PharmacognosyII

Lec. 9 **3rd stage 1st semester** **Year 23-24**

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Indian hemp

The Indian hemp plants were originally considered as a distinct species but came to be regarded as a variety of *Cannabis sativa*, the common European hemp, which thus exhibited a variety of ecotypes giving rise to differing cannabinoid mixtures.

The American taxonomists for the recognition of three distinct species *C. sativa*, *C. indica* and *C. ruderalis*. Other botanists have proposed sub-species of *C. sativa*.

The plant is found in India, Bangladesh and Pakistan. The plant consists of the dried flowering and fruiting tops of the pistillate plants from which no resin has been removed. Limited cultivation is permitted in some countries.

The drug has been produced in East Africa, South Africa, Asia, Tripoli and USA. In temperate climate, large quantities of hemp are grown for the stem fibre and for the seeds, which yields 30-50% of drying oil.

History

Hemp has been cultivated for its seed and fibres from a very remote period, but the narcotic properties are usually not marked in plants grown in temperate regions, and even in India an active drug can only be grown in certain districts.

Three main types of narcotic products are produced:

1- The Indian hemp or ganja of the Indian pharmacopoeia is required to contain (not more than 10% of its fruit, large foliage leaves and stems over 3 mm).

2- Bhang (Hindustani) or hashish (Arabic) consists of the larger leaves and twigs of both male and female plants.
3- Charas or churrus is the crude resin. This is obtained by rubbing the tops between the hands, beating them on cloths or carpets, or by natives who wear leather aprons walking among the growing plants. The resin is scraped off and forms an ingredient of numerous smoking mixtures, like bhang. It is also used with butter.

Production of ganja

This is legally only produced by a few licensed growers in Bengal, Mysore and Madras. The seed is sown in rows about 1.3 m apart and male plants are eliminated as soon as they can be recognized. The resinous tops, largely of unfertilized female plants are cut about 5 months after sowing and pressed into cakes. The yield is about 120 kg per acre.

Constituents

The narcotic resin is brown, amorphous semisolid and soluble in alcohol, ether and carbon disulphide. It contains over 60 compounds (cannabinoids) all composed of aromatic portion (C11 or C12). Some principal components are cannabinol, tetrahydrocannabinol (THC), cannabidiol (CBD), cannabidiol-carboxylic acid, cannabigerol and cannabichromene.


Other higher plants

Apocynaceae

Iboga root (*tabernanthe iboga*) used in combat fatigue, as a neuro-stimulant, and for treatment of diabetes, an African narcotic that contains alkaloids of the indole groups. The alkaloid ibogaine has received attention as a possible antiaddictive drug, ibogaine has been shown to affect biogenic amine levels in selected brain-regions. Because of the involvement of these neurotransmitters in drug addiction, the effect of ibogaine on biogenic amine transport may contribute to the potential anti-addictive properties of ibogaine in vivo.

Compositae

Calea zacatechichi; In Mexico taken first as an infusion and then smoked.

Teratogens of higher plants

Teratogenic substances, when ingested by the mother, can cause abnormalities in the developing fetus, thalidomide which induce limb defect, (in 1960 used in morning sickness during pregnancy), represents the tragic example of a synthetic drugs having such undetected properties at the time of its use.

Teratogenic of higher plants:

Plant source	Constituents	Sources
Senecio spp. (Compositae)	Pyrrolizidine alkaloids	Possible teratogenic in rats
Leguminosaea	Indospicine	Cleft palate and embryo lethality in rats
Nicotiana spp. (Solanaceae)	Pyridine alkaloids	Responsible for skeletal deformation in pigs

Akee apple, fruit and seeds (Sapindaceae)	Hypoglycine A	Hypoglycaemic in humans and teratogenic in rats

Other toxic plants: Such plants are generally of local importance, and it is desirable that the pharmacist should have some knowledge of those found in own locality, be familiar with those characters by which the plant can be identified and be aware of the antidotes required for the treatment for poisoning.

Case of poisoning of human by higher plants are most likely to occur in children and involve those plants that produce attractive berries (e.g. belladonna, cotoneaster), seeds (e.g. laburnum) eaten for green peas, and those which may be introduced into the mouth for the other reason.

E.g. the hollow stems of hemlock used as pea-shooter, mistaken identify occasionally leads to fatalities and this is particularly with members of Umbelliferae.

Consumption of *Cicuta maculata* (water hemlock) (spotted cowbane) in mistake for ginseng, the poisonous principle presented in *Cicuta spp*. It is a C17-polyunsaturated alcohol named cicutoxin, the toxic property of cicutoxin could be due to a prolonged neuronal action potential.

Poisonous plants may be consumed by animals because the plants happen to be growing among the fodder or were collected and dried with hay. In the latter case, some unstable poisonous constituents may disappear with drying and storage. During the dry summer of 1976 numerous cows died near Crediton .UK after eating *Oenanthe crocata*.

Some widespread poisonous plants owe their properties to the presence of hepatotoxic pyrrolizidine alkaloids. These include the *Senecio spp*. (ragwort) and members of the tribe Eupatorieae of the Compositae. Several commonly used herbs containing small quantities of these alkaloids including comfrey and Russian comfrey, human fatalities have been reported in relation to the herbal use of *Senecio longilobus* in the USA.

Another group of compounds that have been shown to promote liver cancer in rats is that containing safrole and other alkylbenzene derivatives. Although these are weak carcinogens and concentrations in products for the human consumption never approach the toxic levels observed in lab tests, the desirability of their use has been questioned. Oils in which they occur include Brazilian sassafras, star-anise, cinnamon and nutmeg.