



flax focus

Flax dehulling technology – A boost to health industry

Flax is well known for its versatility and many health benefits. However, the hard, outer surface of flax seeds means that, eaten whole, the inside kernel and other healthy nutrients may not be easily digested by the human body.

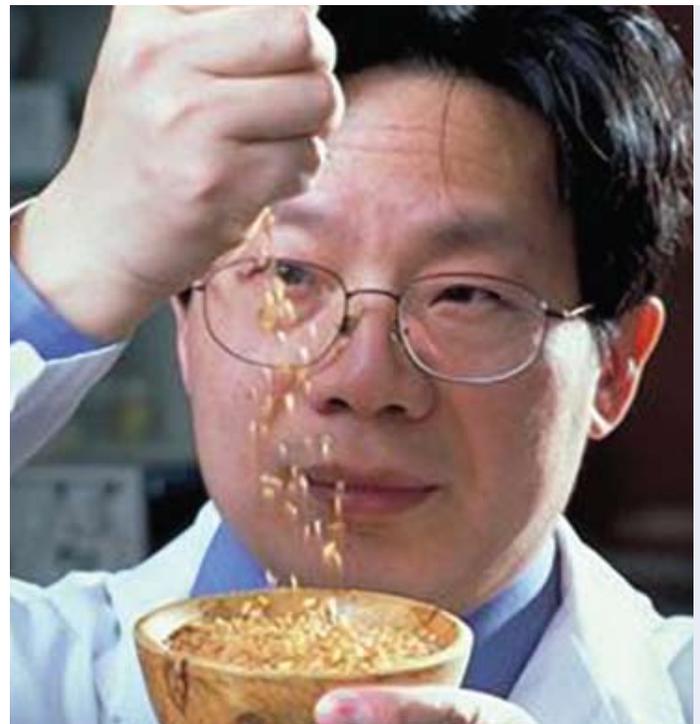
By solving the mystery of how to remove flaxseed's shell, Dr. Steven Cui and his colleagues at Agriculture and Agri-Food Canada were the first to develop an innovative, economical process known as Flaxseed Dehulling Technology that makes such flax components as alpha-linolenic fatty acid, lignans and dietary fibre more easily accessible.

These powerful agents help in the prevention and treatment of diseases, including heart and certain kinds of cancer.

According to Dr. Cui, large American food companies had sought the dehulling process since the 1950s. He began his research into the process in 1993 while working as a Post Doctoral Fellow at the Agriculture and Agri-Food Canada laboratory in Morden, Manitoba with Dr. Joe Mazza. "The inspiration came from the industry," said Dr. Cui.

During the dehulling process, a flax seed sample is treated to remove moisture. Using mechanical friction or abrasion, the seed is broken into two pieces – the hull and the kernel. Air, blown through the flax seeds, separates out components by weight, without affecting the oil in the kernel.

As Dr. Cui explained, "The beauty of the dehulling process is that it doesn't destroy the cells and the oil in the seed is protected from the potential for oxidization."



Dr. Steven Cui, who developed the flax dehulling technology in the lab

Once Drs. Cui and Mazza patented the technique, the next hurdle was moving the results of their research from the lab bench to the commercial market.

In 2001, he connected with Dr. Nam Han, President and Chief Executive Officer of Natunola Health Inc., a leading researcher and manufacturer in the field of health-related products in Winchester, Ontario, a half-hour drive from Ottawa. The company also produces natural ingredients for cosmetics and personal care products.

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With a two-year \$100,000 grant from Agriculture and Agri-Food Canada's Matching Investment Initiative, research continued into industrialization of the process. According to Agriculture and Agri-Food Canada, "Natunola was so impressed by Dr. Cui's expertise and technical assistance that the company built the world's first manufacturing plant of dehulled flaxseed products."

The 40,000 square foot plant now employs 22 staff and processes 800 to 1,000 metric tonnes of prairie-grown flaxseed annually. "The bigger the seed, the better," said Dr. Han. Preferred flax cultivars are larger seed varieties such as Emerson and Sorrel.

Another advantage of the Flaxseed Dehulling Technology is that it lends itself to value-added processing at the plant. "To be able to enrich the mucilage and lignans in the hulls and the omega-3 fatty acid in the kernels, you need to get them in a pure format," Dr. Cui said. Products containing lignans and mucilage from the flax hull, as well as alpha-linolenic fatty acid in the kernel, can be enriched up to four times the amount contained in flax naturally. This has led to the full utilization of each functional component in flax and an expansion of nutraceutical, animal feed and



Natunola is the winner of the prestigious 2008 Award of Excellence for Innovation in Agriculture and Agri-Food. The award was presented in November at the Royal Agricultural Winter Fair in Toronto. Receiving the award is President of Natunola, Nam Han, center. Left, is Gayle McPherson, Vice-President for the Royal Agricultural Winter Fair; right, the Honourable Mr. Guy Lauzon, who presented the award on behalf of the Honourable Gerry Ritz, Minister of Agriculture.

personal care product lines. Natunola flax products include omega-3 flax kernel, flax hull, flax bran, flax fibre, as well as milled flax and flax meal. These products can be used by the industry as ingredients in baked goods, in dairy products and other foods. Natunola also has a line of water-extracted flax ingredients which have been used in personal care product lines such as cream, lotion, shampoo and body washes.

For his groundbreaking efforts, Dr. Cui recently received the Technology Transfer Award from the Canadian government's Federal Partners in Technology Transfer. The award was granted "for exemplary leadership in the development of inventive food extraction processes and the transfer of flaxseed dehulling technologies." ■

World's first flax dehulling plant receives award for innovation

Natunola's plant in Winchester, Ontario, represents the culmination of many years of research into the flax dehulling process and provides new opportunities for Canada's flax growers. Natunola is the eighth recipient of the annual award, Award of Excellence, co-sponsored by Agriculture and Agri-food Canada and the Royal Agricultural Winter Fair in Toronto, which recognizes an individual, organization or business for an innovative contribution to the agri-food sector.

"We are very excited about our innovative flax products and the Award of Excellence," Dr. Han said. "These provide the catalyst for our company and our team to continue to expand our market share in the healthy food industry."

In the past few years, Natunola Health Inc. has sold a range of new flax products developed from dehulled flax, such as shelled flax kernel and shelled flax meal. These products are shelf stable and do not require grinding or refrigeration. Many retail products are now using the flax ingredients from Natunola. The company also has its own brand of retail products under the brand name of Health's Delight™. ■

Fitzpatrick wins Excellence Award

FC2015 Director of Human Health, Kelley Fitzpatrick, received the Industry Builder Award from the Western Canadian Functional Food and Natural Product Network (WCFN) during its conference in Winnipeg, Manitoba on November 24, 2008 at the Richardson Centre for Functional Foods and Nutraceuticals.

The WCFN press release says Kelley was recognized by this award because of her volunteer involvement and professional accomplishments that have been recognized across Canada, North America and worldwide for almost 20 years. Kelley has helped not only build organizational capacity within the sector at the provincial, regional and national level but also helped secure millions of dollars through grants, projects and other industry initiatives. Kelley Fitzpatrick truly exemplifies the values of the WCFN and the Industry Builder Award such as leadership, partnership and accountability.

Ms. Fitzpatrick serves as the Director of Health and Nutrition for “Flax Canada 2015”, a subsidiary of the Flax Council and is a regular contributor to Out of the Blue, a segment of this newsletter. FC2015 is a unique industry-government relationship with the aim of increasing the overall economic value of flax. In this role, she coordinates funding of private and public

initiatives in the areas of human and animal health and nutrition, functional food and natural health product (NHP) development, and plant genetics and agronomy.

Ms. Fitzpatrick is the current Chair of the Board of the Western Canadian Functional Food and Natural Health Product Network (WCFN). She is President of NutriTech Consulting within which she has completed projects involving regulatory reviews, GRAS and Novel Foods submissions; due diligence and feasibility studies, business plans and market trend analyses in the areas of food and health, and several research facilitation and priority setting exercises for government and industry.

Previously Ms. Fitzpatrick lead the activities of an international nutraceutical network, in which she provided assistance to the government, industry and academic community in the areas of nutrition, food science and processing, functional foods and natural health products. Kelley has also worked for the National Research Council of Canada and the University of Manitoba in business development and research commercialization.



Ms. Fitzpatrick has a Master of Science degree in Nutrition from the University of Manitoba and a Bachelor of Arts degree from the University of Winnipeg. ■



The Richardson Centre for Functional Foods and Nutraceuticals is dedicated to the discussion, discovery, and development of functional foods and nutraceuticals. Located in Smartpark Research and Technology Park, University of Manitoba, Winnipeg, Manitoba, the Centre conducts research with a focus on the crops of the Canadian Prairies. The Centre is committed to the potential and growth of researchers, industry, academia, and producers and is dedicated to the support of these groups.

FOCAL POINTS

Flax meets new fat needs

Omega-3-rich flax fortifies foods in some cases where oils without omega-3s have been chosen as ingredients because of their ability to reduce or eliminate *trans* and saturated fats.

It is a food chemist's dilemma when developing a product for the commercial market: which fat will make the best-tasting food, and also provide good nutrition. To meet these goals, food developers must pick and choose among soybean oil, canola, palm and sunflower oils, to name a few; all have different configurations of fatty acids. It's the fatty acid composition which determines a fat's nutritional benefit and whether the fat can be used in that application.

To be acceptable, fats must both satisfy nutritional needs, and perform well in a recipe. Balancing these two needs means taking a careful look at various fats. Today, food chemists have three goals when choosing the fat used in a food:

- Reduce *trans* fats
- Eliminate saturated fats
- Increase omega-3 fats

In the push to avoid *trans* fats, typically new oils have been stripped of omega-3 fats, including alpha-linolenic acid (ALA). Stripping out the ALA makes the food less attractive to people wanting omega-3s in their foods.

Food developers have to put the omega-3 back in. Flax oil doesn't work as well in frying or baking as some other oils because of its high polyunsaturated fatty acid levels. Yet, milled flax and other

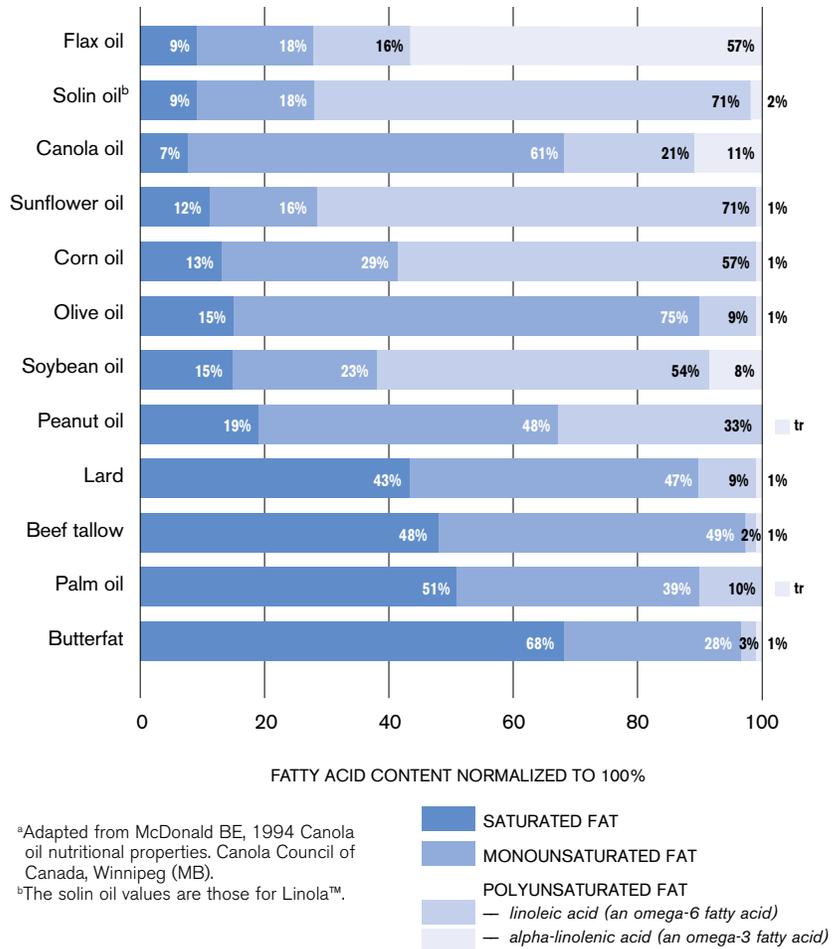
flax products are often used to fortify foods with omega-3 as they are high in the essential omega-3, ALA.

Flax has found a useful niche: milled flax and other flax products are used to add omega-3 fats by food developers in their quest to reformulate fat ingredients in foods. ■

Barry D. *Time for an oil change. Food product design.* Phoenix (AZ): Virgo Publishing. 2008 Feb. 53-63.

Flax oil has a high concentration of polyunsaturated fatty acids, and especially alpha-linolenic acid (ALA).

Comparison of saturated and unsaturated fatty acids in dietary fats and oils^a



Source: http://www.flaxcouncil.ca/english/pdf/FlxPmr_4ed_Chpt1.pdf

Manitoba Flax Growers Association

Victoria Inn – Salon 2

1350 Victoria Ave. West

Brandon, MB

WEDNESDAY, January 21, 2009

AGENDA

- 12:30 p.m. Coffee & Registration
- 1:00 p.m. Welcome & Announcements
Garvin Kabernick
- 1:15 p.m. Grain & Oilseed Market Outlook 2009
Lawrence Yakielashek – V.P. & G.M. Alfred C. Toepfer Canada Ltd.
- 1:45 p.m. Manitoba Flax Crop Survey 2008
Anatasia Kubinec – Oilseeds Specialist Manitoba Ag
- 2:30p.m. Flax Varieties & Trial Updates
Dr. Scott Duguid – Ag Canada Research, Morden
- 3:00p.m. Alternative Markets for Flax
Don Zegers – Zegers Seeds Inc. & Clement Hacault – Parent Seed Farms Ltd.
- 3:30p.m. New Herbicides for Flax – Update on “Headline”
Dwight Willoughby – BASF
- 4:00p.m. MFGA Annual Business Meeting
- 4:30p.m. Adjournment
-

For anyone not delivering flaxseed in this crop year who would like to retain a membership, voting privileges, and receive our literature please contact:

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Flax – Potential Functional Food Applications in Japan

By Kelley Fitzpatrick

In Japan, flax has traditionally been associated with industrial applications, particularly for paint and flooring, but increasing scientific evidence and promotional activities are moving more flax into the health sector. The opportunity for Canada to supply flax to this significant market is impressive.

The FCC and FC2015 have worked very closely in partnership with the Flaxseed Association of Japan (FAJ) in promoting flaxseed in the country. In September, Kelley Fitzpatrick, Director of Health and Nutrition for FC2015 had the opportunity to participate in the International Dietetics Congress (IDC) held in Yokohama, Japan. The FAJ and FC2015 jointly exhibited at the congress that attracted over four thousand international dietitians. Interest was high in the health benefits of flaxseed. The level of knowledge and awareness of the positive attributes of the fibre and lignan components of flax, in addition to the very well recognized omega-3 alpha linolenic acid (ALA) was impressive. Several requests were made for contacts to Canadian suppliers of milled flaxseed and oil for clinical trials.

A number of clinical trials focusing on health outcomes related to flax oil and milled seed are being

conducted by Japanese companies. The results were highlighted at a Seminar entitled “Flaxseed and the Metabolic Syndrome”, which was organized by FAJ and held at the Canadian Embassy in Tokyo following the IDC. For example, a study sponsored by Sadamitsu Foods, a producer of omega-3 enriched chicken, and ongoing at Tokushima University, is focusing on the consumption of flaxseed oil and its effect on small dense LDL (low density lipoprotein) cholesterol and the prevention of arteriosclerosis. Another trial being conducted at the Central Research lab of Nippon Flour Mill is examining the effects of flaxseed lignans on various genes expressed in Metabolic Syndrome. A publication of this work has recently appeared in the British Journal of Nutrition¹. Flax is also of interest in the prevention of diabetes and in the area of weight loss. Research at the Wayou Women’s University is concentrating on the consumption of flaxseed bread and the effect of Glycemic Index in lowering the risk of diabetes.

In October, Ms. Fitzpatrick was an invited speaker at a Seminar sponsored by the Canadian Embassy as part of a “Canada-Japan Innovation Week”. She provided a presentation on “Linking Agriculture and Health” in which the FC2015 model of health research was described. The Seminar itself was designed to raise the profile of Canada as a

¹ Fukumitsu, S. Aida, K. Ueno, N., et.al. 2008. Flaxseed lignan attenuates high-fat diet-induced fat accumulation and induces adiponectin expression in mice. Br. J. Nutr. 100:669.

successful innovation and commercialization partner for Japanese companies and researchers. More than 130 people attended the seminar. The diverse audience included Canadian and Japanese researchers, science and technology officers of the foreign diplomatic missions in Tokyo, officials from government departments, agencies and business contacts.

Interviews with Ms. Fitzpatrick about FC2015 and the health benefits of flaxseed later appeared in *The Chemical Daily*, a magazine with a circulation of 130,000 targeting Science and Technology communities; in *Health Industry Newspaper*, a trade paper targeting 65,000 readers in the health food, personal health and leisure industries, and *Food Industry Newspaper*, a publication with a circulation of 107,000 targeting the food industry and including manufacturers, retailers, wholesalers and importers.

So why should the Canadian flax industry be interested in the Japanese market?

Japan is widely recognized as the most developed and established market for “functional” health foods in the world. There are two unique features of this market, namely the range and diversity of products as well as the role that the government plays in promoting functional foods. Japan is the only country with a regulatory framework for functional foods, “Foods for Specified Health Uses” (FOSHU – Tokuhō in Japanese). This market has developed over the past 15 years. Japan has the second largest functional food market behind the U.S. with a value of approximately \$12.5 billion U.S. Since the inception of FOSHU in 1991, sales have been growing at an average of 25% annually².

Flax can play an important role in the health of the Japanese population which is aging more rapidly than any other country in the world, according to the Japanese Ministry of Health, Labour, and Welfare (MHLW). Currently, one in every five, or 24.3 million people are 65 years or older.³ By 2025, it is anticipated that 28% of the Japanese population will be 65 years or older in comparison to 18% in the United States. The current life expectancy for Japanese women is 85.2 years and 78.3 years for men, the world’s longest.

Although the Japanese population has the highest longevity in the world and is considered to be relatively healthy by global standards, the increasing costs of health care are a burden on the entire population. In 2006, nearly 50% of all medical expenses were for people aged 65 or older. Given the projected demographic trends, it is easy to understand the concerns in Japan regarding an impending health care financial crisis.

The major health concerns of the Japanese population are those related to aging and for which flaxseed and flax oil are the subjects of numerous clinical investigations. In 2003, the MHLW estimated that of deaths per 100,000 people, cancer claimed 242; heart diseases, 121; cardiovascular diseases, 115; pneumonia, 75 and 20 deaths related to diabetes⁴. The leading causes of death in Japan are cancer, cardiovascular diseases and cerebrovascular diseases⁵, all of which flax has shown benefit in risk reduction.

Canada as a country has a positive image and credibility in producing high quality crops such as flax. Japanese customs and the country’s strong interest in health and wellness is the foundation that could make Japan the world’s second-largest flax market after North America. ■

² Bailey, R. 2006. Japan: A regulatory update for functional foods & nutraceuticals. *Nutraceuticals World*. July/August.

³ Ministry of Health, Labor and Welfare. Japan. 2002.

⁴ Ministry of Health, Labor and Welfare. National Nutrition Survey in Japan, 2002.

⁵ “Deaths in Japan”, *Nikkei Weekly*, July 8, 2002.

Clothing retailer chooses linoleum for comfort and savings

by Peter McKinnon

The unique characteristics of linoleum make it the ideal flooring material for about 40 percent of floors installed in Le Château stores. This company is one of Canada's largest, busiest and most successful retail clothing chains. The company's phenomenal growth – from a single Montreal store in the 1960s to more than 200 stores across North America today – is the result of many factors, such as an eye for fashion and careful attention to the smallest of details, including flooring materials.

“Linoleum stands up to heavy foot traffic, requires relatively little maintenance, and is easy on the legs,” says Konstantin Nifakos, principal architect with the Montreal-based firm. “As a designer, I also like the fact that linoleum comes in a variety of finishes, colours and patterns.”

The natural advantages of Marmoleum™

Linoleum is a resilient, durable material made from all-natural ingredients including linseed oil from Canadian flax, tree rosin and jute. Le Château prefers Marmoleum™, a product made by Forbo Flooring Inc., a leading manufacturer of linoleum. According to Konstantin Nifakos, many of Le Château's stores located in shopping malls have linoleum floors.

“Our employees, who tend to be on their feet all day, like the fact that Marmoleum™ is easier on their legs than marble or other materials,” says Nifakos.

■ Easy to maintain

Linoleum also offers cleaning and maintenance advantages. “It's easy to keep linoleum clean, even in our busiest stores,” says Konstantin Nifakos. “Our employees mop the floors everyday; the busiest stores are typically stripped and resealed once a year. Cuts and holes can be repaired with a simple patch and weld.”

■ Offers flexibility in store layouts

As Konstantin Nifakos explains, Marmoleum™ also accommodates regular adjustments in store layout. “Much of our merchandise is displayed in racks mounted on casters. It's relatively easy for staff to reposition the racks and reconfigure a store's layout because linoleum floors are seamless. And there's little risk of damaging the floors.”

■ Is environmentally friendly

The fact that linoleum is environmentally friendly is another big plus. Because linoleum is made from natural ingredients, it doesn't emit noxious fumes and is completely biodegradable.

“Our decisions about what goes into each store are influenced by a number of factors,” says Nifakos. “Marmoleum™ certainly satisfies the requirements for many of Le Château's stores.” ■

For more information, please contact John Oliver, Chair, Flax Canada 2015 Inc. at (905) 706-1405; Les Rankin, Co-ordinator, and Director, Industrial and Fibre Uses; Kelley Fitzpatrick, Director, Health and Nutrition at the Flax Canada 2015 Inc. office at (204) 982-2115, or email: fc2015@fc2015.ca

www.fc2015.ca



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