Quality
is in our nature

Canada

The Case for Canadian Mustard

Quality is in our nature

Canada

A Perfect Place for Mustard

The Prairies of Canada

Canada's Prairie climate, with its warm, dry summers and cold, dry winters, has proven to be an ideal environment for growing mustard. As a result, Canada now exports more of this valuable crop than any other country in the world, and is the world's second-largest mustard producer as well.

The industry began in a very small way, with a modest 40 hectares planted in southern Alberta in 1936. But production was soon growing by leaps and bounds as it became clear that Prairie growing conditions brought excellent mustard yields of high quality, together with a relatively low risk of crop failure. By 1950 Canadian mustard growers were planting 20,000 hectares of the crop every year and, by 1960, that figure had tripled to 60,000 hectares.

Three types of mustard—yellow, brown and oriental—are commonly grown on the Prairies, and the crop has become a valuable way to diversify production in the brown and dark-brown soil zones of the Canadian west. It needs only a short growing season; 80 to 85 days is sufficient for yellow mustard, and 90 to 95 days for the oriental and brown varieties. Most of the crop comes from south-central Saskatchewan, with smaller amounts being grown in southern Alberta.

One reason for the high quality of Canadian mustard is the hot, dry weather that the growing regions usually experience in July, which contributes to a reduced concentration of fixed oils and a higher content of protein and glucosinolate. This is ideal for mustard processors, who generally prefer a crop with lower fixed-oil levels. In the case of yellow mustard, the Prairie day lengths and sunny summers contribute to a greater intensity of seed colour.

A second big advantage of the Prairie climate is that harvest times are typically characterized by warm, dry conditions and strong, drying winds, which facilitates harvesting and further enhances crop quality. In addition, the cold, dry winters provide good storage conditions for preserving seed quality.

Finally, because of the large scale of production, and because of the large number of producers involved, Canada can consistently meet the international demand for this valuable and widely consumed commodity.

Quality is in our nature

Canada

A Matter of Trust

Quality assurance in Canada's mustard industry

The producers, processors and exporters of Canada's mustard industry are tightly linked in a supply chain that emphasizes crop quality and identity preservation. This uncompromising attention to excellence, together with Canada's huge mustard supply ranging from 200,000 to 380,000 tonnes annually during the past five crop years, assures an abundant and reliable source of mustard for North American and international buyers.

Monitoring and identity preserved production

The quality of Canada's mustard is verified by the crop monitoring and quality assurance programs of the Canadian Grain Commission (CGC), and by the work of the CGC's Grain Research Laboratory. Together, these services provide buyers with extensive and objective information about the quality of the annual crop and about industry's ability to deliver specific shipments of Canadian mustard.

Production contracts are widely used in the Canadian mustard sector and are a first step in meeting precise buyer requirements. The use of production contracts has been enhanced in recent years by identity preserved (IP) mustard production programs implemented by suppliers and verified by the CGC. A number of mustard buyers now demand IP production because it requires crop segregation, absence of commingling, traceability, product purity and a guarantee that the supplier will deliver mustard with the exact qualities and attributes specified by the buyer.

To ensure that the supply and production chain meets these requirements, Canada has established the Canadian Identity Preserved Recognition System (CIPRS), a third-party verification and certification service delivered by the CGC. CIPRS certification guarantees that a company has established effective quality-management systems for the production, handling, and transportation of mustard, and that the product is fully documented and traceable from seed to export vessel, or from seed to domestic end user.

Benefits of the CIPRS

CIPRS has several important benefits for buyers:

- They receive exactly the mustard variety they ordered.
- They know where the mustard comes from, back to the field in which it grew and the seed used to grow it.
- They can be assured that due diligence has been exercised throughout the supply chain, and that all documentation and records are in place to ensure product integrity and traceability.
- They can be confident that the program is effectively overseen by the Canadian Grain Commission. The CGC is globally recognized and has vast experience in maintaining quality standards for grains and oilseeds. CIPRS is ISO-based and is being harmonized with other national standards as well.

For more information on CIPRS, please visit the CGC website at:
www.grainscanada.gc.ca/Prodser/ciprs/ciprs1-e.asp

CGC's Grain Research Laboratory

The CGC's Grain Research Laboratory also publishes a detailed report on the quality of western Canadian mustard. The report includes information on the oil, protein and glucosinolate contents and the fatty acid composition of oriental, brown and yellow mustard. The report can be found on the following website: www.grainscanada.gc.ca/quality-qualite/iaqm-mrsq-eng.htm.

Quality is in our nature

Canada

Building a Better Mustard

Canada's superior cultivars

Canada's long-term programs for developing superior mustard varieties have produced a range of cultivars that provide large yields, high quality and excellent resistance to disease. This has given North American and international buyers a dependable supply of mustards with the latest genetics and the latest functional and nutritional advantages.

Sophisticated R&D

The development of Canadian mustards tailored to Prairie growing conditions goes back to the 1940s, and continues now at Agriculture and Agri-Food Canada's Saskatoon Research Centre (AAFC-SRC). AAFC-SRC is the only Canadian public institution currently doing significant mustard R&D, and it is backed by a sophisticated research infrastructure that includes:

- a seed-quality analysis laboratory to assess mustard traits;
- land for field tests of seeding, growing and harvesting;
- facilities for field tests of seed-cleaning and drying equipment;
- genomics resources for mustard improvement;
- a cytogenetics and plant tissue laboratory for developing genetically diverse breeding populations;
- facilities for production of new breeding populations; and
- infrastructure for pathology testing.

Improved cultivars

Canadian mustard R&D delivers unique and improved varieties of seed that benefit both growers and processors. Increased seed weight and mucilage content, for example, were priorities in developing the new yellow mustard variety Andante, which was registered in 2002. Lower fixed-oil and chlorophyll content, and changes in the hot principle to meet different processing requirements, are among the other seed quality improvements targeted by AAFC-SRC researchers.

New lines of mustard must also guarantee uniform and consistent quality. To ensure that only these superior cultivars are introduced into the marketplace, each variety first undergoes peer approval and recommendation for registration by the Prairie Recommending Committee for Oilseeds. Once it is recommended, the Variety Registration Office of the Canadian Food Inspection Agency (CFIA) reviews the performance data of the cultivar and officially registers the new mustard.

Looking to the future

In years to come, North American and international mustard buyers can expect to see even more advanced varieties originating from Canada. Now being bred in the laboratory and the field, these cultivars are GMO-free, and no genetic modification techniques are being used in their development.

Among the R&D objectives for Canadian mustard are:

- further improvements in seed quality, disease resistance and yield;
- improved colouring, protein content and mucilage content in yellow mustard;
- lower fixed-oil content in yellow and oriental mustards;
- tailoring of different hot-principle levels for different markets; and
- improved weed and pest control.

The global appetite for mustard is growing at a fast pace. Canada's sophisticated R&D into this valuable crop ensures a steady flow of advanced varieties that will help the mustard industry meet the needs of its rapidly evolving market.

Quality is in our nature

Canada

Magical Mustard

Medicine with savour

Mustard's aromatic zest has been a favourite of cooks and diners for thousands of years, but there's far more to mustard than piquant flavouring. In folklore, mustard has long been credited with numerous health benefits; among these are improved appetite and better digestion owing to the increased flow of saliva and gastric juices. It has also been used as a laxative, a cough suppressant and a diuretic.

Honourable traditions

Mustard plasters, of course, were a traditional treatment for aching muscles and rheumatic pain, and for relieving the sinus congestion and sore throat that accompany the common cold. Mustard has long been used to treat skin diseases because of its high sulphur content, and its reputation as an anti-inflammatory goes back for centuries. The oils in mustard seed are good anti-fungal and antiseptic agents that inhibit the growth of certain moulds, yeasts and bacteria, and this has made mustard a natural preservative that permits food to be stored longer with greater safety.

New directions

Research indicates that mustard may offer even more benefits than those suggested by tradition. It's a healthy and nutritious condiment because its intense flavour comes with a very low calorie count—less than five calories per gram of mustard flour—and because it contains a cornucopia of essential minerals including calcium, iron, manganese, magnesium, phosphorus, selenium and zinc. Mustard seed is about 25 percent protein but contains no cholesterol, and it's a good source of the omega-3 fatty acids that may help cut the risk of heart disease.

Yellow mustard seed is an especially good source of dietary fibre in the form of mucilage gum, which is found in the seed coat. The fibre is easy to extract and to incorporate into foods and nutraceuticals, and extensive research suggests that dietary fibre from mustard may someday play a role in controlling certain cancers. In studies of colon cancer, for example, researchers have discovered that mustard gum can retard the growth of precancerous lesions in laboratory animals, and such lesions are also present in humans who have a high risk of developing colon cancer. In addition, research into diabetes suggests a role for mustard-gum fibre in managing the pre-diabetic states of insulin resistance in humans.

Mineral medicine

But the possible benefits don't end there. Mustard seeds are a very good source of selenium, and medical evidence has demonstrated that this mineral has protective effects related to colorectal, prostate and lung cancer, as well as to cardiovascular diseases and inflammation. Mustard seeds are also rich in magnesium, which the human body needs for many vital functions such as controlling blood pressure and blood sugar levels, and regulating heart rhythm. These characteristics suggest possible roles for mustard in managing disorders such as hypertension and diabetes.

Research now supports tradition in valuing mustard as a real contributor to human health. For the agri-food industry, this opens up fresh possibilities for mustard as a component of functional foods and nutraceuticals, possibilities that can be used not only to add value to existing products, but also to develop new ones in response to growing consumer demand.

Quality is in our nature

Canada

More Than Just a Spice

Tradition and innovation in Canadian mustard

Almost anyone who has eaten a hot dog or hamburger knows the zestful, savoury taste of mustard. But the story of this tremendously adaptable spice doesn't end at the table — from food to fuel, mustard has innovative uses we're just now beginning to explore.

Even as a condiment it's highly versatile. Yellow mustard, the mildest type, is a favourite accompaniment for many foods. Brown mustard is the base for hotter preparations such as Dijon mustard, while the oriental variety is the essential ingredient in the specialty mustards prized by discriminating diners. As an ingredient in other products, it's vital to the piquancy and flavour of pickles, relishes, ketchups, mayonnaises, sauces and salad dressings.

But for the food industry as a whole, the uses of mustard go far beyond spicing up a jar of pickles. When ground into flour and treated to reduce its pungency, it becomes de-heated ground mustard (DGM), a product with a myriad of uses. For the meat processing industry, DGM is an excellent oil- and water-binding agent and a valuable emulsifier. It gives a smooth texture to meat products and improves the flavour and usability of convenience foods such as wieners and luncheon meats.

DGM is a vital ingredient for the baking industry as well. It enhances flavour, water absorption and shelf life, and because it's a good emulsifier, it can replace egg yolk in the preparation of many products. It improves the slicing quality and heat stability of processed cheese, and improves the colour and taste of the batter coatings of fried foods.

Because its seed is so rich in oil, and because of its high protein and fibre content, mustard holds great promise for developing new products that go well beyond its traditional uses. Enhancing food safety is a further possibility, owing to the fact that mustard contains chemicals that retard or prevent the growth of many food-borne pathogens. Certain types of ground mustard, for example, can reduce the viability of dangerous bacteria in ground beef, an effect that could significantly improve the safety of hamburger meat.

Green pest control

But mustard is speedily becoming more than a food ingredient. Canadian researchers and entrepreneurs are discovering new and important uses for the crop, such as the environmentally friendly bio-pesticide developed over the past 10 years by Nematrol, an Ontario technology corporation, and Peacock Industries, a manufacturer based in Saskatchewan. Derived from oriental mustard, this innovative bio-pesticide is designed to control nematodes, microscopic worms that feed on the roots of all kinds of crops. Nematodes are a major pest throughout the world's temperate zones, and it's estimated that they cause worldwide crop losses of US$78 billion annually.

The potential market for this new nematicide is enormous, especially since the only other registered agent for nematode control is being phased out because of its toxicity. By contrast, the mustard-based nematicide is made from food-grade materials, so it's safe for both humans and the environment. The largest and most lucrative markets are expected to be professional golf courses, home lawn care, the flower- and vegetable-garden markets, specialty markets in Europe, and markets worldwide that require the use of environmentally friendly pesticides.

Fuels and fertilizers

Better yet, the production of the nematicide requires de-oiling the mustard, and the oil by-product turns out to be a very useful biodiesel additive. Because of its excellent lubricating qualities, this mustard-oil additive will become increasingly important as Canadian diesel fuel moves to ultra-low-sulphur standards and thus loses the lubrication formerly provided by the sulphur in the fuel.

Mustard oil also has high lubricity and cetane-enhancing qualities, which help improve diesel engine performance and efficiency, and it's better for these purposes than canola oil, the other commonly used biodiesel additive. Moreover, mustard oil costs considerably less than canola because mustard does not have an edible-oil market.

And as if this weren't enough, Bio-Green Technologies of Saskatchewan has recently launched a product called Mustard Organic Soil Stabilizer (MOSS), which is a natural bio-fertilizer and soil stabilizer derived from mustard seed. It's ideal for restoring damaged or poor soils, and slowly releases safe, organic, and environmentally friendly nutrients while enhancing plant growth.

AAFC No. 11537E