B.Sc. SEM IV (H) CC 9

Drug Yielding Plants

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11.15 am -12.15 pm

Morphology, Processing uses and health hazards of *Papaver* spp.

Papaver is a genus of 70–100 species of frost-tolerant annuals, biennials, and perennials native to temperate and cold regions of Eurasia, Africa and North America.

Commonly known species is Papaver somniferum, commonly known as the opium poppy or bread seed poppy, is a species of flowering plant in the family Papaveraceae. It is the species of plant from which both opium and poppy seeds are derived and is also a valuable ornamental plant, grown in gardens. Its native range is probably the eastern Mediterranean, but is now obscured by ancient introductions and cultivation, being naturalized across much of Europe and Asia.

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Historical background of *Papaver* cultivation:

- Opium's history dates back to 3400 B.C., when the first records of its cultivation and use are known.
- It was used by the ancient Greeks and Romans as a potent pain reliever. It was grown in Southeast Asia and known as the "joy plant", or Hul Gil, by the Sumerians.
- The Assyrians and the Egyptians also cultivated opium, and it traveled along the Silk Road (a series of travel routes) between Europe and China where it was involved in the beginning of the Opium Wars of the 1800s.
- Opium dens were places where opium could be bought and sold, and were also found worldwide, especially in Southeast Asia, China and Europe.
- In the U.S. in the 1800's, opium dens sprang up in the west, such as in San Francisco's Chinatown, and spread east to New York. Chinese immigrants who came to the U.S. for railroad and the gold rush work often brought their opium with them for its intoxicating and pain-relieving effects.

Morphology:

- Erect robust annual herbs, glaucous, glabrous rarely sparsely setose, about 50-100 cm tall.
- Stem simple or branched. Root stock, erect, slender, conical.
- Leaves alternate, broadly lanceolate, ovate oblong, shallowly pinnatifid about 5-25 x 2-7 cm across, base obtuse or rounded, margin serrate-dentate, apex obtuse to acute, glaucous, glabrous both above and beneath,. Petiole glabrous about 1-2 cm long, upper cauline leaves, smallers and becoming more shallowly lobed, subsessile towards the shoot, base cordate-amplexicaul.
- Peduncles glabrous or sparsely bristly, about 5-25 cm long.

- Flowers bisexual, solitary, terminal, about 3-10 cm across, white, pale pink, pale purple, sometimes with black blotch at the base, flower buds oblong-ovoid, apex obtuse, about 1.5-3 x 1-2 cm across.
- Sepals 2, free, deciduous, ovate-orbicular, early caducous, glabrous, petals 4, obovate, overlapping, apex rounded wavy, white, pale pink, pale purple, sometimes with black blotch at the base, about 3-6 x 3-8 cm across.
- Stamens numerous, usually as long as the ovary, filaments filiform, slender, yellowish, about 5-10 mm long,
- Ovary ovoid-globose, unilocular, superior, glabrous, about 10 mm long, ovules numerous, stigmatic rays disc yellow, enlarged, opposite to placentas, rays about 7-18.

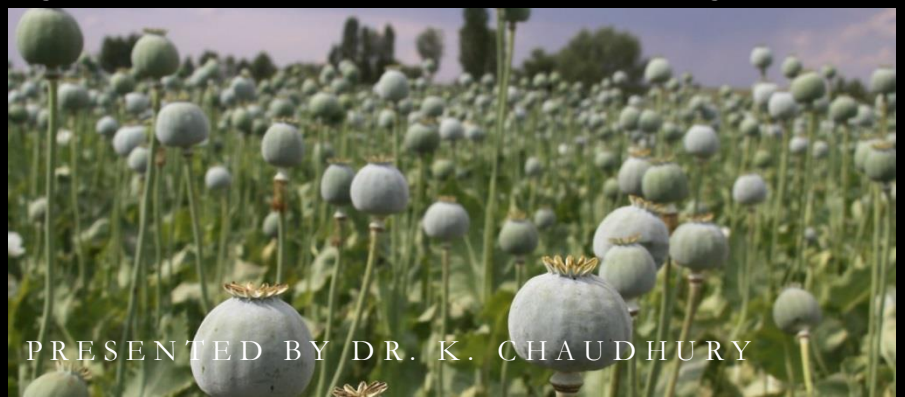
- Fruits capsules, globular-ovoid, base rounded, apex flat topped, glabrous, about 2-7 x 5-6 cm across, dehiscing by subapical pores or persistent disc.
- Seeds many, globose, reniform, pale grayish white, black or grayish brown, about 0.3 mm across, rich in oil.

Cultivation

- ✓ Propagated from seed. Seeds germinate best at 15°C and are less sensitive to temperature than most poppy species.
- ✓ They flower in April and May and the capsules are ripe in June to July. Optimum yields are obtained when plants are spaced 10 cm between plants and rows 32 cm apart, thus allowing space for mechanical cultivation.
- ✓ Yields of seeds are slightly higher when plants are spaced 30 cm apart than when 40 cm apart. Thinning and spacing do not affect the oil content of the seeds. Fertile soil is essential for good growth and land should be fertilized accordingly.

Harvesting:

- While nearly all parts of the poppy plant contain a white milky juice or latex, the unripe capsules, containing the juice in abundance, are used for extraction of morphine and other alkaloids.
- The capsule wall is traversed by a network of branching and anastomosing lactiferous vessels which contain the latex. In the green unripe capsule, the latex is richest in morphine; but as they turn yellow and ripen, the morphine content diminishes and the codeine and narcotine contents increase.
- Usually in the late afternoon or early morning while the temperature is low, transverse oblique or ventral incisions are made in the unripe capsules with a single-bladed knife having one saw edge or a several-bladed knife, care being taken not to cut through the inner wall of the capsule lest valuable juice be lost and the seeds injured.



- The white juice exudes and soon hardens in the outside wall of the capsule into brownish masses which are scraped off the following day on a wooden tray.
- The scrapings are later transferred to earthen vessels or larger trays or dumped on the ground, where the opium is kneaded by hand to a uniform consistency.
- It is then shaped into balls, cakes, or sticks, ready for marketing. Crude opium from the 3 or 4 lancings should be separated for medicinal use since it contains a higher percentage of morphine. Morphine content is highest during period 10–30 days after flowering.

Uses:

- ✓ Opium is the air-dried milky exudation obtained from excised unripe fruits. It is extensively smoked as an intoxicant.
- ✓ Opium is largely used for manufacture of morphine, codeine, narcotine, laudenine, papaverine, and many other alkaloids.
- ✓ It is also the source of the toxic and extremely habit forming narcotic heroin or dimorphine, prohibited in some countries.
- ✓ Seeds contain no opium and are used extensively in baking and sprinkling on rolls and bread. Seeds are a good source of energy.
- ✓ They are also the source of a drying-oil, used for manufacture of paints, varnishes, and soaps, and in foods and salad dressing.
- ✓ Seeds used for preparation of emulsions (white-seeded varieties preferred); the bluish-black varieties are generally used for baking.
- ✓ Seeds regarded as analgesic, anodyne, antitussive, aphrodisiac, astringent, bactericidal, calmative, carminative, demulcent, emollient, expectorant in folk medicine.

Health hazards:

- Heroin is derived from the morphine alkaloid found in opium. The resulting yellow-brown latex, which is scraped off of the pod, is bitter in taste and contains varying amounts of alkaloids such as **morphine**, **codeine**, **thebaine** and **papaverine**. Other synthetic or semisynthetic opium derivatives include **fentanyl**, **methadone**, **oxycodone** and hydrocodone.

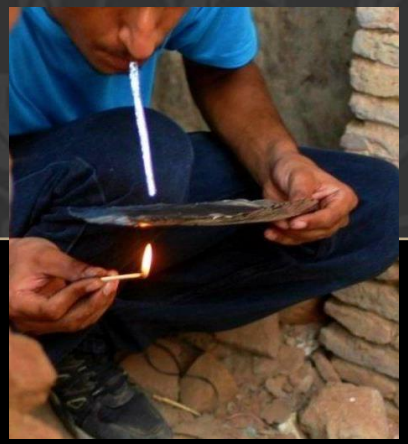
Afghanistan is the worldwide capital of opium cultivation, leading to about three-quarters of the world's heroin supply.

Heroin which is derived from opium is most often injected, however, it may also be vaporized (or smoked), sniffed (also known as snorting), used as a rectal suppository, or orally ingested by mouth.

Smoking, snorting or orally ingesting heroin does not produce an intense "rush" as might be experienced with intravenous (IV) injection.

Opium affects everyone differently:

Short term effects may include: euphoria, relaxation, Analgesia, slower, shallower breathing, lower heart rate, impaired reflexes, temporary constipation, loss of appetite.



Overdose

Symptoms of opium overdose: very slow breathing, loss of consciousness, tiny pupils.

Untreated overdose can lead to brain damage and death.

Long-term effects

Regular use of opium may cause:

tolerance - needing to use more to get the same effect

irregular periods and difficulty having children

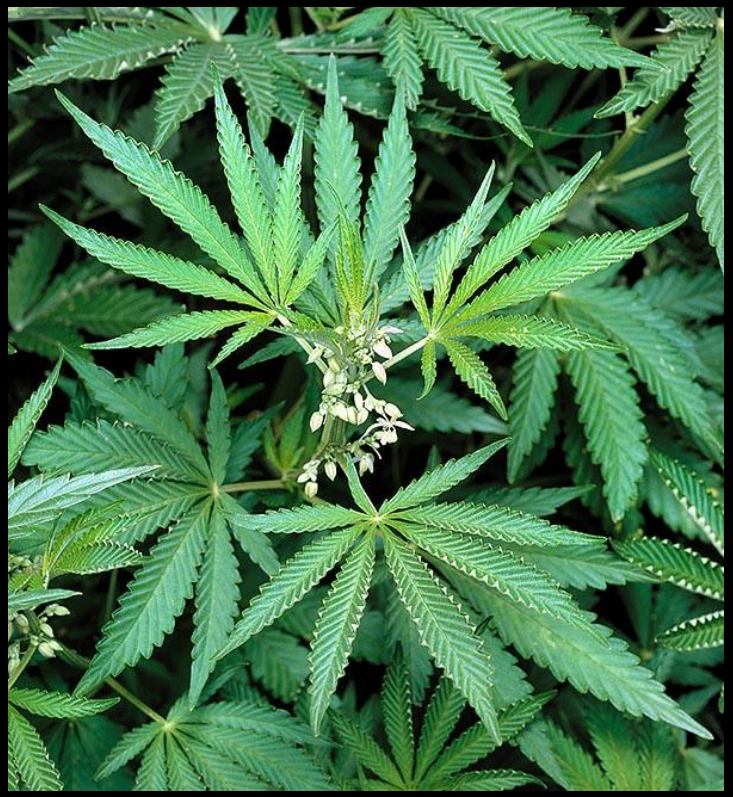
loss of sex drive

constipation

dependence on opium.

Morphology, Processing uses and health hazards of *Cannabis* spp.

Cannabis is a genus of flowering plants in the family Cannabaceae. The number of species within the genus is disputed. Three species may be recognized: *Cannabis sativa*, *Cannabis indica*, and *Cannabis ruderalis*; *C. ruderalis* may be included within *C. sativa*; all three may be treated as subspecies of a single species, *C. sativa*; or *C. sativa* may be accepted as a single undivided species.



The genus is widely accepted as being indigenous to and originating from Central Asia, with some researchers also including upper South Asia in its origin.

Hemp is called *ganja* (Sanskrit: गञ्जा, IAST: *gañjā*) in Sanskrit and other modern Indo-Aryan languages. Some scholars suggest that the ancient drug soma, mentioned in the Vedas, was cannabis. *Bhanga* is mentioned in several Indian texts dated before 1000 CE.

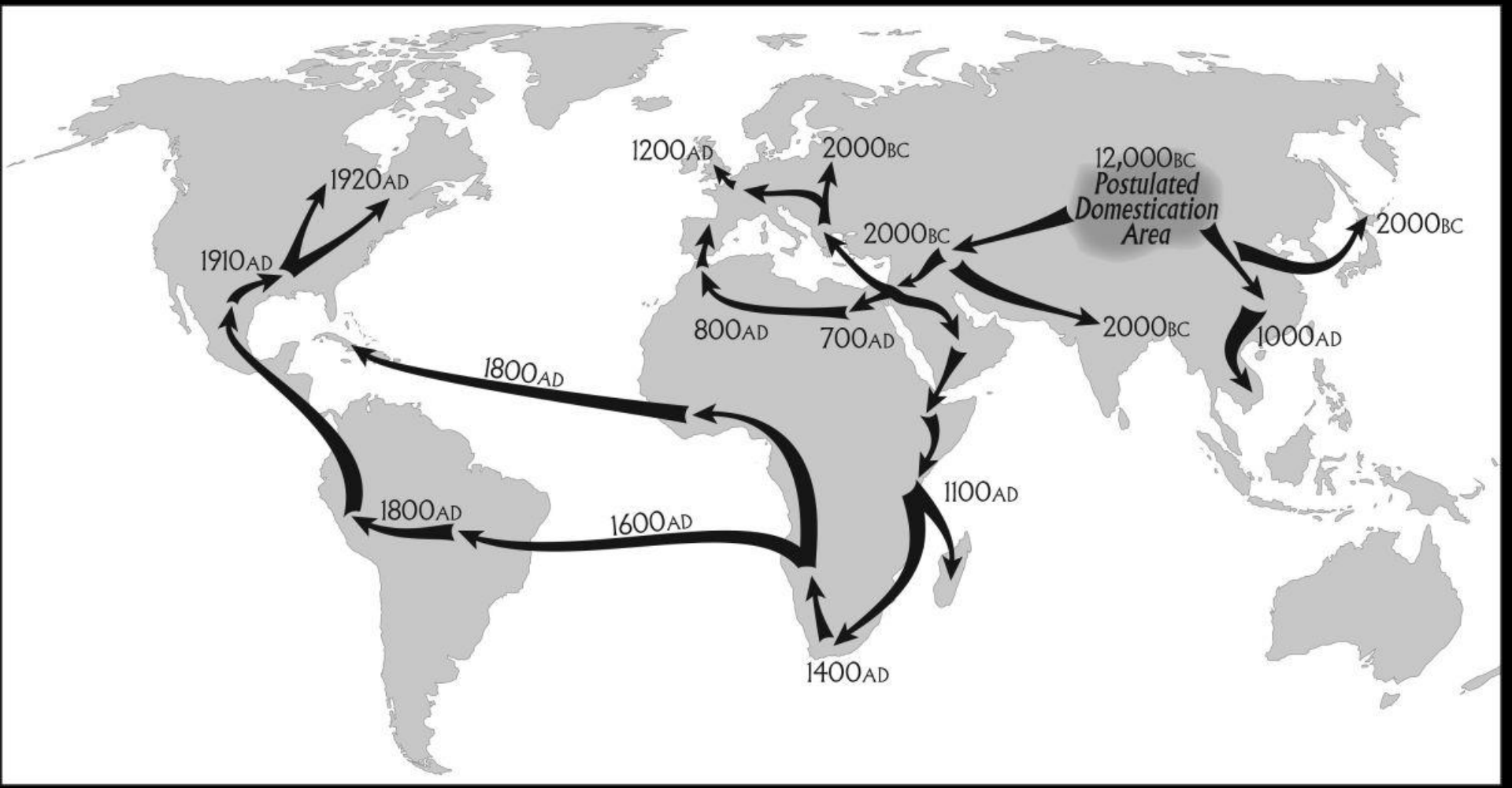
Cannabis has an ancient history of ritual use and is found in pharmacological cults around the world. Hemp seeds discovered by archaeologists at Pazyryk suggest early ceremonial practices like eating by the Scythians occurred during the 5th to 2nd century BC confirming previous historical reports by Herodotus.

The earliest restrictions on cannabis were reported in the Islamic world by the 14th century.

In the 19th century, it began to be restricted in colonial countries, often associated with racial and class stresses.

In the middle of the 20th century, international coordination led to sweeping restrictions on cannabis throughout most of the globe.

Entering the 21st century, some nations began to change their approaches to cannabis, with measures taken to decriminalize cannabis; the Netherlands became the first nation to legalize cannabis, and in 2015 Uruguay became the first to legalize recreational cannabis with Canada following in 2018 and South Africa for personal home use only.

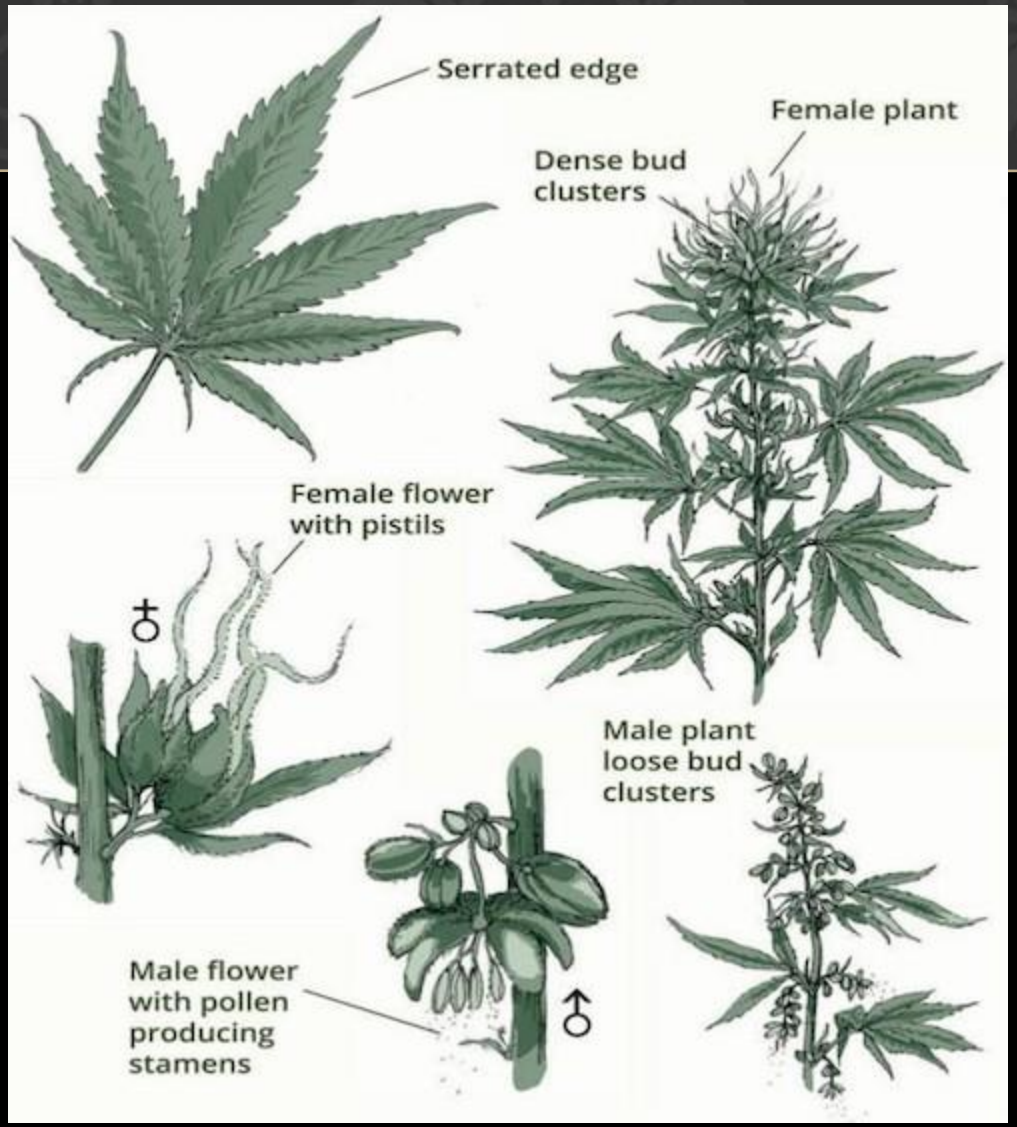


Morphology:

- Cannabis sativa and indica are widely cultivated and economically important; The main morphological difference between *C. indica* and *C. sativa* is in their leaves.
- The leaves of *sativa* are much smaller and thinner, whereas those of *indica* have wide fingers and are deep green, often tinged with purple; at maturity, they turn dark purple.
- *C. indica* plants are shorter and bushier, usually under 6 ft tall and rarely over 8 ft. It has short branches laden with thick, dense buds, which mature early, usually at the beginning of September in the Northern Hemisphere.

The natural distribution of *C. indica* is Afghanistan, Pakistan, India, and surrounding areas.

- Leaves are alternate. The *Cannabis* leaf is iconic, with serrate-edged leaflets radiating from the base in a distinctly palmate pattern recognized around the world.
- *Cannabis* is dioecious, having both male and female plants, although monoecious plants are not unusual. Until flowering, the sexes are differentiated by size and shape. The female is shorter and with thicker foliage, the male taller and sparsely leafed.



- The flowers of *Cannabis* develop as clusters or buds. The flowers of male plants are loose and hang from the plant. In females, flowers are dense, bristling with leaflets and upright in thick leaf clusters arrayed along the flowering limb.

- Male plants are staminate and produce pollen. Female plants are pistillate and produce seeds, which are fertilized by wind-driven pollen.

Processing:

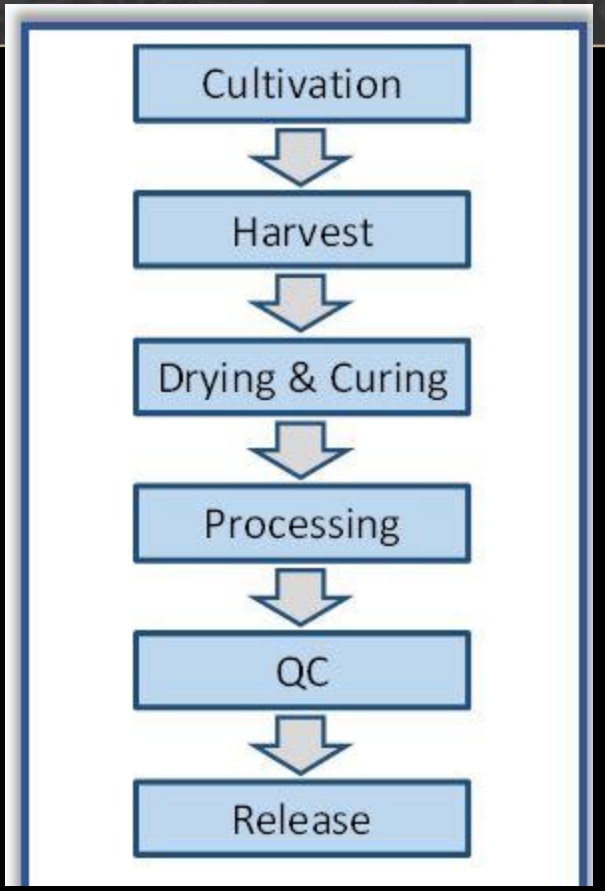
It takes at least eight weeks for indoor cannabis plants to finish the flowering stage. Depending on the size of the garden, harvesting cannabis plants can be a very time consuming process.

There are three stages that all cannabis horticulturists must go through at some point during the harvest process. The three stages are: the removal of the large fan leaves, trimming or removing the remaining leaves in close proximity to the flowers, and removing the flowers themselves from the stems.

other crucial stages of the harvest process include the drying, sorting, and curing of the cannabis flowers.

Fan Leaf Removal:

The large fan, or sun, leaves are easily identifiable as the stereotypical cannabis leaf. These leaves can be plucked by hand, cut with scissors, or removed with a device, such as a hand-held hedge trimmer.


Cultivation
Harvest
Drying & Curing
Processing
QC
Release

Drying: Cannabis plants are usually hung upside down to dry and are either cut into smaller, more manageable sections (branches) or left as an entire plant during the drying stage. The ideal conditions for drying cannabis are temperatures between 65-75 degrees F with humidity levels around 45-55%. If possible, drying should take place in complete darkness as UV light from the sun or artificial lights could damage some of the cannabinoids or terpenes in the flowers.

De-stemming:

If a wet trim method was implemented and the drying process is complete, the flowers can be de-stemmed and stored in the appropriate holding containers for the curing process. A cannabis cultivator who chooses a dry trim method and wishes to use an automated trimmer should begin the de-stemming process after the plants have dried.

Sorting:

Sorting cannabis flowers can be an important step in maximizing the efficiency of the harvest process. Separating the dried cannabis flowers into different sizes allows the cultivator to further process the flowers more effectively and efficiently.

Trimming: The purpose of dry trimming is to remove as much of the leaf material surrounding the flowers as possible, thus exposing just the flowers (the most potent part of the cannabis plant).

Curing: During the curing process, the flowers continue to dry very slowly and this enriches the flowers's flavor. Containers used for the curing process should be stored in a cool, dark place where they can be examined daily. For the first week or two, the containers should be opened ("burped") once or twice a day. This lets out some of the built up humidity and allows some fresh air in. After the first week or so, the containers can be opened less frequently (anywhere from once a day to once every other day). After a couple of months, the curing process is complete and the cannabis flowers should be at their peak flavor.

Uses of Cannabis:

Users can get the following health benefits of cannabis:

Relief of chronic pain:

There are hundreds of chemical compounds in cannabis, many of which are cannabinoids. Cannabinoids have been linked to providing relief of chronic pain due to their chemical makeup.

Improves lung capacity:

Unlike smoking cigarettes, when smoking cannabis in the form of cannabis your lungs aren't harmed.

Help lose weight:

If you look around, you will notice that the avid cannabis user is usually not overweight. That is because cannabis is linked to aiding your body in regulating insulin while managing caloric intake efficiently.

Regulate and prevent diabetes:

With its impact on insulin, it only makes sense that cannabis can help regulate and prevent diabetes. Research conducted by the American Alliance for Medical Cannabis (AAMC) has linked cannabis to stabilise blood sugars, lower blood pressure, and improve blood circulation.

Fight cancer:

One of the biggest medical benefits of cannabis is its link to fighting cancer.

Helps treat depression:

Depression is fairly widespread without most people even knowing they have it. The endocannabinoid compounds in cannabis can help in stabilising moods which can ease depression.

Health hazards:

It May Affect Your Mental Health:

Not everyone's experience with marijuana is pleasant. It often can leave you anxious, afraid, or panicked. Using pot may raise your chances for clinical depression or worsen the symptoms of any mental disorders you already have. Scientists aren't yet sure exactly why. In high doses, it can make you paranoid or lose touch with reality so you hear or see things that aren't there.

Your Thinking May Get Distorted:

Marijuana can cloud your senses and judgment. The effects can differ depending on things like how potent your pot was, how you took it, and much marijuana you've used in the past. It might eighten your senses (colors might seem brighter and sounds might seem louder)

Distort your sense of time:

Hurt your motor skills and make driving more dangerous

Lower your inhibitions so you may have risky sex or take other chances

Morphology, Processing uses and health hazards of Tobacco

Tobacco is the common name of several plants in the *Nicotiana* genus under the Solanaceae family, and the general term for any product prepared from the cured leaves of the tobacco plant.

More than 70 species of tobacco are known, but the chief commercial crop is ***N. tabacum***. The more potent variant ***N. rustica*** is also used around the world.

Tobacco contains the highly addictive stimulant alkaloid **nicotine** as well as **harmala alkaloids**. Dried tobacco leaves are mainly used for smoking in cigarettes and cigars, as well as pipes and shishas . They can also be consumed as snuff, chewing tobacco, dipping tobacco and snus.

In 2008, the World Health Organization named tobacco use as the world's single greatest preventable cause of death.

Origin of Tobacco:

Tobacco was first discovered by the native people of Mesoamerica and South America. Tobacco had already long been used in the Americas by the time European settlers arrived and took the practice to Europe, where it became popular.

Greek and Roman accounts exist of smoking hemp seeds, and a Spanish poem c. 1276 mentions the energetic effects of lavender smoke, but tobacco was completely unfamiliar to Europeans before the discovery of the New World.

Following the arrival of Europeans, tobacco became one of the primary products fueling colonization, and also became a driving factor in the incorporation of African slave labor. The Spanish introduced tobacco to Europeans in about 1528.

French cultivation of *herbe de la Reine* (the queen's herb) began in 1560. By 1570 botanists referred to tobacco as ***Nicotiana***.


Status of the WHO Framework Convention on Tobacco Control (WHO FCTC)
166 Contracting Parties*

The Japanese were introduced to tobacco by Portuguese sailors from 1542. Tobacco first arrived in the Ottoman Empire in the late 16th century, where it attracted the attention of doctors and became a commonly prescribed medicine for many ailments. Although tobacco was initially prescribed as medicine, further study led to claims that smoking caused dizziness, fatigue, and a foul taste/odour in the mouth.

Cannabis smoking in India has been known since at least 2000 BC and is first mentioned in the Atharvaveda. Tobacco was introduced to India in the 17th century. It later merged with existing practices of smoking (mostly of cannabis). By the start of the 20th century, tobacco smoking, especially among the youth, had become so common and widespread sale of marketing of tobacco products as a growing social menace.

There are approximately 120 million smokers in India. According to the World Health Organization (WHO), India is home to 12% of the world's smokers. According to a 2002 WHO estimate, 70% of adult males in India smoke. Among adult females, the figure is much lower at between 13–15%. About 90% of children under the age of 16 years (10th class) have used some form of tobacco in the past, and 70% are still using tobacco products.

According to the study, "A Nationally Representative Case-Control Study of Smoking and Death in India", tobacco will be responsible for 1 in 5 of all male deaths and 1 in 20 of all female deaths in the country by 2010. This means approximately 1 million Indians would die annually from smoking by 2010.

A survey conducted by the International Institute of Population Science and the Ministry of Health and Family Welfare, reveals that 56.6% of people in Kolkata smoke, the highest rate in the country. 82% of men and 23.5% of women smoke in Kolkata The highest number of beedi smokers are in Uttarakhand.

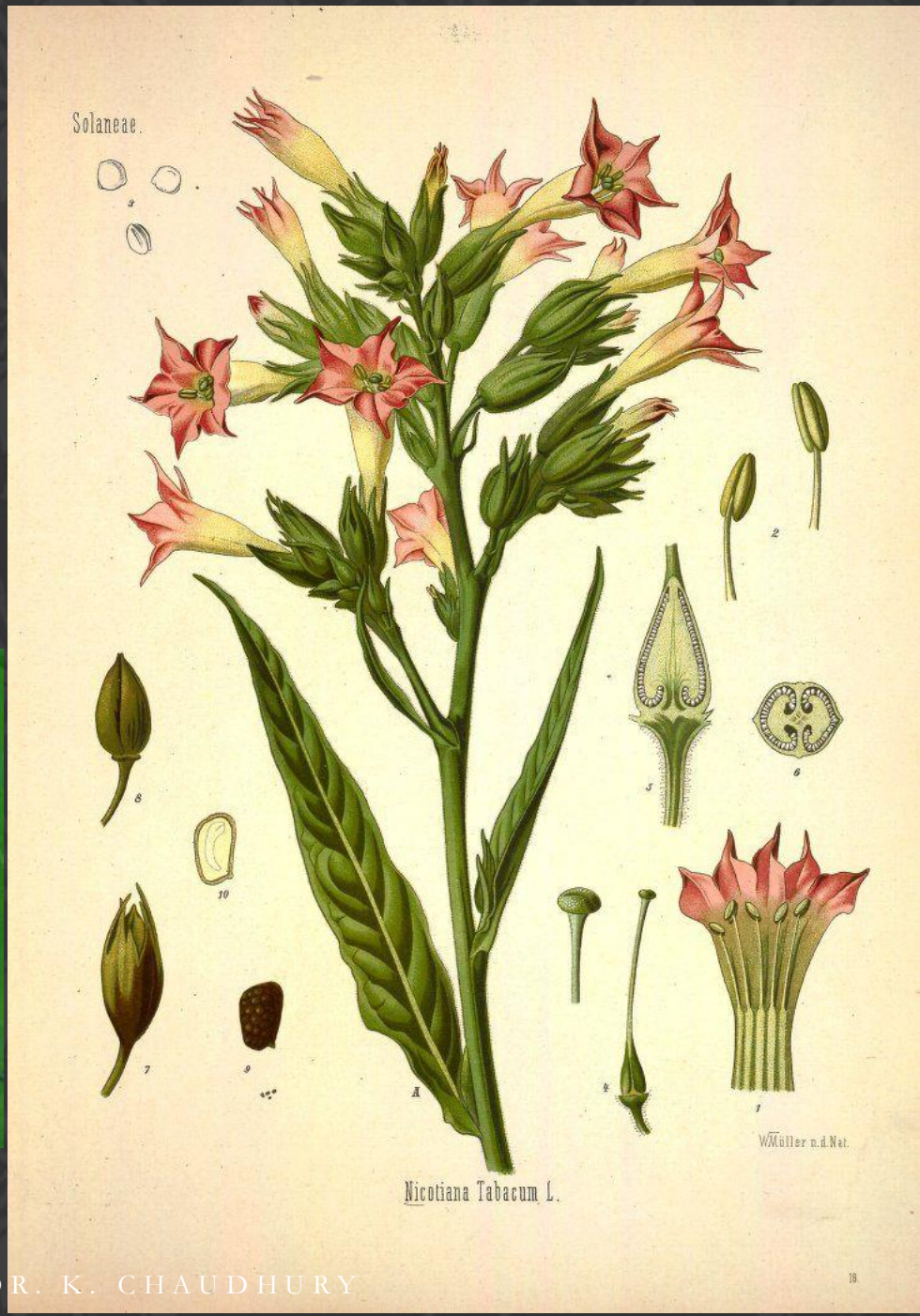
Morphology of Tobacco Plant:

N. tabacum **is considered of American origin and has been widely introduced for cultivation to the rest of the world. It is well represented in the West Indies, Mesoamerica, and South America, as well as in the Pacific Islands. It is also cultivated, and has often escaped from cultivation, in Asia and Europe.**

- **Erect, stout annual or short lived perennial herbs, reaching a height of 1.5-2 m; stems sparsely branched, viscid pubescent with abundant glandular hairs.**

- **Leaves green, simple, alternate, often large, coarse, elliptic to ovate or obovate, up to 50 cm long, usually decreasing in size up the stem, glandular pubescent, margins entire or undulate, apex acute to acuminate, base decurrent, amplexicaul, lower leaves with winged petioles, upper leaves subsessile.**


rarepalmseeds.com


Solaneae.
Nicotiana Tabacum L.
W.Müller n.d.Nat.

- Flowers in short, dense panicles, pedicels 5-15 mm long; calyx tubular, 12-20 mm long, the tube 10-15 mm long, the lobes narrowly triangular, acute, sometimes unequal, shorter than calyx tube; corolla salverform, the limb white, pink, or reddish, 5 lobed to pentagonal, 30-50 mm in diameter, the tube proper shorter and narrower than throat cylinder, 4-5 cm long, throat cup distinct; stamens unequal, the upper four long, the fifth shorter, all inserted near the base of corolla tube and adnate to it for ca. 1 cm; filaments 2.5-4 cm long, pubescent at base.

Capsules ellipsoid to ovoid, equalling or exceeding calyx, 1.5-2.5 cm long. Seeds numerous, ca. 0.5 mm long, globose to oblong, testa wavy reticulate.

N. rustica is a much smaller plant, about 0.6-1.2 m in height, which usually develops suckers (lateral shoots). Leaves are short, but thick, broadly oval and petiolate with an uneven, puckered surface. Flowers are pale yellow to green.

Processing of Tobacco:

Whole tobacco leaves contain a central stem (or midrib) and the leaf (lamina) which are mechanically separated at the leaf processing facility as they are used separately at the primary processing plant.

1. Green Leaf and Stem Conditioning:

To make the leaves ready for the mechanical threshing process, harvested tobacco leaves are conditioned in cylinders to be more pliable using forced hot air and steam. The conditioning cylinder is a rotating drum with independently-controlled steam jet nozzles that inject moisture into the tobacco. The conditioned tobacco then goes to the threshing process.

2. Threshing Process:

The conditioned leaf passes through a series of mechanical threshers. The thresher drums and blades tear the lamina from the stems, and the thresher produces a mixture of lamina, stems and un-threshed leaf. This mixture is fed into a classifier that separates the lamina from the un-threshed leaf and the stem.

The stem now moves on to the stem conditioning line, which gives the stem a higher moisture content than the green leaf. The stem is then processed through a stem cutter to give a consistent cut, and will then move to the drying process - similar to that of the lamina.

3. Drying

The lamina from the different classifiers has different moisture content, so the moisture has to be made uniform for proper storage of the lamina. The lamina first passes through a drying chamber to make the moisture uniform. The dried lamina is cooled and then passes into a high humidity conditioning chamber where the tobacco absorbs moisture and reaches equilibrium.

To safely store tobacco for extended times and to ensure a quality product requires a moisture level of the lamina and stems between 11 to 12%. When the lamina exits the drying chamber it is around 6 to 8%, and when it exits the humidity chamber it is at the final 11 to 12%. The final packed lamina and stems are typically stored for at least 6 months for aging or mellowing.

Temperature:

To monitor the effectiveness of the drying and conditioning processes, real-time temperature monitoring can be added as an option in addition to moisture.

4. Value and Quality:

Throughout the tobacco leaf processing from green to finished lamina and stem, moisture control is critical. Having closed loop process control with a Process Sensors Corporation MCT460-T moisture analyzer will provide optimal efficiency in all parts of the process. It will help to produce a consistent, high-quality end product that can be safely stored for months until being used for finished product at a secondary processing plant.

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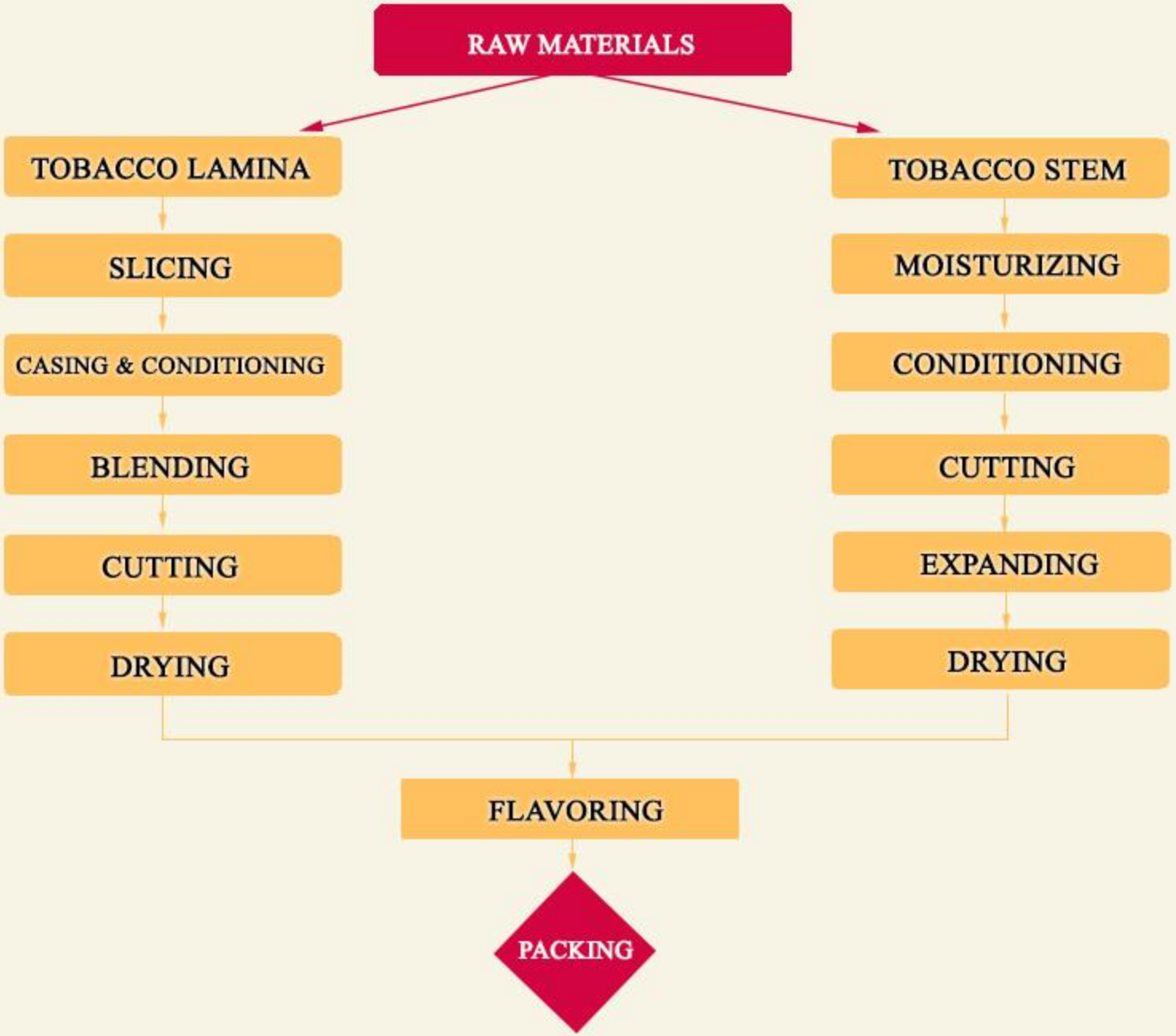
RAW MATERIALS
TOBACCO LAMINA
SLICING
CASING & CONDITIONING
BLENDING
CUTTING
DRYING
TOBACCO STEM
MOISTURIZING
CONDITIONING
CUTTING
EXPANDING
DRYING
FLAVORING
PACKING

Efficient tobacco green leaf threshing (GLT) requires a conditioned leaf between 17 and 22% moisture content. An accurate moisture measurement is critical to optimize GLT and achieve the desired strand length. The stem is conditioned to around 40% moisture by controlling the steam levels to make it more pliable for the cutting process.

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Uses:

- ✓ A local irritant; if used as snuff it causes violent sneezing, also a copious secretion of mucous; chewed, it increases the flow of saliva by irritating the mucous membrane of the mouth.

- ✓ The alkaloid nicotine is a virulent poison producing great disturbance in the digestive and circulatory organs. It innervates the heart, causing palpitation and cardiac irregularities and vascular contraction, and is considered one of the causes of arterial degeneration.

- ✓ Tobacco was once used as a relaxant, but is no longer employed except occasionally in chronic asthma. Its active principle is readily absorbed by the

- ✓ Medicinally it is used as a sedative, diuretic, expectorant, discutient, and sialagogue, and internally only as an emetic, when all other emetics fail.

Health hazards:

Tobacco use causes:

- Cancer (oropharynx, larynx, esophagus, trachea, bronchus, lung, acute myeloid leukemia, stomach, liver, pancreas, kidney and ureter, cervix, bladder, and colorectal)
- Heart disease and stroke
- Lung diseases (emphysema, bronchitis, chronic airway obstruction, chronic obstructive pulmonary disease, and pneumonia)
- Reproductive effects (ectopic pregnancy, premature birth, low birth weight, stillbirth, reduced fertility in women, and erectile dysfunction; and birth defects, including clept-lip and/or cleft palate)
- Other effects (Type 2 diabetes, age-related macular degeneration, rheumatoid arthritis, blindness, cataracts, hip fractures, impaired immune function, periodontitis, and overall diminished health)


DANGER POISON !
Acetone
(solvent)
*Naphtylamine
Methanol
(used as rocket fuel)
*Pyrene
Naphtalène
(moth-repellent)
Nicotine
(used as a herbicide and insecticide)
*Cadmium
(used in batteries)
Carbon monoxide
(found in exhaust fumes)
Vinyl chloride
(used in plastic materials)
Cyanhydric acid
(was used in the gas chambers)
Ammoniac
(détergent)
*Urethane
Toluene
(industrial solvent)
Arsenic
(lethal poison)
*Dibenzacridine
*Polonium 210
(a radioactive element)
DDT
(insecticide)
*Known carcinogenic substances
STOP SMOKING!


तम्बाकू से दर्दनाक मौत होती है
आज ही छोड़ें, कॉल करें 1800-11-2356
तम्बाकू से कैंसर होता है
आज ही छोड़ें, कॉल करें 1800-11-2356

Thank You

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