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DIETARY FIBRE: Pandora's Box or The Next Big Trend for Consumer Health?

This is the first of a two part series on fibre. This month's installment looks at traditional and novel forms of fibre, formulation challenges and the current Health Canada debate on the evolving definition for fibre. Part two will outline various novel forms of fibre and health claims.

The *Dietary Guidelines for Americans*, released in January, identified dietary fibre as the only macronutrient that consumers need to significantly increase in their diet. Increasing dietary fibre consumption can lower cholesterol, reduce the risk of cancer, control blood sugar and help in weight loss. It seems dietary fibre, both soluble and insoluble, is just what the doctor ordered!

Cardiovascular health: Soluble fibre has been proven to reduce blood cholesterol levels, helping in the reduction of heart

disease. In order to reinforce this relationship in the U.S., the Food and Drug Administration has approved health claims for beta glucan in oats and psyllium husks.

Gastrointestinal health: Fibre maintains regularity and some types can function as a prebiotic, increasing the beneficial micro flora in the gut and enhancing the gastrointestinal and immune system.

Weight Management: Fibre fills you up and breaks down much more slowly (if at all) than other carbohydrates. A study of more than 74,000 nurses in the U.S. showed that the women with the highest dietary fibre intake gained an average of 3.5 lbs (1.52 kg) less than the women with the lowest levels of fibre intake.

Cancer: Fibre has been associated with preventing specific types of bowel and breast cancer. In one study it was concluded that individuals with a low average intake of fibre could reduce their risk of colorectal cancer by 40 per cent if they doubled their fibre intake.

Furthermore, those with type II diabetes or anyone in a pre-diabetic condition can maintain a healthier blood sugar level with higher fibre consumption, since fibre does not readily break down into glucose units compared to other carbohydrates.

"There is ample evidence that fibre is good for you," says Dr. Alison Duncan, a professor in Human Biology and Nutritional Sciences at the University of Guelph. "Incorporating fibre into our diet is one of the best things that we can do for our health." Duncan recommends that consumers look for more whole grains in bread and cereals and consume more fruits and vegetables.

She says research demonstrates that both soluble and insoluble fibre are important to a healthy diet, a distinction that has become clear with studies on beta glucan in oat bran, and the effects of other soluble fibres such as psyllium, inulin, other fructooligosaccharides and galactooligosaccharides.

The challenge is to get consumers to eat more soluble and insoluble fibre. Health Canada recommends that Canadians consume approximately 25 grams (as much as 38 grams for males over 19) of dietary fibre per day. However, provincial food surveys, such as the 2003 Ontario Food Survey, suggest that it is likely that on average we only consume about 15 to 19 grams per day.

There is good evidence that with rising health care costs, an aging population and concerns about an ever-increasing national obesity rate adding fibre to processed foods could be the next wave in the North American health and wellness trend. Food companies can play a significant role in promoting consumer health by increasing fibre levels in foods.

Formulating with Dietary Fibre

Formulating products with dietary fibre in Canada is a little like opening Pandora's Box. Questions like: What is dietary fibre? What ingredients can we use? and What dietary fibre claims can we make? unravel to form a series of contentious issues that threaten the competitiveness of the industry.

According to Health Canada, the current Canadian definition of dietary fibre is: Endogenous components of plant material in the diet which are resistant to digestion by enzymes produced by man. They are predominantly non-starch polysaccharides and lignin and may include, in addition, associated substances.

There are two types of fibre: soluble, which will dissolve in water, and insoluble, which will not dissolve in water. The total fibre content of most plant foods consists of both types in varying amounts. Under Canadian guidelines, fibres are defined as traditional or novel.

Traditional Fibres

Traditional fibres and fibre sources are those that come from whole grains and seeds. Examples include corn bran, oat bran, coarse wheat bran, medium wheat bran and whole foods such as fruits, vegetables, traditionally milled grains including rare grains, legumes, nuts and seeds such as flax. During the recent low-carb craze numerous processors used wheat, corn and oat bran to replace some of the simple carbohydrates in their foods, thus reducing what Atkin's calls impact or net carbs. In September 2004, General Mills announced that it would become the only food company with 100 per cent of its cereals made from whole grains. This list includes Honey Chex, Cheerios, Golden Grahams, Lucky Charms and Oatmeal Crisp.

There are many suppliers of traditional fibres. Millers and other ingredient companies sell various blends of fibres or premixes for food applications in the baking, pasta and snack food industries. These blends incorporate bran and other fibres at various levels. Even at moderate levels (15 to 20 per cent), traditional fibre ingredients can drastically affect the sensory and functional properties of a product. For example, high levels (20 to 30 per cent) of certain brans can impart a nutty flavour, increase water binding capacity and darken the colour of a product. During formulation there needs to be some compatibility between the product and the fibre source. For example, corn bran will be lighter in colour and contribute less to the flavour than wheat bran. Furthermore, most traditional fibres are insoluble and not effective in beverages or liquid-based products, such as yogurt, where solubility is important.

Novel Fibres

Due to the functional and sensory limitations of many traditional fibres, new fibre products have hit the market. Canadian guidelines refer to many of these new fibres as novel fibres.

A novel fibre or novel fibre source is a food that has been manufactured to be a source of dietary fibre, and:

a) has not traditionally been used for human consumption to any significant extent; or
b) has been chemically processed or physically processed so as to modify the properties of the fibre; or
c) has been highly concentrated from its plant source.

Novel Fibre sources cannot be declared as dietary fibre on a food label unless they demonstrate a series of physiological affects and are approved by Health Canada. Examples of approved novel fibres include: oat hull fibre, psyllium seed husk, rice bran, soy cotyledon fibre, sugar beet fibre and fine wheat bran (less than 0.5 mm in particle size). It should be noted that novel fibre applications are approved on a case-

by-case basis and are often tied to the specific brand of a fibre ingredient.

The approval process for novel fibres in Canada can be lengthy. Submissions, including scientific and clinical studies, must be made to Health Canada, often followed by a series of requests for additional information. In some cases, ingredients that have been recognized as fibre by health agencies in other countries have still not received approval in Canada several years after the initial submission.

The Definition Debate

If there were a lightning rod to the fibre debate, it would be the evolving definition of fibre. The American Association of Cereal Chemists and the Institute of Medicine of the U.S. National Academies of Science have put two relatively new and progressive definitions forward. Unfortunately, the two are not in complete agreement with one another, but fortunately, neither is as restrictive as Canada's current definition.

According to Nora Lee, acting chief of nutrition evaluation division for Health Canada, Health Canada is applying the recommendations of the Institute of Medicine (IOM) following consideration and consultation as needed. "In the case of dietary fibre, Health Canada intends to review the long-standing current definition in light of the recommendations from the IOM and to propose how it would affect our policies on dietary fibre in a document for comments from stakeholders," says Lee. "This is among our important commitments but currently we have not scheduled when it will take place."

Herein lies the crux of the problem – timing. As other countries move forward with their new definitions of dietary fibre, as obesity and other health issues increase in magnitude, and as consumers demand more and better, good tasting products containing fibre, the Canadian food industry urgently needs to respond.

"Health Canada is recognized in many international scientific and regulatory circles as a leader in its scientific understanding of dietary fibre. It has the expertise to reconcile the expanding definition of dietary fibre into a set of regulations," says Carol Culhane, a food industry analyst and president of International Food Focus. "Given the growing importance of fibre in promoting the health of Canadians, moving forward should be an urgent priority. The government does an immense disservice to consumers, the industry and itself by failing to mobilize its scientific resources and recognize that the current definition is outdated and inflexible."

So the debate continues, with little resolution in sight, and is leading to a crisis of competitiveness and innovation in the Canadian food industry.

Dietary Fibres Allowed in Canada

Allowed in Canada as Traditional or Novel Ingredients		Acceptable as Ingredient	Included in Label
Apple pomace (Treetop brand)	Novel	Yes	No
Corn bran by traditional milling	Traditional	Yes	Yes
Corn bran (greater than 65% TDF)	Novel	Yes	No
Mustard bran	Novel	Yes (as condiment)	No
Oat bran (greater or equal to 13% dietary fibre of which 30% or more is soluble at 12% or lower moisture)	Traditional	Yes	Yes
Oat Hulls – ground bleached (Canadian Harvest or Opta Food Ingredients)	Novel	Yes (in grain & bakery products)	Yes Yes
Pea Hulls unbleached (Woodstone Foods and Parrheim Foods)	Novel	Yes	Yes (bakery & cereal)
Psyllium seed husk	Novel	Yes (in individual products accepted by HPFB)	Yes (if accepted)
Rice bran (Farmers rice Cooperative)	Novel	Yes	Yes
Soy cotyledon (Fibrim)	Novel	Yes	Yes
Sugar beet fibre (Fibrex Delta Fibre foods)	Novel	Yes	Yes (bakery products)
Wheat bran coarse (greater than 0.75 mm in size)	Traditional	Yes	Yes
Wheat bran medium (0.5 – 0.75 mm)	Traditional	Yes	Yes
Wheat bran fine (less than 0.5 mm)	Novel	Yes	No
Starch reduced wheat (Fiprotein MohawkOil 0.6 mm)	Novel	Yes	Yes (bakery products)
Whole foods fruits, vegetables, traditionally milled grains, seeds, nuts	Traditional	Yes	Yes (not finely ground)

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