

Industrial Hemp Production & Regulation



Executive Summary

Hemp and marijuana products both are species of the cannabis plant, but hemp is typically distinguished by its lower concentration of THC (delta-9-tetrahydrocannabinol). In the United States, production of industrial hemp is allowed, but it is controlled under drug enforcement laws and requires a permit from the Drug Enforcement Agency because of the THC content levels, which are the main psychoactive, or mood altering, ingredient of the plant. Currently, the [Missouri Department of Agriculture](#) may ask a Missouri farmer to destroy their crop if their industrial hemp crop contains an average THC concentration by weight that exceeds 0.3%. In the 2022 Missouri General Assembly, [SB 1235](#) was introduced to raise the allowable THC concentration to 1%.

Highlights

- The [2018 Farm Bill](#) legalized the production of hemp as an agricultural commodity while removing it from the list of controlled substances.
- Classification of cannabis as either marijuana or industrial hemp is based on a threshold concentration of THC.
 - Current federal law in the U.S. uses 0.3% THC as the threshold to distinguish strains of hemp from marijuana and cultivars of hemp must have less than the threshold THC concentration to be grown under license in the states that permit hemp cultivation.
- Although the federal law allows hemp production and is legal in 46 states, Idaho, Mississippi, New Hampshire and South Dakota continue to ban production of the crop within their borders.

Limitations

- There is a potential of a hemp crop coming in at a THC concentration above the 0.3% threshold, even if it was grown to be below the legal threshold. That is because crops may increase in their THC content post-harvest.
 - The differences in THC content post-harvest may originate from the timing of farming/processing, genetic make-up of plants, location, and more.

Research Background

Industrial Hemp

Industrial hemp is an agricultural commodity that includes all varieties of cannabis cultivated for commercial use. Cannabis is a tall, leafy plant with a strong, fibrous stem. Although hemp is

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the same plant species as marijuana, it is genetically different and is distinguished by its use and chemical makeup.¹ Hemp has long been cultivated for non-drug use in the production of industrial and other goods. The global market for hemp consists of more than 25,000 products, including foods and beverages, cosmetics and personal care products, nutritional supplements, fabrics and textiles, yarns and spun fibers, paper, construction and insulation materials, and other manufactured goods.¹

Most of the parts of a hemp plant can be used in different capacities and it can be grown as a fiber, seed, or other purpose crop (Figure 1).¹ For example, while the hemp stalk can be used for textiles, paper, and building materials, its stalk hurds (coarse parts of hemp) and leaves can be used in various other applications such as animal bedding, raw material inputs, low-quality papers, and composites.¹

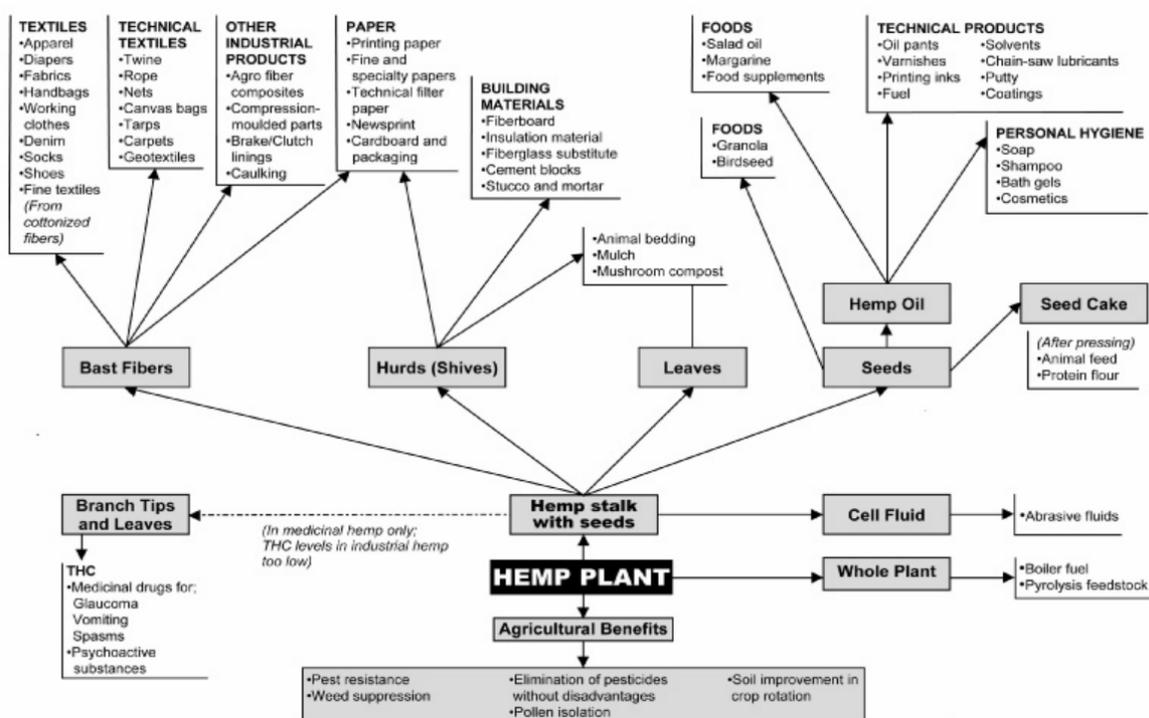


Figure 1. Modern Uses for Industrial Hemp.¹

Regulations for Hemp Production

Industrial hemp was grown commercially in the United States and the industry thrived in Kentucky, Missouri, and Illinois from the 1850s through the World War II era, but its cultivation was prohibited in the 1950s and 1960s.² During WWII, the U.S. government encouraged farmers to grow hemp for ropes for the U.S. Navy. [The 2018 Farm Bill](#) reclassified hemp production as an agricultural commodity and removed it from the list of controlled substances, as long as the levels of THC are at or below the threshold of 0.3%.³ Although the federal law allows hemp production, Idaho, Mississippi, New Hampshire, and South Dakota continue to ban production of the crop within their borders.

Hemp Production

Production refers to the cultivation, propagation, harvesting, and/or manufacturing of industrial hemp. Cultivated industrial hemp plants usually consist of a spindly main stalk covered with leaves. Considered a low-maintenance crop, hemp plants typically reach between 6–15 feet in height. Depending on the purpose, variety, and climate, the period between planting and harvesting ranges from 70 to 140 days.⁴

One acre of hemp can yield an average of 700 pounds of *grain*, which in turn can be pressed into about 22 gallons of oil and 530 pounds of meal. The same acre will also produce an average of 5,300 pounds of *straw*, which can be transformed into approximately 1,300 pounds of *fiber*.¹ Industrial hemp may be an excellent rotation crop for traditional crops because it suppresses weeds and decreases outbreaks of insect and disease problems. Hemp may also rebuild and condition soils by replacing organic matter and providing aeration through its extensive root system.⁴

Production in Missouri

Because hemp has not been commercially grown in Missouri for decades, there is limited research and field data on hemp production given Missouri's climate and soils. It is also unknown what production system is most desirable/suitable for planting, growing and harvesting in Missouri for each type of industrial hemp and the pressure from insects, weeds, and diseases are unknown for industrial hemp under Missouri's climate. Currently, no chemical solutions (herbicides, insecticides, and fungicides) are labeled for pest management in industrial hemp, so there are limited control methods.⁸ Eligible producers can apply for crop insurance programs, including the [Whole-Farm Revenue Protection and Multi-Peril Crop Insurance coverage](#), under certain restrictions. Eligible hemp producers may also be eligible for [farm loans](#), and [NRCS conservation programs](#), including the [Environmental Quality Incentives Program, Conservation Stewardship Program](#).³

The industrial hemp industry is in its early stages in the U.S., and market pricing will evolve over time. Given the potential profit, most farmers who have adopted industrial hemp early have targeted CBD or Cannabidiol production. Currently, the FDA has approved one plant-based marijuana drug (Epidiolex), which contains purified cannabidiol to help treat seizure disorders.⁹ Available estimates show that the expected gross (not net) return of industrial hemp per acre can range from \$500 to \$36,000, with CBD production seeing the highest return.⁸

Limits & Testing of Producing Industrial Hemp

Although a level of 1% THC is considered a minimum value to elicit an intoxicating effect, current laws in the U.S. use 0.3% THC as the threshold at which cannabinoid content is used to distinguish strains of hemp from marijuana. Cultivars of hemp must have less than the threshold THC concentration to be grown under license in the states that permit hemp cultivation.⁵

However, there is a potential of a hemp crop coming in at a THC concentration above the 0.3% threshold, because seeds grown in different geographical regions can express certain traits differently; the same type of seed grown in two different parts of the country can produce crops with different THC concentrations, inadvertently pushing some growers over the THC threshold.⁵

Additionally, growers who breed low-THC varieties of hemp may see the plants exhibiting higher THC percentages if the plants get hot/dry. Different temperatures, genetics make up, amounts of water, soil makeup, the location it was grown in, are all a possible cause of a hemp plant going hot and being prevented to be sold and must be disposed of.⁶

In 2018 [HB 2034](#) became a law ([RSMo 261.265](#)) and established the industrial hemp agricultural pilot program, in accordance with federal law, to study the growth, cultivation, processing, feeding and marketing and created the Industrial Hemp Fund. Since that law came into effect, Missouri farmers have been allowed to grow hemp as an agricultural commodity, as long as it is under 0.3% in THC content. If a crop of industrial hemp contains an average THC concentration exceeding 0.3%, or the maximum concentration allowed under federal law, the Missouri Department of Agriculture (MDA) may retest the crop. If the second test indicates that a crop contains an average THC concentration exceeding 0.3%, or the maximum concentration allowed under federal law, MDA may order a producer to destroy the crop. In 2022, [SB 1235](#) intends to raise the THC concentration to 1%.

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