, Bhuta nashini, Uragandha (Sanskrit); Changpu (Chinese); Acore aromatique, Acore calame, Acore odorant, Acore vrai, Canne aromatique, Jonc odorant, Lis des marais, Roseau odorant (French); Calmus (German); Acoro vero, Calamo (Italian); Calamo aromatic, Calamis (Spanish); Kalmus (Dutch); Azakegeri (Turkish); Shoubu





Bockhornsklover (Swedish); Co cari, Ho lo ba (Vietnamese); Hu lu ba (Chinese); koruha, Fenu-guriku (Japanese); Kelabet, Klabat, Kelabat (Indonesian); Uluhal (Sinhalese); Methi, Methika, Chandrika, Asumodhagam (Sanskrit); Hilbeh, Hulabaha, Hulba, Helba (Arabic); Shamlita (Persian); Methi, Shanbalid (Urdu); Halba, Kelabet (Malaysian); Penantazi (Burmese); Methi (Nepalese); Methi (Odia); Methi (Punjabi); Methi, Mithim Mithiguti (Assamese); Methi, Sag methi—fresh leaves, Kasuri methi dried leaves, Methi, Muthi (Hindi); Menthi-shak, Methuka, Methi (Bengali); Menthya, Mentessoppu, Menthe-gida, Mente (Kannada); Metthi, Mente, Mette (Konkani); Uluva, Vanthiam, Venthayam, Uluva ila leaves (Malayalam); Methi (Marathi); Meti, Menthiyam, Vetani, Venthiam, Vendayam, Vendaya kirai leaves (Tamil); Menthikura, Menthi aakulu-leaves, Menthulu-seeds (Telugu).

### Biological Source

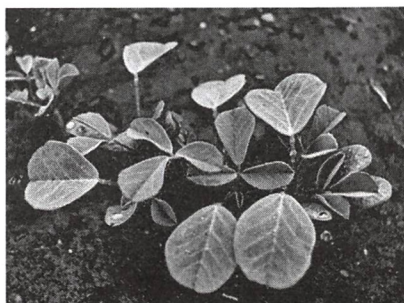
Methi consists of the dried ripe seeds, pods and leaves of *Trigonella foenum-graecum* L. (Family: Fabaceae, also known as Leguminosae). The binomial comes from the Greek word, *Trigonella* meaning '3-angled' referring to the leaves and *foenum-graecum* meaning 'Greek hay' (of an inferior grade).



Methi habit



Methi in cultivation



Methi young plant

