

Hemp

This article is about industrial and foodstuff products that are derived from hemp cultivars of the *Cannabis* plant. For the usage of *Cannabis* as a drug, see *Cannabis (drug)*. For other uses, see *Hemp (disambiguation)*.

Hemp (from Old English *hænep*) is a commonly used term for high growing varieties of the *Cannabis* plant and its products, which include fiber, oil, and seed. Hemp is refined into products such as hemp seed foods, hemp oil, wax, resin, rope, cloth, pulp, paper, and fuel.

Other variants of the herb *Cannabis sativa* are widely used as a drug, commonly known as marijuana. These variants are typically low growing and have higher content of tetrahydrocannabinol (THC). The legality of *Cannabis* varies widely from country to country, and from state to state in the United States. In many countries regulatory limits for concentrations of psychoactive drug compounds, particularly THC, in hemp require the use of strains of the plant which are bred for low content.



Hemp field in Côtés-d'Armor, Brittany, France

Uses

Hemp is used for many varieties of products including the manufacture of cordage of varying tensile strength, durable clothing and nutritional products. The *bast fibers* can be used in 100% hemp products, but are commonly blended with other organic fibers such as flax, cotton or silk, for apparel and furnishings, most commonly at a 55%/45% hemp/cotton blend. The inner two fibers of hemp are more woody and are more often used in non-woven items and other industrial applications, such as mulch, animal bedding and litter. The oil from the fruits ("seeds") oxidizes (commonly, though inaccurately, called "drying") to become solid on exposure to air, similar to linseed oil, and is sometimes used in the manufacture of oil-based paints, in creams as a moisturizing agent, for cooking, and in plastics. Hemp seeds have been used in bird seed mix as well. A survey in 2003 showed that more than 95% of hemp seed sold in the EU was used in animal and bird feed. Hemp seed is also used as a fishing bait.



Hemp grown for milk animal fodder

In modern times hemp is used for industrial purposes including paper, textiles, clothing, biodegradable plastics, construction (as with Hempcrete and insulation), body products, health food and bio-fuel.

Food

Hemp seeds can be eaten raw, ground into a meal, sprouted, made into hemp milk (akin to soy milk), prepared as tea, and used in baking. The fresh leaves can also be consumed in salads. Products include cereals, frozen waffles, hemp milk ice cream, hemp tofu, and nut butters. A few companies produce value added hemp seed items that include the seed oils, whole hemp grain (which is sterilized by law in the United States, where they import it from China and Canada), dehulled hemp seed (the whole seed without the mineral rich outer shell), hemp flour, hemp cake (a by-product of pressing the seed for oil) and hemp protein powder.



Hemp seeds

Market share

Within the UK, the Department for Environment, Food and Rural Affairs (Defra) has treated hemp as purely a non-food crop. Seed appears on the UK market as a legal food product, and cultivation licenses are available for this purpose. In North America, hemp seed food products are sold, typically in health food stores or through mail order. The United States Department of Agriculture estimates that "the market potential for hemp seed as a food ingredient is unknown. However, it probably will remain a small market, like those for sesame and poppy seeds." Since 2007 the commercial success of hemp food products has grown considerably.

Nutrition

Typical nutritional analysis of hulled hemp seeds	
Calories/100 g	567 kcal
Protein	30.6
Carbohydrate	10.9
Dietary fiber	6.0
Fat	47.2
Saturated fat	5.2
Palmitic 16:0	3.4
Stearic 18:0	1.5
Monounsaturated fat	5.8
Oleic 18:1 (Omega-9)	5.8
Polyunsaturated fat	36.2
Linoleic 18:2 (Omega-6)	27.6
Linolenic 18:3 (Omega-3)	8.7
Gamma-Linolenic 18:3 (Omega-6)	0.8
Cholesterol	0 mg
Moisture	4.7
Ash	6.6
Vitamin A (B-Carotene)	4.0 IU/100g

Thiamine (Vit B₁)	1.4 mg
Riboflavin (Vit B₂)	0.3 mg
Pyridoxine (Vit B₆)	0.1 mg
Vitamin C	1.0 mg
Vitamin E	9.0 IU/100g
Sodium	9.0 mg
Calcium	74.0 mg
Iron	4.7 mg

Approximately 44% of the weight of hempseed is edible oils, containing about 80% essential fatty acids (EFAs); e.g., linoleic acid, omega-6 (LA, 55%), alpha-linolenic acid, omega-3 (ALA, 22%), in addition to gamma-linolenic acid, omega-6 (GLA, 1–4%) and stearidonic acid, omega-3 (SDA, 0–2%). Proteins (including edestin) are the other major component (33%). Hempseed's amino acid profile is "complete" when compared to more common sources of proteins such as meat, milk, eggs and soy. Hemp protein contains all nutritionally significant amino acids, including the 9 essential ones adult bodies cannot produce. Proteins are considered complete when they contain all the essential amino acids in sufficient quantities and ratios to meet the body's needs. The proportions of linoleic acid and alpha-linolenic acid in one tablespoon (15 ml) per day of hemp oil easily provides human daily requirements for EFAs.



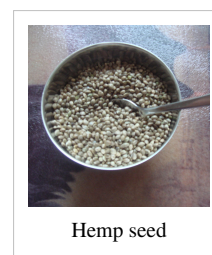
Hemp
substitute
milk



Japanese
hemp
seed
seasoning



Swiss hemp beer uses blossoms



Hemp seed

Storage

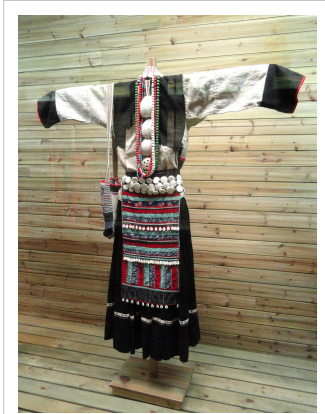
Hemp oil, like any food oil rich in essential fatty acids, will spontaneously oxidize and turn rancid within a short period of time if not stored properly; Its shelf life is extended when stored in a dark airtight container and refrigerated.

Fiber

Hemp fiber was widely used throughout history. Items ranging from rope, to fabrics, to industrial materials were made from hemp fiber. Hemp was often used to make sail canvas, and the word *canvas* derives from *cannabis*. Today, a modest hemp fabric industry exists, and hemp fibers can be used in clothing. Pure hemp has a texture similar to linen.



Hemp stem showing fibers.



Hemp dress



Hemp dress



100% hemp fabric

Building material

Main article: hempcrete

Concrete-like blocks made with hemp and lime have been used as an insulating material for construction. Such blocks are not strong enough to be used for structural elements; they must be supported by a brick, wood, or steel frame.^[1] However hemp fibres are extremely strong and durable and have been shown to be used in replacement of wood for many jobs including creating very durable and breathable homes.

The first example of the use of hempcrete was in 1986 in France with the renovation of the Maison de la Turquie in Nogent-sur-Seine by the innovator Charles Rasetti. In the UK hemp lime was first used in 2000 for the construction of two test dwellings in Haverhill. Designed by Modece Architects, who pioneered hemp's use in UK construction, the hemp houses were monitored in comparison with other standard dwellings by BRE. Completed in 2009, The Renewable House is one of the most technologically advanced made from hemp-based materials. The first US home made of hemp-based materials was completed in August 2010 in Asheville, North Carolina.



Hemp fiber board



Hemp thermal insulation



Hemp interior thermal insulation blocks



Hemp acoustic ceiling insulation

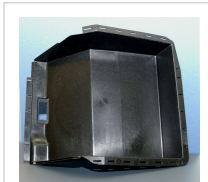


Concrete block made with hemp in France

Plastic and composite materials

Main article: Bioplastic

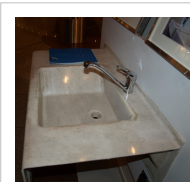
A mixture of fibreglass, hemp fiber, kenaf, and flax has been used since 2002 to make composite panels for automobiles. The choice of which bast fiber to use is primarily based on cost and availability. Various car makers are beginning to use hemp in their cars, including Audi, BMW, Ford, GM, Chrysler, Honda, Iveco, Lotus, Mercedes, Mitsubishi, Porsche, Saturn, Volkswagen and Volvo. For example, the Lotus Eco Elise and the Mercedes C-Class both contain hemp (up to 20 kg in each car in the case of the latter).



Hemp plastic
automobile glove
box



Hemp plastic column, automobile



Hemp composite
sink basin

Paper

History and development

The first identified coarse paper, made from hemp, dates to the early Western Han Dynasty, two hundred years before the nominal invention of papermaking by Cai Lun, who improved and standardized paper production using a range of inexpensive materials, including hemp ends, approximately 2000 years ago. Recycled hemp clothing, rags and fishing nets were used as inputs for paper production.

The Saint Petersburg, Russia paper mill of Goznak opened in 1818. It used hemp as its main input material. Paper from the mill was used in the printing of "bank notes, stamped paper, credit bills, postal stamps, bonds, stocks, and other watermarked paper."^[2]

In 1916, U.S. Department of Agriculture chief scientists Lyster Hoxie Dewey and Jason L. Merrill created paper made from hemp pulp and concluded that paper from hemp hurds was "favorable in comparison with those used with pulp wood."^[3] Modern research has not confirmed the positive finding about hemp hurds. They are only 32% and 38% cellulose. On the other hand, hemp contains only 4-10% lignin against the 18-30% found in wood. This lignin must be removed chemically and wood requires more use of chemicals in the process. The actual production of hemp fiber in the U.S continued to decline until 1933 to around 500 tons/year. Between 1934-35, the cultivation of hemp began to increase but still at a very low level and with no significant increase of paper from hemp.



Wrapping paper with hemp fiber excavated from
the Han Tomb of Wu Di (140-87 BC) at Baqiao,
Xi'an

Contemporary

Hemp has never been used for commercial high-volume paper production due to its relatively high processing cost. Currently there is a small niche market for hemp pulp, for example as cigarette paper. Hemp fiber is mixed with fiber from other sources than hemp. In 1994 there was no significant production of 100% true hemp paper. World hemp pulp production was believed to be around 120,000 tons per year in 1991 which was about 0.05% of the world's annual pulp production volume. The total world production of hemp fiber had in 2003 declined to about 60,000 from

80,000 tons. This can be compared to a typical pulp mill for wood fiber, which is never smaller than 250,000 tons per annum. The cost of hemp pulp is approximately six times that of wood pulp, mostly because of the small size and outdated equipment of the few hemp processing plants in the Western world, and because hemp is harvested once a year (during August)Wikipedia:Citation needed and needs to be stored to feed the mill the whole year through. This storage requires a lot of (mostly manual) handling of the bulky stalk bundles. Another issue is that the entire hemp plant cannot be economically prepared for paper production. While the wood products industry uses nearly 100% of the fiber from harvested trees, only about 25% of the dried hemp stem — the bark, called bast — contains the long, strong fibers desirable for paper production. All this accounts for a high raw material cost. Hemp pulp is bleached with hydrogen peroxide, a process today also commonly used for wood pulp.

Market share

Around the year 2000, the production quantity of flax and hemp pulp total 25000-30000 tons per year, having been produced from approximately 37000-45000 tonnes fibers. Up to 80% of the produced pulp is used for specialty papers (including 95% of cigarette paper). Only about 20% hemp fiber input goes into the standard pulp area and are here mostly in lower quality (untreated oakum high shive content added) wood pulps. With hemp pulp alone, the proportion of specialty papers probably at about 99%. The market is considered saturated with little or no growth in this area.^{[4][5]}

Jewelry

Main article: Hemp jewelry

Hemp jewelry is the product of knotting hemp twine through the practice of macramé. Hemp jewelry includes bracelets, necklaces, anklets, rings, watches and other adornments. Some jewelry features beads made from glass, stone, wood and bones. The hemp twine varies in thickness and comes in a variety of colors. There are many different stitches used to create hemp jewelry, however, the half knot and full knot stitches are most common.



Hemp and bead Jewelry

Cordage



Hemp rope

Hemp rope was used in the age of sailing ships, though the rope had to be protected by tarring, since hemp rope has a propensity for breaking from rot, as the capillary effect of the rope-woven fibers tended to hold liquid at the interior, while seeming dry from the outside. Tarring was a labor-intensive process, and earned sailors the nickname "Jack Tar". Hemp rope was phased out when Manila, which does not require tarring, became widely available. Manila is sometimes referred to as Manila hemp, but is not related to hemp; it is abacá, a species of banana.

Animal bedding

Hemp shives are the core of the stem, hemp hurds are broken parts of the core. In the EU, they are used for animal bedding (horses, for instance), or for horticultural mulch.^[6] Industrial hemp is much more profitable if both fibers and shives (or even seeds) can be used.



Hemp straw animal bedding

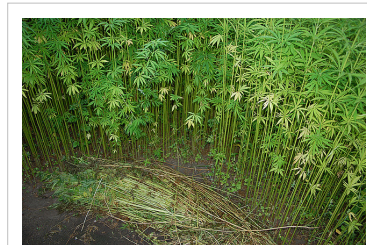
Water and soil purification

Hemp can be used as a "mop crop" to clear impurities out of wastewater, such as sewage effluent, excessive phosphorus from chicken litter, or other unwanted substances or chemicals. Eco-technologist Dr. Keith Bolton from Southern Cross University in Lismore, New South Wales, Australia, is a leading researcher in this area. Hemp is being used to clean contaminants at the Chernobyl nuclear disaster site. This is known as phytoremediation - the process of clearing radioisotopes as well as a variety of other toxins from the soil, water, and air.

Weed control

Main article: Weed control § Organic methods

Hemp, because of its height, dense foliage and its high planting density as a crop, is a very effective and long used method of killing tough weeds in farming by minimizing the pool of weed seeds of the soil. Using hemp this way can help farmers avoid the use of herbicides, to help gain organic certification and to gain the benefits of crop rotation *per se*. Due to its rapid, dense growth characteristics, in some jurisdictions hemp is considered a prohibited noxious weed, much like Scotch Broom. It has been used extensively to kill weeds in agriculture.



The dense growth of hemp helps kill weeds, even thistle.

Fuel



Biodiesel sample

Biofuels, such as biodiesel and alcohol fuel, can be made from the oils in hemp seeds and stalks, and the fermentation of the plant as a whole, respectively. Biodiesel produced from hemp is sometimes known as "hempoline".

Filtered hemp oil can be used directly to only power diesel engines. In 1892, Rudolf Diesel invented the diesel engine, which he intended to fuel "by a variety of fuels, especially vegetable and seed oils, which earlier were used for oil lamps, i.e. the Argand lamp."

Production of vehicle fuel from hemp is very small. Commercial biodiesel and biogas is typically produced from cereals, coconuts, palmseeds and cheaper raw materials like garbage, wastewater, dead plant and animal material, animal feces and kitchen waste.^[7]

Cultivation

Hemp is usually planted between March and May in the northern hemisphere, between September and November in the southern hemisphere.^[8] It matures in about three to four months.

Millennia of selective breeding have resulted in varieties that look quite different. Also, breeding since circa 1930 has focused quite specifically on producing strains which would perform very poorly as sources of drug material. Hemp grown for fiber is planted closely, resulting in tall, slender plants with long fibers. "Until the early 1900s industrial hemp was a valuable crop used all over the world for its strong fibers and oil seeds. Today, however, the common perception of the industrial hemp plant is generally negative and associated with the drug marijuana. This perception is the legacy of a century of powerful influences constructing hemp as a dangerous drug, even though it is not a drug and it has the potential to be a profitable alternative crop. In the United States, the public's perception of hemp as marijuana has blocked hemp from becoming a useful crop and product,"^[9] in spite of its vital importance prior to World War II. Ideally, according to Britain's Department for Environment, Food and Rural Affairs, the herb should be desiccated and harvested towards the end of flowering. This early cropping reduces the seed yield but improves the fiber yield and quality.^[10] In these strains of industrial hemp the tetrahydrocannabinol (THC) content would have been very low.

The seeds are sown from mid April to mid May with grain drills to 4–6 cm sowing depth. Hemp needs less fertilizer than corn does. A total of 60–150 kg of nitrogen, 40–140 kg phosphorus (P_2O_5) and 75–200 kg of potassium [5] per acre for hemp fiber made before sowing and again later, maybe three to four weeks. When practiced, especially in France double use of fiber and seed fertilization with nitrogen doses up to 100 kg / ha rather low. Organic fertilizers such as manure can utilize industrial hemp well. Neither weeds nor crop protection measures are necessary.

Cultivars

A total of 46 varieties of hemp with low levels of tetrahydrocannabinol (THC) are certified by the European Union (EU). They have, unlike other types, a very high fiber content of 30-40%. In contrast to cannabis for medical use, varieties grown for fiber and seed have less than 0.2% THC and they are unsuitable for producing hashish and marijuana. The most important cannabinoid in industrial hemp is cannabidiol (CBD) with a proportion of 1 to 5%.



Hemp being harvested

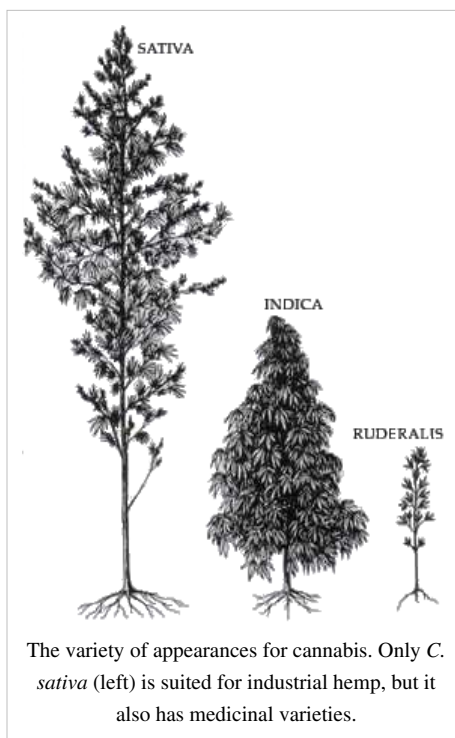


Cannabis sativa stem



Hemp strains USO-xx and Zolotoniski-xx

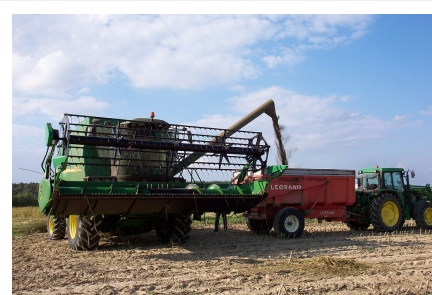
Cannabis sativa L. subsp. *sativa* var. *sativa* is the variety grown for industrial use, while *C. sativa* subsp. *indica* generally has poor fiber quality and is primarily used for recreational and medicinal purposes. The major difference between the two types of plants is the appearance and the amount of Δ^9 -tetrahydrocannabinol (THC) secreted in a resinous mixture by epidermal hairs called glandular trichomes, although they can also be distinguished genetically.^[11] Oilseed and fiber varieties of *Cannabis* approved for industrial hemp production produce only minute amounts of this psychoactive drug, not enough for any physical or psychological effects. Typically, hemp contains below 0.3% THC, while cultivars of *Cannabis* grown for recreational use can contain anywhere from 2% to over 20%.^[12]



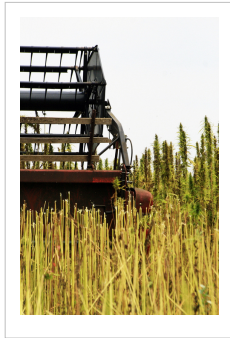
Harvesting

Smallholder plots are usually harvested by hand. The plants are cut at 2 to 3 cm above the soil and left on the ground to dry. Mechanical harvesting is now common, using specially adapted cutter-binders or simpler cutters.

The cut hemp is laid in swathes to dry for up to four days. This was traditionally followed by *retting*, either water retting (the bundled hemp floats in water) or dew retting (the hemp remains on the ground and is affected by the moisture in dew, and by molds and bacterial action). Modern processes use steam and machinery to separate the fiber, a process known as thermomechanical pulping.



Industrial hempseed harvesting machine in France.



Location and crop rotation

For profitable hemp farming, particularly deep, humus-rich, nutrient-rich soil with controlled water flow is preferable. Water logged acidic, compressed or extremely light (sandy) soils primarily affect the early development of plants. Steep slopes and high altitudes of more than 400 m above sea level are best avoided. Hemp is relatively insensitive to cold temperatures and can withstand frost down to -5 degrees C. Seeds can germinate down to 1-3 degrees. Hemp needs a lot of heat, so earlier varieties come to maturation. The water requirement is 300-500 l / kg dry matter. Up to 3 feet growing roots into the soil can also use water supplies from deeper soil layers. Worth noting is that the water requirement of hemp is at least 14 times lower than that of cotton which takes between 7 000-29 000 l/kg, according to WWF.



Hemp maze in France

Hemp benefits crops grown after it. For this reason it is generally grown before winter cereals. Advantageous changes are high weed suppression, soil loosening by the large hemp root system and the positive effect on soil tilth. Since hemp is very self-compatible, it can also be grown several years in a row in the same fields (monoculture).

Diseases

Main article: List of hemp diseases

Hemp plants can be vulnerable to various pathogens, including bacteria, fungi, nematodes, viruses and other miscellaneous pathogens. Such diseases often lead to reduced fiber quality, stunted growth, and death of the plant. These diseases rarely affect the yield of a hemp field, so hemp production is not traditionally dependent on the use of pesticides.

Environmental impact

Hemp is considered by a 1998 study in *Environmental Economics* to be environmentally friendly due to a decrease of land use and other environmental impacts, indicating a possible decrease of ecological footprint in a US context compared to typical benchmarks. A 2010 study, however, that compared the production of paper specifically from hemp and eucalyptus concluded that "industrial hemp presents higher environmental impacts than eucalyptus paper"; however, the article also highlights that "there is scope for improving industrial hemp paper production". Hemp is also claimed to require few pesticides and no herbicides, and it has been called a carbon negative raw material. Results indicate that high yield of hemp may require high total nutrient levels (field plus fertilizer nutrients) similar to a high yielding wheat crop.

Producers

The world-leading producer of hemp is China, with smaller production in Europe, Chile and North Korea. Over thirty countries produce industrial hemp, including Australia, Austria, Canada, Chile, China, Denmark, Egypt, Finland, France, Germany, Great Britain, Hungary, India, Italy, Japan, Korea, Netherlands, New Zealand, Poland, Portugal, Romania, Russia, Slovenia, Spain, Sweden, Switzerland, Thailand, Turkey and Ukraine.

The United Kingdom, and Germany resumed commercial production in the 1990s. British production is mostly used as bedding for horses; other uses are under development. Companies in Canada, the UK, the United States and Germany, among many others, process hemp seed into a growing range of food products and cosmetics; many traditional growing countries still continue to produce textile-grade fibre.

Air dry stem yields in Ontario have from 1998 and onward ranged from 2.6-14.0 tonnes of dry, retted stalks per hectare (1-5.5 t/ac) at 12% moisture. Yields in Kent County, have averaged 8.75 t/ha (3.5 t/ac). Northern Ontario crops averaged 6.1 t/ha (2.5 t/ac) in 1998. Statistic for the European Union for 2008 to 2010 say that the average yield of hemp straw has varied between 6.3 and 7.3 ton per ha. Only a part of that is bast fiber. Approximately one tonne of bast fiber and 2-3 tonnes of core material can be decorticated from 3-4 tonnes of good quality, dry retted straw. For an annual yield of this level is it in Ontario recommended to add nitrogen (N):70–110 kg/ha, phosphate (P₂O₅): up to 80 kg/ha and potash (K₂O): 40–90 kg/ha. The average yield of dry hemp stalks in Europe was 6 ton/ha (2.4 ton/ac) in 2001 and 2002.

FAO argue that an optimum yield of hemp fiber is more than 2 tonnes per ha, while average yields are around 650 kg/ha.



Dried hemp stalks displayed at the International Hemp Fair in Vienna

Australia

In the Australian states of Tasmania, Victoria, Queensland and, most recently, New South Wales, the state governments have issued licences to grow hemp for industrial use. The state of Tasmania pioneered the licensing of hemp in 1990. Wikipedia:Citation needed The state of Victoria was an early adopter in 1998, and has reissued the regulation in 2008.

Hemp production in tonnes 2003–2004				
FAOSTAT (FAO)				
 China	23000	79 %	24000	79 %
 France	4300	15 %	4300	14 %
 Chile	1250	4 %	1250	4 %
 Russia	200	1 %	300	1 %
 Turkey	150	1 %	150	< 1%
 Ukraine	150	1 %	150	< 1%
 Romania	100	< 1 %	100	< 1%
 Hungary	40	< 1 %	40	< 1%
 Poland	15	< 1 %	15	< 1%
 Spain	8	< 1 %	8	< 1%
 Serbia	2	< 1 %	2	< 1%
Total	29215	100 %	30315	100 %

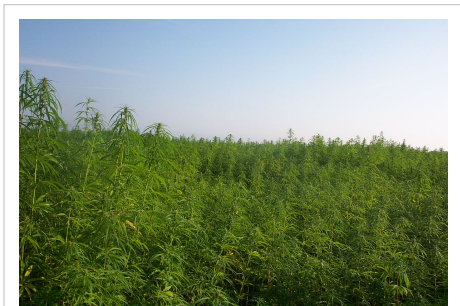
Queensland has allowed industrial production under licence since 2002, where the issuance is controlled under the Drugs Misuse Act 1986. Most recently, New South Wales now issues licences under a law, the Hemp Industry Regulations Act 2008 (No 58), that came into effect as of 6 November 2008.

Canada

Commercial production (including cultivation) of industrial hemp has been permitted in Canada since 1998 under licenses and authorization issued by Health Canada (9,725 ha in 2004, 5450 ha in 2009). It is expected that hemp will contribute \$100 million to Canada's economy.

France

France is Europe's biggest producer with 8,000 hectares cultivated. 70-80% of the hemp fibre produced in Europe in 2003 was used for specialty pulp for cigarette papers and technical applications. About 15% is used in the automotive sector and 5-6% were used for insulation mats. Approximately 95% of hurds were used as animal bedding, while almost 5% were used in the building sector. In 2010/2011, a total of 11 000 ha was cultivated with hemp in the EU, a decline compared with previous year.^[13]

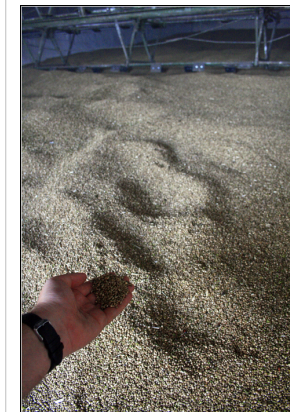


Industrial hemp production in France

Russia



Russian hemp



Hemp seed warehouse (Russia)

Some Russian speaking people have created a web site on topics related to growing cannabis.

United Kingdom

In the United Kingdom, cultivation licences are issued by the Home Office under the Misuse of Drugs Act 1971. When grown for non-drug purposes, hemp is referred to as **industrial hemp**, and a common product is fibre for use in a wide variety of products, as well as the seed for nutritional aspects and for the oil. **Feral hemp** or **ditch weed** is usually a naturalized fibre or oilseed strain of *Cannabis* that has escaped from cultivation and is self-seeding.



A hemp crop in Peasenhall Road, Walpole, Suffolk, UK

United States

Hemp is not legal to grow in the U.S. under Federal law because of its relation to marijuana, and any imported hemp products must meet a zero tolerance level. It is considered a controlled substance under the Controlled Substances Act (P.L. 91-513; 21 U.S.C. 801 et seq.). Some states have made the cultivation of industrial hemp legal, but these states — North Dakota, Hawaii, Kentucky, Maine, Maryland, Oregon, California, Montana, West Virginia and Vermont — have not yet begun to grow it because of resistance from the federal Drug Enforcement Administration. In 2013, after the legalization of marijuana in the state, several farmers in Colorado planted and harvested several acres of hemp, bringing in the first hemp crop in the United States in over half a century. Colorado,^[14] Vermont, California, and North Dakota have passed laws enabling hemp licensure. All four states are waiting for permission to grow hemp from the DEA. Currently, Wikipedia:Manual of Style/Dates and numbers#Chronological items North Dakota representatives are pursuing legal measures to force DEA approval. Oregon has licensed industrial hemp as of August 2009[15]. In February 2014, Congress passed an agriculture bill that eased restrictions on cultivation in 10 states.



A display about the uses of Hemp in the Chicago Field Museum

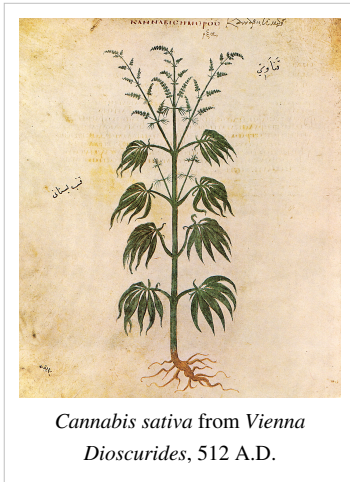
History



Yangshao culture (ca. 4800 BCE) amphora with impressed hemp cord design

麻

Radical 200 (麻 or *má*), the Chinese character for hemp, depicts two plants under a shelter. The use of hemp in Taiwan dates back at least 10,000 years.



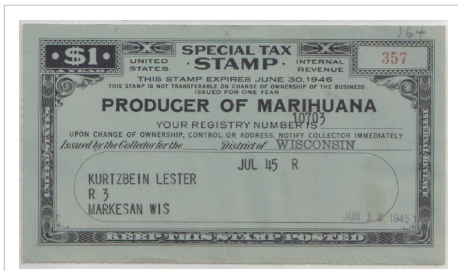
Hemp is one of the earliest domesticated plants known.^[16] It has been cultivated by many civilizations for over 12,000 years. Hemp use archaeologically dates back to the Neolithic Age in China, with hemp fiber imprints found on Yangshao culture pottery dating from the 5th millennium BC.^[17] The Chinese later used hemp to make clothes, shoes, ropes, and an early form of paper. The classical Greek historian Herodotus (ca. 480 BC) reported that the inhabitants of Scythia would often inhale the vapors of hemp-seed smoke, both as ritual and for their own pleasurable recreation.

Textile expert Elizabeth Wayland Barber summarizes the historical evidence that *Cannabis sativa*, "grew and was known in the Neolithic period all across the northern latitudes, from Europe (Germany, Switzerland, Austria, Romania, Ukraine) to East Asia (Tibet and China)," but, "textile use of *Cannabis sativa* does not surface for certain in the West until relatively late, namely the Iron

Age."^[18] "I strongly suspect, however, that what catapulted hemp to sudden fame and fortune as a cultigen and caused it to spread rapidly westwards in the first millennium B.C. was the spread of the habit of pot-smoking from somewhere in south-central Asia, where the drug-bearing variety of the plant originally occurred. The linguistic evidence strongly supports this theory, both as to time and direction of spread and as to cause."^[19]

Jews living in Palestine in the 2nd century were familiar with the cultivation of hemp, as witnessed by a reference to it in the Mishna (*Kil'ayim* 2:5) as a variety of plant, along with Arum, that sometimes takes as many as three years to grow from a seedling. In late medieval Germany and Italy, hemp was employed in cooked dishes, as filling in pies and tortes, or boiled in a soup.^[20] Hemp in later Europe was mainly cultivated for its fibers, and was used for ropes on many ships, including those of Christopher Columbus. The use of hemp as a cloth was centered largely in the countryside, with higher quality textiles being available in the towns.

The Spaniards brought hemp to the Western Hemisphere and cultivated it in Chile starting about 1545. However, in May 1607, "hempe" was among the crops Gabriel Archer observed being cultivated by the natives at the main Powhatan village, where Richmond, Virginia is now situated;^[21] and in 1613, Samuell Argall reported wild hemp "better than that in England" growing along the shores of the upper Potomac. As early as 1619, the first Virginia House of Burgesses passed an Act requiring all planters in Virginia to sow "both English and Indian" hemp on their plantations.^[22] The Puritans are first known to have cultivated hemp in New England in 1645.



United States "Marihuana" production permit. In the United States, hemp cultivation is legally prohibited, but during World War II farmers were encouraged to grow hemp for cordage, to replace Manila hemp previously obtained from Japanese-controlled areas. The U.S. government produced a film explaining the uses of hemp, called *Hemp for Victory*.

George Washington pushed for the growth of Hemp and even grew hemp himself. In May 1765 he noted in his diary about the sowing of seeds each day until mid-April. Then he recounts the harvest in October which he grew 27 bushels that year. He and Thomas Jefferson (also a hemp farmer who developed a better way to break the stalk by modifying a thresher) would also share the flowers of the plant for smoking. They both preferred this to drinking alcohol or using tobacco, which they both saw as health concerns for the new land.

George Washington also imported the medicinal Indian Hemp plant from Asia, basically Marijuana, which was used for fiber and intoxicating resin production. In a letter to William Pearce who managed the plants for him Washington says, "What was done with the Indian Hemp plant from last summer? It ought, all of it, to be sown again; that not only a stock of seed sufficient for my own purposes

might have been raised, but to have disseminated seed to others; as it is more valuable than common Hemp." He anxiously sent more letters to Pearce, to get the most out of the seeds.

Other presidents known to have used cannabis include James Madison (claimed it inspired him to found a nation on democratic principals), James Monroe (used until he was 73 years old), Andrew Jackson, Zachary Taylor, and Franklin Pierce.^[23]

Historically, hemp production had made up a significant portion of antebellum Kentucky's economy. Before the American Civil War, many slaves worked on plantations producing hemp.^[24]

In 1937, the Marihuana Tax Act of 1937 was passed in the United States. It levied a tax on anyone who dealt commercially in cannabis, hemp, or marijuana. The reasons that hemp was also included in this law are disputed—several scholars have claimed that the Act was passed in order to destroy the US hemp industry,^{[25][26]} with the primary involvement of businessmen Andrew Mellon, Randolph Hearst, and the Du Pont family.

One claim is that Hearst believed that his extensive timber holdings were threatened by the invention of the decorticator, which he feared would allow hemp to become a very cheap substitute for the paper pulp that was used in the newspaper industry. Modern science suggests that this fear would have been unfounded. Improvements of the decorticators in the 1930s, machines that separate the fibers from the hemp stem, could not make hemp fiber a very cheap substitute for fibers from other sources due to the fact that the long strong fibers are only found in the bast, the outer part of the stem. Only about 1/3 of the stem are long and strong fibers.^[27]

Another claim is that Mellon, Secretary of the Treasury and the wealthiest man in America at that time, had invested heavily in DuPont's new synthetic fiber, nylon, and believed that the replacement of the traditional resource, hemp, was integral to the new product's success.

The Marihuana Tax Act of 1937 was ruled unconstitutional by the Supreme Court in a unanimous verdict decided in *Leary v. United States*, and ultimately superseded by the Controlled Substances Act of 1970.

Hemp was used extensively by the United States during World War II. Uniforms, canvas, and rope were among the main textiles created from the hemp plant at this time. Much of the hemp used was cultivated in Kentucky and the Midwest. During World War II, the U.S. produced a short 1942 film, *Hemp for Victory*, promoting hemp as a necessary crop to win the war.

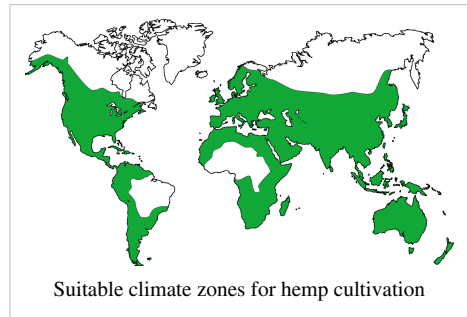
Historical cultivation

Hemp has been grown for millennia in Asia and the Middle East for its fibre. Commercial production of hemp in the West took off in the eighteenth century, but was grown in the sixteenth century in eastern England.^[28] Because of colonial and naval expansion of the era, economies needed large quantities of hemp for rope and oakum. Other important producing countries were China, North Korea, Hungary, the former Yugoslavia, Romania, Poland, France and Italy.

In Western Europe, the cultivation of hemp was not legally banned by the 1930s, but the commercial cultivation stopped by then, due to decreased demand compared to increasingly popular artificial fibres. Theories about the potential for commercial cultivation of hemp in very large quantities have been strongly criticized by European experts on Hemp such as Dr. Hayo M.G. van der Werf and Dr. Ivan Búcsa. From their perspective hemp was, outside the U.S, simply out-competed by other fibers in most applications.^[1]

Soviet Union

From the 1950s to the 1980s, the Soviet Union was the world's largest producer (3,000 km² in 1970). The main production areas were in Ukraine, the Kursk and Orel regions of Russia, and near the Polish border. Since its inception in 1931, the Hemp Breeding Department at the Institute of Bast Crops in Hlukhiv (Glukhov), Ukraine, has been one of the world's largest centers for developing new hemp varieties, focusing on improving fiber quality, per-hectare yields, and low THC content.^{[29][30]}



Harvesting hemp in the USSR, 1956

Japan

In Japan, hemp was historically used as paper and a fiber crop. There is archaeological evidence cannabis was used for clothing and the seeds were eaten in Japan back to the Jōmon period (10,000 to 300 BCE). Many Kimono designs portray hemp, or *asa* (Japanese: 麻), as a beautiful plant. In 1948, marijuana was restricted as a narcotic drug. The ban on marijuana imposed by the United States authorities was alien to Japanese culture, as the drug had never been widely used in Japan before. Though these laws against marijuana are some of the world's strictest, allowing five years imprisonment for possession of



Japanese Shinto shrine with rope made of hemp

the drug, they exempt hemp growers, whose crop is used to make robes for Buddhist monks and loincloths for Sumo wrestlers. Because marijuana use in Japan has doubled in the past decade, these exemptions have recently been called into question.

Portugal

The cultivation of hemp in Portuguese lands began around the fourteenth century onwards, it was raw material for the preparation of rope and plugs for the Portuguese ships. Colonies for factories for the production of flax hemp, such as the Royal Flax Hemp Factory in Brazil.

After the Restoration of Independence in 1640, in order to recover the ailing Portuguese naval fleet, were encouraged its cultivation as the Royal Decree of D. John IV in 1656. At that time its cultivation was carried out in Trás-os-Montes, Zone Tower Moncorvo, more precisely in Vilarica Valley, fertile land for any crop irrigation, and a very large area, flat and very fertile culture still wide until the last century grew up tobacco, a plant that needs a large space to expand and grow, the area lies in the valley of Serra de Bornes.


As of 1971, this cultivar is considered illegal because of marijuana, a decision subsequently revoked by the European Union. Wikipedia:Citation needed Wikipedia:Please clarify

References

- [1] NNFCC. "NNFCC Project Factsheet: Guide to Building with Hemp-Lime Composites, NNFCC 07-001" (<http://www.nnfcc.co.uk/publications/nnfcc-project-factsheet-guide-to-building-with-hemp-lime-composites-nnfcc-07-001>), "National Non-Food Crops Centre", Retrieved on 16 Feb 2011
- [2] A brief history of the St. Petersburg Paper Mill of Goznak (www.goznak.spb.ru) (<http://www.goznak.spb.ru/eng/about/history/>)
- [3] Dewey and Merrill, U.S.D.A. Bulletin No. 404, Hemp Hurds as Paper-Making Material, Washington, D.C., October 14, 1916. Page 25
- [4] Ivan Bócsa, Michael Karus, Daik Lohmeyer: The cultivation of hemp. Botany, varieties, cultivation and harvesting, markets and product lines. 2 support, agricultural Verlag GmbH, Münster 2000th
- [5] Michael Carus et al.. Study of market and competition for natural fibers and natural fiber materials (Germany and EU) trade talks Gülzower 26, ed. of the Agency of Renewable Resources, Gülzow 2008 Download nova-Institut (ed.): The small hemp-Lexikon Verlag The Workshop, Göttingen, 2. Edition, 2003, page 79 ISBN 3-89533-271-2
- [6] NNFCC. In the US, pet manufacturers use hemp in dog and cat bedding. "Crop Factsheet: Hemp" (http://www.nnfcc.co.uk/metadot/index.pl?id=7199;isa=DBRow;op=show;dbview_id=2457), *National Non-Food Crops Centre*, 2008-06-09. Retrieved on 2009-05-06
- [7] Increased biogas production at the Henriksdals Waste Water plant, Cajsja Hellstedt et. all, June 2010 (http://biogasmax.co.uk/media/d2_15_biogasmax_svab_v2_20100518final__078478600_0944_26012011.pdf)
- [8] Hemp Cultivation (www.green.net.au) (http://www.green.net.au/gf/hemp_cultivation.htm)
- [9] This paper begins with a history of hemp use and then describes how hemp was constructed as a dangerous crop in the U.S. The paper then discusses the potential of hemp as an alternative crop.
- [10] <http://archive.defra.gov.uk/foodfarm/growing/crops/industrial/pdf/flaxhemp-report.pdf>
- [11] Datwyler SL, Weiblen GD. Genetic Variation in Hemp and marijuana (*Cannabis sativa L.*) *sativa* plants are taller and less dense. *Indica* plants are shorter but a lot more dense than *sativas*. According to Amplified Fragment Length Polymorphisms. *Journal of Forensic Sciences*. 2006; 51(2):371-375.
- [12] Hemp and Marijuana: Myths & Realities (http://www.naihc.org/hemp_information/content/hemp.mj.html) written by David P. West, Ph.D. for the North American Industrial Hemp Council
- [13] Jordbruksverket: 2.1–2.3, 2.5 Marknadssituationen för spannmål, oljeväxter, proteingrödor, ris, 2011-03-10, (Swedish Board of Agriculture, Report from an expert group in the European Union about the market situation for a number of agricultural products. Published only in Swedish) (<http://www.sjv.se/amnesomraden/handel/politikochframtid/eusjordbrukspolitik/spannmal/nyhetsbrevomeukommittemotenspannmalm/2011protokoll/20110310.5.4bdd0ace12e454f491d80002616.html>)
- [14] Colorado Amendment 64
- [15] <http://en.wikipedia.org/w/index.php?title=Hemp&action=edit>
- [16] :)
- [17] Barber, E. J. W. (1992). *Prehistoric Textiles: The Development of Cloth in the Neolithic and Bronze Ages with Special Reference to the Aegean*. Princeton University Press. p. 17.
- [18] Barber, E. J. W. (1992). *Prehistoric Textiles: The Development of Cloth in the Neolithic and Bronze Ages with Special Reference to the Aegean*. Princeton University Press. p. 18.
- [19] Barber (1992). p. 19.
- [20] *Regional Cuisines of Medieval Europe: A Book of Essays* (2002), edited by Melitta Weiss Adamson ISBN 0-415-92994-6 pg. 98, 166

- [21] Gabriel Archer, *A Relatyon of the Discoverie of Our River...*, printed in *Archaeologia Americana* 1860, p. 44. William Strachey (1612) records a native (Powhatan) name for hemp (*weihkippeis*).
- [22] Proceedings of the Virginia Assembly, 1619 (<http://etext.lib.virginia.edu/etcbin/jamestown-browse?id=J1036>), cf. the 1633 Act: *Hening's Statutes at Large*, p. 218 (<http://vagenweb.org/hening/vol01-09.htm>)
- [23] Robinson, Rowan. *The Great Book of Hemp: The Complete Guide to the Environmental, Commercial, and Medicinal Uses of the World's Most Extraordinary Plant*. Rochester, VT. Park Street Press, 2010. Chapter 5:129-135. Print
- [24] James F. Hopkins, "Slavery in the Hemp Industry" (<http://www.druglibrary.org/schaffer/hemp/history/slavery.htm>), Drug Library
- [25] Earlywine, 2005: p. 24 (<http://books.google.com/books?id=r9wPbxMAG8cC&pg=PA24>)
- [26] Peet, 2004: p. 55 (http://books.google.com/?id=uC0_YznYjScC&pg=PA55)
- [27] Dr. Ivan BÚcsa, GATE Agricultural Research Institute, Kompolt – Hungary, Book Review Re-discovery of the Crop Plant Cannabis Marihuana Hemp (Die Wiederentdeckung der Nutzpflanze Cannabis Marihuana Hanf) (<http://www.hempfood.com/iha/iha01214.html>)
- [28] New Fossil Evidence for the Past Cultivation and Processing of Hemp (*Cannabis sativa* L.) in Eastern England Author(s): R. H. W. Bradshaw, P. Coxon, J. R. A. Greig, A. R. Hall Source: *New Phytologist*, Vol. 89, No. 3 (Nov., 1981), pp. 503-510 (<http://www.jstor.org/stable/2434380>) Published by: Blackwell Publishing on behalf of the New Phytologist Trust Accessed: 06/07/2009
- [29] Hemp will help Ukraine to grow wealthy (<http://news2000.org.ua/print?a=/paper/5463>)
- [30] Interview with Dr. V. G. Virovets, the head of the Hemp Breeding Department at the Institute of Bast Crops (<http://mojo.calyx.net/~olsen/HEMP/IHA/jiha5111.html>) (1998)

External links

- Hemp as an Agricultural Commodity (<http://www.fas.org/sgp/crs/misc/RL32725.pdf>) Congressional Research Service
- Industrial Hemp in the United States: Status and Market Potential (www.ers.usda.gov/publications/ages001e/) (<http://www.ers.usda.gov/publications/ages001e/>)
-  "Hemp". *New International Encyclopedia*. 1905.

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