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Hemp: Nature's Forgotten Nutraceutical

As Seen in Natural Pharmacy Magazine by Darrell L. Tanelian, M.D., Ph.D.

That the hemp plant (*Cannabis sativa*) is used as food initially surprises and confuses most people. The public information system has largely restricted knowledge of hemp to its use for obtaining marijuana (*Cannabis sativa*), with its leaf content of the psychoactive substance delta-9-tetrahydrocannabinol (THC), rope and cloth from the fiber of the plant, and paper from the plant stalk. Yet both the oldest Chinese agricultural treatise, the Xia Xiao Zheng, written in the 16th century BC, and other Chinese records discuss hemp as one of the major grain crops grown in ancient China. [1](#) [2](#)

Besides its propagation in China, the cultivation and use of hemp has, since the beginnings of recorded history, also been documented by many other great civilizations, including: India, Sumeria, Babylonia, Persia, Egypt, and other nations of the Near East; and the Aztec and Mayan civilizations of South America; as well as by native cultures in North America and Europe. Indeed, it might be said that over these thousands of years, hemp has always followed humankind throughout the world, or vice versa. Nutritionally, the key point about hemp is that its edible portion--the meat of the shelled seed--resembles the seeds of other cultivated grains including wheat and rye, and does not contain THC. Moreover, the strains of hemp plant used for food have been naturally selected so as to produce little THC, generally. These nutritional varieties of hemp plant grow in temperate climates to heights of 14 feet, and as with many agricultural grains, their seeds can be harvested in a conventional manner with a combine. Since the most modern handling and shelling of the seed minimize its contact with leaf resins, the shelled seed itself and the oil, nut butter, and other foods prepared from the seed have been made with THC concentrations as low as 1 ug/g (ppm) to nondetectible. These modern hemp products, when consumed in normally recommended amounts, should all but eliminate positive urine tests for THC. [3](#)

Studies conducted on older versions of hemp seed oil found some to contain THC concentrations that resulted in positive urine tests. [4](#)

Nutrients in Hemp Seed

The most basic hemp seed product is the shelled seed, sometimes referred to as the "hemp seed nut." The other major hemp food products are hemp seed nut butter, which resembles peanut and other nut butters, and cold-pressed hemp seed oil and hemp seed flour. These basic products can be consumed alone or used along with or instead of other grains, seeds, nuts, and oils in any appropriate recipe. In terms of its nutrient content, shelled hemp seed is 34.6% protein, 46.5% fat, and 11.6% carbohydrate.

The most important feature of hemp seed is that it provides both of the essential fatty acids (EFAs) needed in the human diet-- linoleic and alpha-linolenic acid--as well as a complete and balanced complement of all essential amino acids.

Hemp Fats

As compared with most nuts and seeds, the 46.5% fat content of shelled hemp seed is relatively low, and hemp food products have a low cholesterol content and high content of the natural phytosterols that reduce cholesterol levels. Hemp seed oil has on average the highest mono and polyunsaturated fat content of all oils, taken collectively, of 89%

The polyunsaturated linoleic acid, an omega-6 fatty acid, is present in hemp seed oil in a content of 55.6 g/100 g, and alpha-linolenic acid, a polyunsaturated omega-3 fatty acid, is present at 17.2 g/100 g. The ratio of the two EFAs is 3.38, closely approximating the 4.0 average ratio recommended by the World Health Organization (WHO), Sweden and Japan for the human diet. [5](#)

Conveniently, hemp seed oil is also one of the only food oils to contain the direct metabolites of linoleic and alpha-linolenic acid--gamma-linolenic acid (GLA) and stearidonic acid (SDA), respectively. Because of this, it can circumvent the impaired EFA metabolism and physical compromise that can result from genetic factors, intake of other fats, aging, and lifestyle patterns.

By contrast with unsaturated fat, only 6.6% of the total calories in shelled hemp seed come from saturated fat--a percentage that contrasts sharply with the 13 to 14% of saturated fat calories in the modern American diet. [6](#)

This gives hemp seed oil a polyunsaturated-to-saturated fat ratio of 9.7, in comparison to the current ratio of 0.44 in the American diet, [6](#) and indicates that consuming even a small portion of hemp seed oil daily can contribute strongly to bringing this dietary imbalance back toward the U.S. Senate Select Committee recommended goal of 1.0.

Hemp Protein

Besides providing the human EFAs and having a favorable unsaturated-to-saturated fat ratio, hemp seed is an excellent dietary source of easily digestible, gluten-free protein. Its overall protein content of 34.6 g/100 g is comparable to that of soy beans and better than that found in nuts, other seeds, dairy products, meat, fish, or poultry. Hemp protein provides a well-balanced array of the 10 essential amino acids for humans. An important aspect of hemp seed protein is a high content of arginine (123 mg/g protein) and histidine (27 mg/g protein), both of which are important for growth during childhood, and of the sulfur-containing amino acids methionine (23 mg/g protein) and cysteine (16 mg/g protein), which are needed for proper enzyme formation. Hemp protein also contains relatively high levels of the branched-chain amino acids that are important for the metabolism of exercising muscle.

Other Hemp Nutrients

The carbohydrate content of shelled hemp seed is 11.5% and its sugar content is 2%. Of the shelled hemp seed carbohydrate, 6% is in the form of fiber. The fiber content of hemp seed flour is 40%, which is the highest of all commercial flour grains. In addition to containing the basic human nutrient groups, hemp foods have a high content of antioxidants (92.1 mg/100g) in the form of alpha-, beta-, gamma-, and delta-tocopherol and alpha-tocotrienol. Additionally, hemp seed contains a wide variety of other vitamins and minerals.

Hemp in Health and Disease Prevention

The high content of omega-6 and omega-3 fatty acids, and the relatively high phytosterol content of hemp foods, make them beneficial to cardiovascular health.⁷ Numerous human and animal studies have shown that substitution of polyunsaturated for saturated fats can reduce the risk of sudden cardiac arrest ⁸ and fatal cardiac arrhythmia, ⁹ as well as reducing blood cholesterol levels and decreasing the cellular proliferation associated with atherosclerosis. ¹⁰

A high polyunsaturated-to-saturated fat ratio, especially when it includes linoleic acid, has also been positively associated with reduced arterial thrombosis. ¹¹

Additionally, phytosterols, of which hemp seed contains 438 mg/100g, have been shown to reduce total serum cholesterol by an average of 10% and low-density lipoprotein (LDL) cholesterol by an average of 13%. ¹²

Polyunsaturated fatty acids, and especially GLA, have also been found beneficial in treating various human cancers, ¹³⁻¹⁷ and studies have shown that phytosterols may offer protection against colon, breast, and prostate cancers. ¹⁸

Besides the importance of a proper dietary ratio of linoleic to alpha-linolenic acid in maintaining the polyunsaturated fatty acid composition of neuronal and glial membranes, ¹⁹ membrane loss of polyunsaturated fatty acids has been found in such neurodegenerative disorders as Alzheimer's and Parkinson's diseases, and it has been suggested that a diet with a proper balance of omega-6 to omega-3 fatty acids may help delay or reduce the neurologic effects of these diseases.²⁰ A fatty acid preparation with a ratio of omega-6 to omega-3 fatty acids of 4, which is practically identical to that in hemp oil, has been shown to improve the quality of life of Alzheimer's disease patients. ²¹

Additionally, GLA has been found effective for treating rheumatoid arthritis and active synovitis, ²²⁻²⁴ and the GLA and vitamin D content of hemp foods may make them beneficial in preventing and treating osteoporosis. ²⁵

Moreover, supplementation with products containing EFAs has been found capable of reversing scaly skin disorder, inflammation, excessive epidermal water loss, itch, and poor wound healing caused by EFA deficiency, ²⁶ and GLA has been shown to be beneficial for atopic eczema and psoriasis. ²⁷

Hemp in Cosmetics and Processed Food Products

The critical importance of EFAs, and especially GLA, for healthy skin makes hemp seed oil a highly effective skin care and cosmetic product. Its lipid constituents allow it to permeate through intact skin and to thereby nourish skin cells directly while also carrying therapeutic substances with it into the skin. These properties have led to a multitude of soaps, shampoos, skin lotions, lip balms, conditioners, and other skin-care products containing hemp seed oil. Among food products made from hemp seed, oil, and flour are beer, pasta, cheese, cookies, waffles, granola, candy, ice cream, and others, with new products now being regularly developed. In short, hemp can constitute an important element in nutrition, health, and cosmetics, with the prospect of playing a major role in preventing disease and reducing health care expenditures.

References

1. Yu Y. Agricultural history over seven thousand years in China, In: Feeding a Billion: Frontiers of Chinese Agriculture, ed. S Witter, 1987.
2. Li H. "The Origin and Use of Cannabis in Eastern Asia: Their Linguistic Cultural Implications," in Cannabis and Culture, ed. V Rubin, The Hague: Mouton, 1975.
3. Leson G, Pless P, Grotenherman F, Kalant H, ElSohly MA. Food products from hemp seeds: Could their consumption interfere with workplace drug testing J Anal Toxicol, Accepted, 2000
4. Bosy TZ, Cole KA. Consumption and quantitation of D9 tetrahydrocannabinol in commercially available hemp seed oil products. Anal Toxicol, 7:562-6, 2000.
5. Kris-Etherton PM, Taylor DS, Yu-Poth S et. al. Polyunsaturated fatty acids in the food chain in the United States. Am J Clin Nutr, 71:179S-88S 2000.
6. Eaton SB, Eaton III SB, Konner MJ. Paleolithic nutrition revisited: A twelve-year retrospective on its nature and implications. Eur J Clin Nutr 51:207-216, 1997.
7. Brousseau ME, Schaefer EJ. Diet and Coronary Heart Disease: Clinical Trials. Curr Atheroscler Rep 2:487-493, 2000.
8. Siscovic DS, Raghunathan TE, King I et. al. Dietary intake of long-chain n-3 polyunsaturated fatty acids and the risk of primary cardiac arrest. Amer J Clin Nutr, 71:208S-212S, 2000.
9. Kang JX, Leaf A. Prevention of fatal cardiac arrhythmias by polyunsaturated fatty acids. Amer J Clin Nutr, 71:202S-207S, 2000
10. Fan YY, Ramos KS, Chapkin RS. Modulation of atherosclerosis by dietary gamma-linolenic acid. Adv Exp Med Biol 469:485-91, 1999.
11. Hornstra G, Kester AD. Effect of the dietary fat type on arterial thrombosis tendency: systemic studies with a rat model. Atherosclerosis 131:25-33, 1997
12. Moghadasian MH, Frohlich JJ. Effects of dietary phytosterols on cholesterol metabolism and atherosclerosis: Clinical and experimental evidence. Amer J Med 107:588-94, 1999.
13. Vartek S, Robbins ME, Spector AA. Polyunsaturated fatty acids increase the sensitivity of 36B10 rat astrocytoma cells to radiation-induced cell kill. Br J Cancer 77:1612-20, 1998.
14. Kenny FS, Pinder SE, Ellis IO, et. al. Gamma-linolenic acid with tamoxifen as primary therapy in breast cancer. Int J Cancer 85:643-8, 2000
15. Robbins M, Ali K, McCaw R, et. al. Gamma-linolenic acid-mediated cytotoxicity in human prostate cancer cells. Adv Exp Med Biol 469:499-504, 1999.
16. Rizzo MT, Regazzi E, Garau D, et. al. Induction of apoptosis by arachidonic acid in chronic myeloid leukemia cells. Cancer Res 59:5047-53, 1999.

17. Southgate J, Pitt E, Trejdosiewicz LK. The effects of dietary fatty acids on the proliferation of normal human urothelial cells in vitro. *Br J Cancer* 74:728- 34, 1996.
18. Awad AB, Fink CS. Phytosterols as anticancer dietary components: Evidence and mechanism of action. *J Nutr* 130:2127-30, 2000.
19. Fenstrom JD. Effects of dietary polyunsaturated fatty acids on neuronal function. *Lipids* 34:161-9, 1999.
20. Youdim KA, Martin A, Joseph JA. Essential fatty acids and the brain: possible health implications. *Int J Dev Neurosci* 18:383-99, 2000.
21. Yehuda S, Rabinovitz S, Carrasso RL, Mostofsky DI. Essential fatty acids preparation (SR-3) improves Alzheimer's patients quality of life. *Int J Neurosci* 87:141-9, 1996.
22. Leventhal LJ, Boyce EG, Zurier, RB. Treatment of arthritis with gamma-linolenic acid. *Ann Intern Med* 119:876-873, 1993.
23. DeLuca P, Rothman D, Zurier RB. Marine and botanical lipids as immunomodulatory and therapeutic agents in the treatment of rheumatoid arthritis. *Rheum Dis Clin N Am* 21:759-77
24. Zurier RB, Rossetti RG, Jacobson EW, et. al. Gamma- linolenic acid treatment of rheumatoid arthritis. A randomized, placebo-controlled trial. *Arthritis Rheum* 39:1808-17, 1996.
25. Kruger MC, Coetzer H, Winter R, et. al. Calcium, gamma-linolenic acid and eicosapentanoic acid supplementation in senile osteoporosis. *Aging* 10:385-94, 1998.
26. Wright S. Essential fatty acids and the skin. *Br J Derm* 125:503-515, 1991.
27. Horrobin DF. Essential fatty acid metabolism and its modification in atopic eczema. *J Am Clin Nutr* 71:367S-72S, 2000.