Hemp: Nature's Forgotten Nutraceutical

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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 ucg/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 (Table I). 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% (Table 2). 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.

Table I

General Hemp Nutritional Analysis by Weight				
		Shelled Hemp Seed or Nut Butter	Oil	Flour
Calories	(kcal/100g)	603	850	400
Protein	(g/100g)	34.6	0	33.3
Fat	(g/100)	45.6	96.2	13.3
Carbohydrate	(g/100g)	11.6	0	46.7
Sugar	(g/100g)	2	0	
Fiber	(g/100)	6	0	40
Cholesterol	(mg/100g)	0	0	0

Courtesy: Manitoba Harvest Hemp Foods & Oils, Winnipeg, Manitoba, CANADA

Table II

Hemp Oil Fatty Acids (%, n = 36 strains)		
	Mean (%)	Range
Saturated	10.3	(9.6 – 11.1)
Monounsaturated	13.6	(11 – 16.9)
Polyunsaturated	75.4	(71.1 – 77.6)
Omega 6	58.2	
linoleic acid	55.6	(54 – 57)
gamma-linolenic acid	2.6	(1.2 – 3.8)
Omega 3	17.2	
alpha-linolenic acid	16.7	(15.1 – 17.9)
stearidonic acid	0.5	(0.1 – 2.5)
Omega 6 / Omega 3	3.4	
Poly / Saturated (P/S) ratio	9.7	

Courtesy: Roman Przbylski, Dept. of Foods and Nutrition, The University of Manitoba.

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HEMP PROTEIN

The King of the Plant Kingdom

Matthew G. Kadey MSc., RD

The importance of obtaining high quality protein from the diet should not be taken lightly. Protein is the fundamental building block for our muscles and it is essential that these same muscles be supplied with a daily dose of high quality protein. This is especially true for those who are exercising on a regular basis. As a result of this need, protein powders are in high demand. Despite its drawbacks, soy protein has traditionally been the most popular choice in terms of a plant protein supplement. However, there is now a new option and it's definitely worth some attention.

For some time now, hemp as a food has been available in Hemp Seed Nut, Hemp Seed Nut Butter and Hemp Seed Oil forms. Now consumers can benefit from hemp in the form of a protein powder. Hemp Protein Powder has been raising eyebrows in the marketplace as a very competitive protein source and a great source of all the essential amino acids.

Hemp foods come from the same plant species as marijuana (*Cannabis sativa l.*), but from a special variety that contains virtually no THC (tetrahydrocannabinol), the chemical that triggers marijuana's psychoactive effects. Hemp Protein Powder is produced when whole hemp seeds are cold-pressed to expel the oil, leaving behind a dry "cake." This cake is then milled at low temperatures to remove some of the fibre and produce a concentrated form of protein.

Nutritional Benefits of Hemp

Hemp Protein Powder can supply any diet with a vegetarian source of essential fatty acids, antioxidants, vitamins, minerals, fibre, chlorophyll and a complete, balanced gluten-free source of the essential amino acids.

Many plant proteins are labelled "incomplete" proteins as a resulting from the low amounts of one or more of the nine essential amino acids. Truth be told, the "incomplete" label is somewhat misleading as all plant proteins do contain each of the essential amino acids. But in most cases (e.g. grains, legumes), levels of one or more amino acid are insufficient for human needs. However, hemp protein supplies enough of each of the essential amino acids to contribute to the human body's requirements. In fact, an important aspect of hemp protein is that it is a quality source of the amino acids arginine and histidine, both of which are important for growth during childhood, and of the sulphur-containing amino acids methionine and cysteine, both of which are needed in the production of vital enzymes. Hemp protein also contains relatively high levels of the branched-chain amino acids that are crucial in the repair and growth of lean body mass, making a hemp protein shake after a workout a worthwhile investment.

Almost two-thirds of hemp protein is made up of edestin, a globulin protein found only in hemp seeds. This makes hemp the superior source for this protein in the plant kingdom. Edestin is a type of plant protein that is similar to protein found in the human body, and thus is perfectly suited to aid in meeting the body's cellular needs such as DNA repair. Since much of hemp's protein resembles that found in human blood, hemp protein is very easily digested and assimilated. In addition, another one-third of hemp's protein is albumin, another high quality globulin protein also found in egg whites.

When purchasing a hemp protein powder you should be looking for a brand that supplies at least 50% protein by weight, supplying 15 grams of protein per 30 gram serving.

While hemp protein powder may contain more total fat than many other protein powders available today, it should be stressed that almost all of this fat comes from the essential polyunsaturated fatty acids omega-6 and omega-3. Hemp is recognized by the World Health Organization as having what is considered to be an optimal three-to-one balance of omega-6 to omega-3 essential fatty acids. It is this ratio that is believed to be ideal in promoting long-term well-being by decreasing the likelihood of developing heart disease, diabetes and depression.

Importantly, the fat present in hemp is also one of the few food sources of the fatty acid known as gamma-linolenic acid (GLA). GLA is showing promise in helping the fight against chronic diseases.

Hemp Protein Powder contains no additives or preservatives. While many protein powders use artificial flavouring, Hemp Protein Powder's natural nutty flavour is all the flavour needed.

Hemp versus Soy

In the plant kingdom hemp is second only to soy in protein content. But it has several advantages over the soybean.

Unlike Hemp Protein Powder, many soy protein isolate powders that are not labelled organic are often processed with hexane, a petroleum solvent that has adverse impacts on the environment and potentially human health. The resulting hexane-processed soy is utilized in many soy protein powders, cereals and bars. Hemp protein Powder produced using only expeller (cold) pressed techniques does not involve the use of hexane in the production process. It is this same technique that ensures valuable vitamins and minerals are not destroyed during processing.

Soy protein contains oligosaccharides that can cause stomach upset and gas in some individuals. Hemp Protein Powder is free of this irritant and there are no known allergens present in Hemp Protein Powder. The addition of sugar to many soy protein products is also a concern for our expanding waistlines.

Perhaps the most important difference, the non-organic soybeans used in many soy protein powders are often derived from genetically modified soybeans. Hemp is never genetically modified. In addition, hemp foods have low environmental impact because hemp doesn't require Herbicides or Pesticides to grow.

How to add hemp protein to your diet

Hemp protein powder can be stirred into juices, smoothies and protein shakes. It can be used during baking by adding to pies, cakes, muffins and breads at a 25% hemp to 75% flour ratio. This is especially useful for those following the low carbohydrate lifestyle.

Whether you are vegan, vegetarian or a carnivore, whether you are young or old, active or sedentary, Hemp Protein Powder is a tasty way to obtain your body's protein needs, and is readily available at a natural products retailer near you.

Hemp Protein Powder Recipes

Green Earth Smoothie

2 scoops Manitoba Harvest™ Hemp Protein Powder
1 Tbsp Manitoba Harvest™ Hemp Seed Oil
2 cups orange juice
1 banana
1 pear
1 Tbsp green food powder
½ cup ice

Combine all ingredients in a blender. Blend on high until creamy and smooth.

Berry Protein Bliss

2 scoops Manitoba Harvest™ Hemp Protein Powder
2 cups milk (dairy, soy or rice)
1 banana
1 cup frozen berries (blueberry, strawberry or raspberry)

Combine all ingredients in a blender. Blend on high until creamy and smooth. If you want a big protein boost, make the recipe with 3-4 scoops of protein.

Chocolate Dream

2 scoops Manitoba Harvest™ Hemp Protein Powder
2 cups milk (dairy, soy or rice)
1 banana
2 Tbsp cocoa powder (or carob powder)
½ cup ice

Combine all ingredients in a blender. Blend on high until creamy and smooth. If you want a big protein boost, make the recipe with 3-4 scoops of protein.

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HEMP SEED OIL

Your Source for Essential Fat

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It should come at no surprise that for many people in Western society far too many daily calories come from fat. While it is true that high intakes of animal-origin saturated fat and hydrogenated fat (trans-fats) are detrimental to health, it is also just as true that essential fatty acids are crucial for long-term well-being. These essential fatty acids are the polyunsaturated fats known as linoleic acid (*omega-6*) and alpha-linolenic acid (*omega-3*). Like vitamins, these two fats are essential for proper human functioning and cannot be made in the body from simpler molecules. This means that they must be supplied in the diet for incorporation into every cell wall.

The list of benefits of consuming a diet rich in essential fatty acids is impressive and constantly growing. Helping prevent and/or relieve symptoms of heart disease, cancer, arthritis, diabetes, depression, stroke, asthma and hypertension, while promoting infant brain development, good skin and shiny hair as well as aiding in weight management, are all on essential fatty acids' remarkable resume. Much of this can be attributed to the lipid-modifying and anti-inflammatory properties of these fatty acids.

Dietary sources of omega-6 fat include cooking oils (corn, sunflower, soy, peanut), seeds and nuts, while good sources of omega-3 fat are oils from flax, fish and walnuts. However, when it comes to essential fatty acid intake there is often one very good food source that gets overlooked – that being hemp oil.

Hemp oil is produced from the plant known as *Canabis sativa l.* and has been a traditional food in China as far back as 1500 BC. Hemp has been legal to grow in Canada since 1998, and lately health-conscious consumers have discovered the health benefits linked with this wonder food.

Since hemp seeds are found at the top of the *Canabis* plant located within a protective shell, hemp products such as hemp oil contain no, or miniscule amounts of, THC. In fact, you would probably have to smoke a whole field of hemp to get any intoxicating effect.

If you are asking yourself why you should incorporate hemp oil into your already impressive array of dietary oils? *Consider this:*

The Perfect Fat Ratio

The anti-inflammatory effects of both omega-3 and omega-6 polyunsaturated fatty acids have been demonstrated in many studies, in particular in the treatment of rheumatoid arthritis. However this only occurs when these fats are consumed in roughly similar amounts, such as what is found in hemp oil.

What is particularly interesting about hemp oil is that the ratio of omega-6 to omega-3 fat is 3:1, which is generally the ratio recognized by the World Health Organization as being ideal for optimum health. Most North Americans consume a ratio of 10:1 as a result of a heavy reliance on oils and products that contain significantly more omega-6 fat (e.g. soybean/vegetable oil). There is a good indication that a diet that is too heavily weighted toward omega-6 fat can negate the positive health benefits of essential fat intake. Daily intake of hemp oil can help ensure your fat intake is closer to what nature intended.

In addition to having one of the highest mono- and polyunsaturated fat contents of all the oils, hemp oil is naturally low in cholesterol, and saturated fat represents only 9% of total calories. Diets high in saturated fat can elevate LDL ("bad") cholesterol, which is a risk factor for atherosclerosis.

GLA

While omega-6 intake in general is quite high among the general population due to a high consumption of vegetable oils, there is one omega-6 fat that is relatively rare in our food system – that being gamma-linolenic acid (GLA). In addition to borage oil, spirulina, black currant and evening primrose oil, hemp oil is one of the other few sources of this metabolite of linoleic acid.

GLA is quite similar in chemistry to one of the beneficial fatty acids present in fish called EPA. And like EPA, some studies have shown that GLA may help in reducing heart disease. Potential health-promoting effects of GLA include:

• Helping prevent conditions such as Alzheimer's disease, heart disease, rheumatoid arthritis, asthma and periodontitis by limiting the inflammatory process. The human body converts GLA into prostaglandins, which are hormone-like compounds that help to regulate inflammation.

• Increasing the effectiveness of cancer treatment. For example, GLA may enhance the ability of medications used to kill off cancerous cells in the treatment of breast cancer. In addition, GLA in itself may help prevent certain cancers by inhibiting cell proliferation.

• Along with DHA and EPA, GLA appears to have lipid-modifying effects such as reducing blood trigyleride levels. This is useful in the fight against heart disease.

• Treating certain skin conditions such as eczema.

• Treating Attention Deficit Hyperactivity Disorder (ADHD) and Alzheimer's disease since essential fatty acids like GLA are necessary for the health and proper functioning of the nervous system.

• Promoting growth and neurodevelopment in pre term infants.

The Environment

When you choose hemp oil you are not only making a wise choice for your body, you are also making a wise choice for the environment. As a hardy plant, hemp requires less water than many crops and is suited to grow very well in the Canadian climate. As a result of its short growing cycle, hemp is ideal for farmers using crop rotation to help prevent soil depletion. Also helping the soil, as well as reducing water pollution, is hemp's ability to grow without the need for pesticides and herbicides. And for those who are worried, and rightfully so, about the introduction of genetically modified foods, the good news about hemp oil, unlike some other common oils (soy, canola), is that hemp oil is never genetically modified.

Hemp Oil Tips

• It is important that you do not cook with hemp oil. It will break down and become ineffective if exposed to high heat.
• Store hemp oil in a cool, dry place away from light (e.g. refrigerator) to prevent the oil from turning rancid. Always buy hemp oil in a dark bottle.
• To ensure optimal quality choose hemp oil that is produced using cold/expeller pressed methods, and that contains no artificial additives.
• Hemp oil can be added to salad dressings or smoothies, used in yogurt or as a dip for your favourite bread.

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MANITOBA HARVEST HEMP FUELED RECIPES

Fig Dreams

Makes: As many as you like
Prep Time: 5 min
Cook Time:

Ingredients:
Hemp Seed Nut Butter
Dried figs

Directions:

Cut open the figs, remove the pit and stuff the inside with Hemp Seed Nut Butter. The taste is amazing. If you do not want to get fancy, you can just open the jar of Hemp Seed Nut Butter and dunk the figs right in. These snacks are the perfect food to have in your backpack for when you're on the go!

Hempini Dressing

Makes: 1 1/2 cups
Prep Time: 5 min.
Cook Time:

Ingredients:

1/2 cup Hemp Seed Nut Butter
1/2 Cup Hemp Seed Oil
1/4 Cup Tamari
1/4 Cup Maple Syrup

Directions:

Combine Hemp Seed Oil and Hemp Seed Nut Butter in a bowl. Stir until creamy and smooth. Add tamari and maple syrup. Mix well. Will keep in the refrigerator for 4-5 days in a sealed container.

Banana Nut Bread

Makes: 1 loaf
Prep Time: 10 min.
Cook Time: 45-60 min.

Ingredients:

2 eggs
1/3 cup applesauce
2/3 cup sugar
1 1/4 cups whole wheat flour
1/2 cup Hemp Seed Flour
2 3/4 tsp. baking powder
1/2 tsp. salt
1 cup mashed very ripe bananas (about 3 medium)
1/4 cup Hemp Seed Nut
1/4 cup chocolate or carob chips (optional)

Directions:

Preheat oven to 300 degrees. Mix first 3 ingredients with mixer at medium speed until pale yellow.
Add dry ingredients, alternately with bananas, to mixture. Mix at medium speed until well blended.
Pour into greased or sprayed loaf pan (9 x 5 or 8 1/2 x 4 1/2). Bake 45-60 minutes or until cake tester comes out clean and dry. Let cool in pan 20-30 minutes before turning out onto rack.

Donny's Healthy Hemp Chocolate Sauce

Makes: 3 cups
Prep Time: 5 min.
Cook Time:

Ingredients:
1 cup Hemp Seed Oil
1 cup maple syrup
1/2 cup carob powder

Directions:

Combine hemp seed oil and maple syrup in a blender. Turn blender on low. Add carob powder until you reach your desired consistency. You can make it as thin or thick as you like.

This sauce is delicious on fresh fruit, frozen desserts or straight off the spoon. Since it is rich in Essential Fatty Acids, you can eat it for breakfast with no guilt!!

Curry Hemp Veggie Salad

Makes: Enough for two
Prep Time: 15 min
Cook Time: Marinade Time: 1-2 hours

Ingredients:

Marinade:

1/2 cup Manitoba Harvest Hemp Seed Oil
1 tsp. curry powder
1/2 tsp. liquid honey
1/4 cup apple cider vinegar
2 finely chopped garlic cloves
2 Tbsp. fresh chopped parsley
salt and pepper to taste

Veggies:

1 1/2 cups sliced fresh mushrooms
1/2 cup chopped green onions
4 large sliced tomatoes
1/2 sliced cucumber or sliced zucchini
2 Tbsp. Hemp Seed Nut

Directions:
Combine all marinade ingredients in a bowl and mix well. Marinate vegetables for 1-2 hours before serving. Can be served as is, or on a bed of fresh greens. Sprinkle Hemp Seed Nut on top.

Date Nut Pasta

Makes: Enough for 3
Prep Time: 10 min.
Cook Time: 15 min.

Ingredients:

1/2 cup Hemp Seed Nut
1/3 cup Hemp Seed Oil
1/2 cup pitted California Dates, chopped
8 cups loosely packed spinach leaves
1 cup feta cheese, crumbled (optional)
2 tablespoons lemon juice
1/8 teaspoon black pepper
1/2 pound fettuccini

Directions:

Wash spinach leaves, spin dry and finely chop. Toss dates and spinach together in a large bowl with Hemp Seed Nut, 1/3 cup Hemp Seed Oil, feta cheese, lemon juice and pepper. Set aside. Cook pasta in salted water until tender. Drain and toss with spinach mixture.

Snowflake Hemp Macaroons

Makes: 15 Macaroons
Prep Time: 10 min
Cook Time: Refrigeration Time: 1-2 hours

Ingredients:

1 cup Hemp Seed Nut
1 Cup raw honey
3 Cups raw shredded coconut

Directions:
Mix Hemp Seed Nut and coconut in a bowl. Warm the honey in a saucepan (or the sun) and pour over mixture. Mix well.

Press into a 9 by 13 casserole pan and refrigerate a few hours. Cut, serve, and enjoy!

Hemp Julius Smoothie

Makes: Enough for one
Prep Time: 15 min
Cook Time:

Ingredients:

2 Scoops Hemp Protein Powder
6 Fl oz Fresh Carrot Juice
6 Fl oz Fresh Orange Juice
1 1/2 frozen bananas(chopped)

Directions:
Combine all ingredients in your blender. Blend on med-high until creamy and smooth.

Lentil Nut Loaf

Makes: 1 Loaf
Prep Time: 10 min.
Cook Time: 40 min.

Ingredients:

1/2 cup of Hemp Seed Nut
1 Tbsp Hemp Seed Nut for garnish
1 onion, chopped
1 Tbsp Coconut oil
2 cups lentils, cooked and drained
1/2 cup sprouted bread crumbs
1/2 tsp thyme
2 Tbsp whole wheat flour
2 eggs, beaten
1/2 cup water
2 tsp vinegar
2 tsp soy sauce

Directions:

Preheat oven to 300 F. Sauté onion in oil until translucent and slightly browned. Mix all ingredients except Hemp Seed Nut for garnish and place in a greased loaf pan. Garnish top with Hemp Seed Nut. Bake for 30 minutes covered, then for 10 minutes uncovered.

Noel's Hemp Seed Cheese

Makes: 3 cups
Prep Time: 15 min
Cook Time:

Ingredients:

2 cups Hemp Seed Nut
1/4 cup Hemp Seed Oil
1/4 Cup sun dried tomato
2 Tbsp red miso
2 Tbsp Tamari
1/4 cup of fresh basil
1/8 cup cilantro
salt and pepper to taste

Directions:

Soak the Hemp Seed Nut in filtered water for 2 hours. Drain the water. Mix the miso with 1 cup of filtered water. Soak the sun dried tomatoes in the miso water for 2 hours. Combine all ingredients in a blender. Blend on high until well mixed. You can make the cheese thicker by blending in some unsoaked hemp seed nut. Chill before serving. Serve as a dip for fresh cut vegetables or as a filling for wraps and rolls.

Jumping Jack Flash

Makes: 2 cups
Prep Time: 5 min.
Cook Time:

Ingredients:

2 Tbsp Hemp Seed Oil
1 cup raw tahini
2 Tbsp Miso Paste
1 tsp fresh lemon juice
1/2 cup chopped green onion or chives

Directions:

In a bowl, combine the tahini and miso paste together. Stir in the Hemp Seed Oil and lemon juice. Add the chopped green onion or chives.

Eat it plain, on bread, or with raw vegetables.

You can thin this recipe down with equal parts water and Hemp Seed Oil and use it as a salad dressing.

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Frequently Asked Questions

1) a) What are the differences between Hemp and Marijuana?

There are many. The most important is that Hemp contains a fraction of the psychoactive compound, Tetrahydrocannabinol (THC), that Marijuana does. This is why hemp is legal and marijuana is not. Some other differences are that hemp is a combination of male & female plants and marijuana plants are just female. Hemp is harvested for its fiber or seed while marijuana is harvested for its flower.

b) Will I get 'high' eating your MANITOBA HARVEST™ hemp foods & oils?

No. Eating hemp foods & oils will not get you "high". MANITOBA HARVEST™ Hemp Foods & Oils are made with a variety of hemp seed that has undetectable amounts of THC. These special hemp seeds are further cleaned and processed to ensure that all MANITOBA HARVEST™ Hemp Foods & Oils have 0.00% THC.

c) Will I fail a urinalysis test if I eat MANITOBA HARVEST™ Hemp Foods & Oils?

No. As stated above, MANITOBA HARVEST™ Hemp Foods & Oils have 0.00% THC so eating them will not cause a false positive on a urinalysis test. If a customer could eat an entire 12oz bottle of MANITOBA HARVEST™ hemp seed oil and an entire 8oz bag of MANITOBA HARVEST™ hemp seed nut in one sitting, he would still pass the urinalysis test. Even if the urine sample was given 6 hours after the time of ingestion (the time of highest elimination).

2) Are all Manitoba Harvest ™ products certified organic?

Not all Manitoba Harvest ™ products are certified organic. All Manitoba Harvest ™ hemp seed is grown sustainably without the use of herbicides or pesticides. No chemicals are sprayed on the crop. We also do grow USDA certified organic hemp seed for our certified organic products.

3) Is Your hemp genetically modified to bring down the THC?

No. The very low THC variety hemp seeds that the company uses has been selectively bred, not genetically modified. All MANITOBA HARVEST ™ hemp seeds are original source and contain no Genetically Modified Organisms (GMOs).

4) **What are Hemp Foods & Oils good for?**

Hemp Foods & Oils have many beneficial properties and biomolecules that promote health and wellness. Hemp Seed Oil has one of the highest concentrations of polyunsaturated fats and an ideal balance of the omega-6 and omega-3 Essential Fatty Acids. Hemp contains 54.4% linoleic acid(Omega-6), 18.3% linolenic acid(Omega-3), 3-4% gamma-linolenic acid(GLA) and 1-2% stearidonic acid; and as such is only one of only 4 oils to do so and is the most economical one of these oils. Hemp's ratio of Omega 6 to Omega 3 fatty acids is about 4:1 which mirrors the primitive diet man evolved on for 2.5 million years. This ratio of fatty acids has been shown to prevent and even reverse Alzheimers disease in animal models and humans (Yehuda et al, Int J Neurosci, vol 3, 141-9, 1996). Polyunsaturated fats have been shown to be beneficial for the prevention of heart disease, especially omega 3 fatty acids. Hemp contains phytosterols (B-sitosterol, stigmasterol, campestrol) in high concentration (one of the highest) which are known to reduce cholesterol. In fact, the US, FDA allows the claim that plant sterol and stanol esters reduce the risk of heart disease by lowering cholesterol levels. Hemp contains chlorophyll which is anti-carcinogenic. The phytosterols have been shown to be anticarcinogenic as well (Phytosterols as Anticancer Dietary Components, Awad and Fink, Recent Advances in Nutritional Sciences, 2000, pp 2127-2129). Hemp is a source of complete protein offering 17 different amino acids including all of the essential ones. This protein is relatively high in cysteine and methionine which are two sulfur bearing amino acids that are usually lacking in vegetable proteins. For more information please read our brochure or nutrition articles.

5) How do I use Hemp Foods & Oils?

Suggestions for uses range from smoothies to salad dressings, and recipes for the products can be found in the recipes section of the MANITOBA HARVEST™ web site at www.manitobaharvest.com and in the informational brochure and recipe booklet that is available through the MANITOBA HARVEST™ sales office at 1 800 665 HEMP(4367) or at your local retail outlet.

6) **I've tried other hemp foods and none tastes as good as the MANITOBA HARVEST™ brand. Why?**
MANITOBA HARVEST™ grows, processes and packages all of our own products. Products are processed and packaged using modern equipment, that is dedicated solely for hemp seeds. The company's strong scientific team has and continues to develop proprietary processing techniques that set MANITOBA HARVEST™ products apart from others on the market. When hemp foods are fresh, they have a pleasant nutty flavor.

7) **How much hemp seed nut should I eat in a day?**
3-5 Tablespoons for an adult. 3-5 Teaspoons for a child.

8) **How much hemp seed oil should I eat in a day?**
1-2 Tablespoons for an adult. 1-2 Teaspoons for a child.

9) **What do you mean when you say that hemp foods & oils are safe for long term consumption?**
MANITOBA HARVEST™ Hemp Foods & Oils are balanced food sources of protein, carbohydrates and essential fatty acids. This means that if you eat MANITOBA HARVEST™ Hemp Foods & Oils over a long period of time, you won't run the risk of setting your body out of balance.

10) **How long is the shelf-life of the products?**
The MANITOBA HARVEST™ Hemp Seed Oil and Hemp Seed Nut Butter have an 8 month shelf-life and the Hemp Seed Nut has a 10 month shelf-life. Hemp Protein Powder has a 12 month shelf life. Once opened, it is recommended to eat the product within 8 weeks. You can extend the shelf life by keeping the products in the freezer.

11) **Do the products need to be kept refrigerated?**
For optimum freshness, it is recommended to refrigerate as much as possible. Once the product seal has been broken, the product should be refrigerated.

12) **Can I freeze your products?**
Yes. All of the MANITOBA HARVEST™ Hemp Foods & Oils can be frozen except for the Hemp Seed Oil Capsules. Freezing the products will extend the shelf life as long as they are in an air-tight container.

13) **How does MANITOBA HARVEST™ Hemp Seed Oil compare to flax seed oil.**
There are three(3) distinctions which separate hemp seed oil and flax seed oil;
a) Hemp Seed Oil has a 3.75:1 Omega-6 to Omega-3 ratio. Flax Seed Oil has a 1:4 Omega-6 to Omega-3 ratio.
b) Hemp Seed Oil has GLA, Flax Seed Oil does not.
c) Hemp Seed Oil has a pleasant nutty flavor, Flax Seed Oil does not.

14) **I am allergic to nuts. Can I eat your Hemp Seed Nut?**
Hemp Seed Nut is not a ground nut but rather the nut(heart) of the hemp seed. People who claim to have allergies to nuts report no reaction to MANITOBA HARVEST™ Hemp Seed Nut.

15) **Why is MANITOBA HARVEST™ hemp seed oil so green?**
MANITOBA HARVEST™ Hemp Seed Oil has a very high content of Chlorophyll. Because of the low-temperature processing, the chlorophyll is not destroyed. Chlorophyll has a very rich green color, thus, MANITOBA HARVEST™ hemp seed oil is green.

16) **Can I cook with hemp foods & oils?**
MANITOBA HARVEST™ Hemp Foods & Oils can be cooked with provided that the temperature does not go above 350 degrees F. Never use the oil for frying due to its high concentration of polyunsaturated fats.

17) **Why if your Hemp Protein Powder so different than other brands?**
Many companies are selling hemp flour as hemp protein powder. Hemp flour only has 30% protein and lots of fiber. Manitoba Harvest ™ Hemp Protein Powder is produced when whole hemp seeds are cold pressed to expel the oil, leaving a dry "cake". This cake is then milled and sifted at low temperature to remove some of the fibre and produce a concentrated form of protein. Manitoba Harvest ™ Hemp Protein Powder is 50% protein.

For More Info Contact:

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