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**From the Selected Works of Madeleine K. Charney**

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## Flax: Food and Fiber

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## **PRE-PRINT VERSION**

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### **Commodity of the Quarter**

**Flax: Food and Fiber**

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This issue's Commodity of the Quarter highlights a versatile and nutritious crop, the flax plant. Evidence shows flax has been in existence for thousands of years, with origins extending from the eastern Mediterranean to India. The flax plant is now cultivated worldwide with the majority grown in China and Canada. An adaptable crop, flax can be grown on wasteland, thus freeing up arable land for other crops (Felice, 2012). Highly nutritious, flax is used for both human food and livestock feed. It is commonly woven into durable linen; however, more innovative uses for flax are fast evolving. The outer fibers of the flax plant are strong as well as biodegradable, making it invaluable in the creation of environmentally friendly products. Flax fibers can be processed to make effective and mold-free insulation. Flax straw may be used for making specialty paper for currency, filters, and condenser and battery separator pages. Lower or inconsistent quality flax fibers and straw may be woven into geotextiles, which are used as ground cover for weed suppression, erosion control, rainwater filtration, site remediation, and dust and mud control. As an alternative to costly wood, ground flax straw may be combined with resins to create plastic composite siding, decking, and sheeting. The linen industry is experiencing rapid growth in parts of Asia, opening new sources of textile grade fiber to supply growing world demand for high quality, natural garments and household textiles. Flax may be mixed with resin to create composites for forming shapes and sizes by various means of molding (e.g., injection, extrusion, spraying) and then used to make items such as airplane bodies, pipelines, slurry containers, and pocket calculator bodies. Shive, small broken pieces of flax

straw left over from fiber from the straw, may be used as an energy source, horticultural mulch, and animal bedding (Saskflax, 2007).

The flax plant is a member of the genus *Linum*, which is in the Linaceae family. There are about 200 *Linum* species; cultivated flax is thought to come from *Linum angustifolium*, a wild, perennial variety. Long-stemmed varieties are cultivated for fiber while shorter more floriferous

varieties are for seed. Flax plants have gray-green, lanceolate, alternate leaves with heights ranging from 1-4 feet. Flax flowers, often blue, can also be white, yellow, pink, or red. The fruit is a capsule with five carpels, each containing two brown, yellow, or mottled shiny seeds. Flax seeds are pressed for linseed oil, which can be used in foods or, when hardened by oxidation, manufactured into paints, varnishes, patent leather, linoleum, and oilcloth. Flax seeds are eaten as seeds and ground into meal (Minderovic, 2008).

## **ORIGINS**

Flax is one of the oldest cultivated crops, having been grown since the beginning of civilization. Uncovered during archaeological excavations, flax seeds, fragments of capsules, stems, and pollen show its use as far back as the early Neolithic era. Apparatus for making flax textiles (a process called retting) have also been found at such sites, as well as ancient wall paintings depicting its use. The oldest known records were discovered in the Fertile Crescent and date back to the 9th millennium. In Europe, the oldest records were found north of the Alps (Karg, 2011).

Flax was first introduced to the United States by colonists primarily to produce fiber for clothing. As the United States expanded and more buildings were constructed, the need for linseed oil, an ingredient in paint, increased. The demand for flaxseed meal for livestock and poultry feed also increased. As a result, the flax processing industry was in full swing during the late 18th century. By the 1940s, however, cotton had replaced flax as a commonly used fiber in the United States, and flax became nearly extinct as a commercially grown crop (Laux, 2013).

## **FLAX INDUSTRY TODAY AND TOMORROW**

Flax production in the U.S. is led by North Dakota, followed by South Dakota, Montana, and Minnesota; these states account for the primary production of U.S. flax production. In 2012, total U.S. flax production was nearly 5.8 million bushels valued at nearly \$78.3 million. The average price for flax was \$13.60 per bushel in 2012. About 95% of the flax was grown in North Dakota which planted 315,000 acres in 2012. Flax production in the state totaled nearly 5.5 million bushels.

However, Canada is the largest producer of flaxseed in the world, representing about 40% of world production. When combined, China, the United States, and India account for another 40% of world production (Laux, 2013). Canadian flax production is strengthening. According to StatsCan, the estimated 2013 flax crop (712,000 tonnes) saw a 46% increase over the previous record yield, although there is increased competition from Eastern Europe (Saskflax, 2013). European flax provides to nearly every European market, although Canada provides Europe with small amounts as well. China is Canada's largest flax import customer. Charts reflect Canadian flax prices dropping during October, November, and December and that flax is currently trading relatively rich compared with canola. Elevator delivery may be challenging due to Triffid testing before delivery. If Triffid—a genetically modified form of the crop ordered to be destroyed in 2000—is present, the flax goes to the U.S. If the flax is “clean,” it can go into any market (Duvenaud, 2013). In 2010, Canada experienced a setback. It was forced out of its European flax market (the destination of 70% of Canadian flax) when traces of Triffid were found in shipments. The European Union's zero-tolerance policy regarding genetically modified organisms means turning away contaminated shipments. Canada continues efforts to eradicate their elusive Triffid-laced flax, but the source of the genetically modified flax is still not clear (“Triffid Seed Threatens Flax Industry,” 2010).

## **HEALTH RESEARCH**

Flax has been referred to as one of the most powerful plant foods on the planet. Recent studies show a correlation between the consumption of flax and reduction of risk of heart disease, stroke, diabetes, and cancer of the breast, prostate, and colon. According to Kelley C. Fitzpatrick, director of health and nutrition with the Flax Council of Canada, at least two of the components in flaxseed seem to contribute to this risk reduction, omega-3 fatty acid and lignans.

Omega-3 fatty acid—a “good” fat shown to have heart-healthy effects—may inhibit tumor incidence and growth in animal studies. Lignans may provide some protection against hormone-sensitive cancers without interfering with the breast cancer drug tamoxifen. Some studies suggest that exposure to lignans during adolescence helps reduce the risk of breast cancer and may also increase the survival of breast cancer patients. The antioxidants in flaxseed may also help protect against cancer and heart disease (Magee, 2014).

With so many health claims and growing evidence, consumer demand is understandably growing. Added to a wide array of food from breads, crackers, cereal products, and snack foods, to eggs laid by flax-fed chickens, flax is becoming a familiar household word. A tablespoon of ground flaxseed contains about 1.8 grams of plant omega-3s. Flaxseed contains 75 to 800 times more lignans than other plant foods. Nearly 300 new flax-based products were launched in the U.S. and Canada in 2010 alone, according to the Flax Council (Magee, 2014). This “super food” seems to have reestablished itself in the human diet as well as in the industry landscape.

## **ORGANIZATIONS AND INFORMATION RESOURCES**

### **United States**

#### **AmeriFlax**

<http://www.ameriflax.com/>

Representing North Dakota flax producers, AmeriFlax is funded by flax check-off dollars from the North Dakota Oilseed Council. Their mission is to increase the use and sale of U.S.-grown flax and by-products in domestic and foreign markets. AmeriFlax guides programs on public relations, advertising, nutrition research, market research, and consumer and industrial education. They also maintain a database directory of regional “Flax Seed Trade & Handlers” and publish *Flax News*.

#### **National Agricultural Statistics Service (NASS)**

[www.nass.usda.gov/](http://www.nass.usda.gov/)

This federal agency provides current and historic U.S. maps, statistics, and other types of information including sections dedicated to acreage, price, yield, and production of flax crops.

### **Canada**

**Flax Council of Canada (FCC)**

<http://www.flaxcouncil.ca/english/index.jsp>

Established in 1986, the Flax Council of Canada is a national organization which promotes Canadian flax and flax products for nutritional and industrial uses in domestic and international markets. The Council focuses on flax market development, market and production research, and crop promotion in Canada, creating worldwide market opportunities as the demand for flax increases. They produce a quarterly online newsletter called *Flax Focus*.

**Manitoba Flax Growers Association (MFGA)**

<http://mfga.ca/flax-resources/>

Established in 1999, the Manitoba Flax Growers Association (MFGA) represents the interests of Manitoba flax growers. A flax commodity based check-off has a fee structure which differs from most other commodities—0.5% for flax prices versus 1% for straw prices. Their goal is to increase profitability for flax producers by raising the status of flax through research. To this end, they are financial partners with Saskatchewan Flax Development Commission (SFDC) and the Flax Council of Canada (FCC) in pursuing much needed plant breeding and agronomic research and development for flax production and enhancement in Canada.

**SaskFlax**

<http://www.saskflax.com/index.html>

Representing more than 7,500 flax producers, SaskFlax promotes research, communication, and market facilitation as well as production and value-added processing of flax in Saskatchewan. The website offers rich information including a directory of registered flax buyers, recipes, professional development events, and updates about the flax check-off and tax credit for levy-paying producers. They also publish the bi-weekly *Crop Production News*.

**International****European Cooperative Programme for Crop Genetic Resources Networks (ECPGR)**

[http://www.ecpgr.cgiar.org/germplasm\\_databases/](http://www.ecpgr.cgiar.org/germplasm_databases/)

Established in 1980, the ECPGR calls itself “a safety network for our crops.” A collaborative program among most European countries, the network strives for long-term conservation and

utilization of plant genetic resources in Europe. The website offers online access to specific crop and multi-crop databases, including the International Flax Data Base (IFDB), which has been managed and coordinated by the AGRITEC company in the Czech Republic since 1994. IFDB includes data from flax and linseed stored in 22 contributing gene banks from 15 countries.

### **Institute of Natural Fibres and Medicinal Plants**

<http://iwnirz.pl/strona,8.html>

Cultivation of fibrous crops such as flax or medicinal crops has been part of Poland's agricultural heritage for centuries. The Institute seeks to improve these crops, conduct research and experimental activities, as well as store genetic information that documents their biological progress. The Institute perpetuates Polish traditions of agriculture and herbal medicine and creates added value in modern research laboratories.

### **SGS**

<http://www.sgs.com>

Established in 1878 and based in Switzerland, SGS offers innovative agricultural inspection services, verification, testing, and certification. They operate a network of more than 1,650 offices and laboratories around the world. They offer an Oilseed Fatty Acid Profile which determines fatty acid profiles of flax and other oil crops so that producers may provide healthier food products to consumers. They also support oilseed breeding projects for improving crops. Their testing method involves an organic solvent which extracts the oil from single seeds or composite bulk samples.

## **REFERENCES**

Duvenaud, J. (2013, October 7). Flax mostly harvested. *AgWeek*. Retrieved from <http://www.agweek.com/event/article/id/21814/>

Felice, M. (2012). Material of the month: Flax. *Materials World Magazine*, 20(7), 35.

Karg, S. (2011). New research on the cultural history of the useful plant *Linum usitatissimum* L. (flax), a resource for food and textiles for 8,000 years. *Vegetation History and*

*Archaeobotany*, 20(6), 507–508.

Laux, M. (2013). *Flax profile*. Retrieved from AgMRC website:

[http://www.agmrc.org/commodities\\_\\_products/grains\\_\\_oilseeds/flax-profile/](http://www.agmrc.org/commodities__products/grains__oilseeds/flax-profile/)

Magee, E. (2014). *The benefits of flaxseed*. Retrieved from WebMD website:

<http://www.webmd.com/diet/features/benefits-of-flaxseed>

Minderovic, C. (2008). Flax. In K.L. Lerner & B.W. Lerner (Eds.), *The Gale Encyclopedia of Science* (4<sup>th</sup> ed., Vol. 3, pp. 1741-1743). Retrieved from Gale Virtual Reference Library.

Saskflax. (2007). *Fiber products*. Retrieved from <http://www.saskflax.com/fibreproducts.html>

Saskflax. (2013, December 16). *Flax market snapshot*. Retrieved from

[http://www.saskflax.com/PDFs/131216\\_FCC\\_FlaxMarketSnapshot.pdf](http://www.saskflax.com/PDFs/131216_FCC_FlaxMarketSnapshot.pdf)

Triffid seed threatens flax industry. (2010, January 20). *CBC News Manitoba*. Retrieved from

<http://www.cbc.ca/news/canada/manitoba/triffid-seed-threatens-flax-industry-1.898128>