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Agri-Food Canada

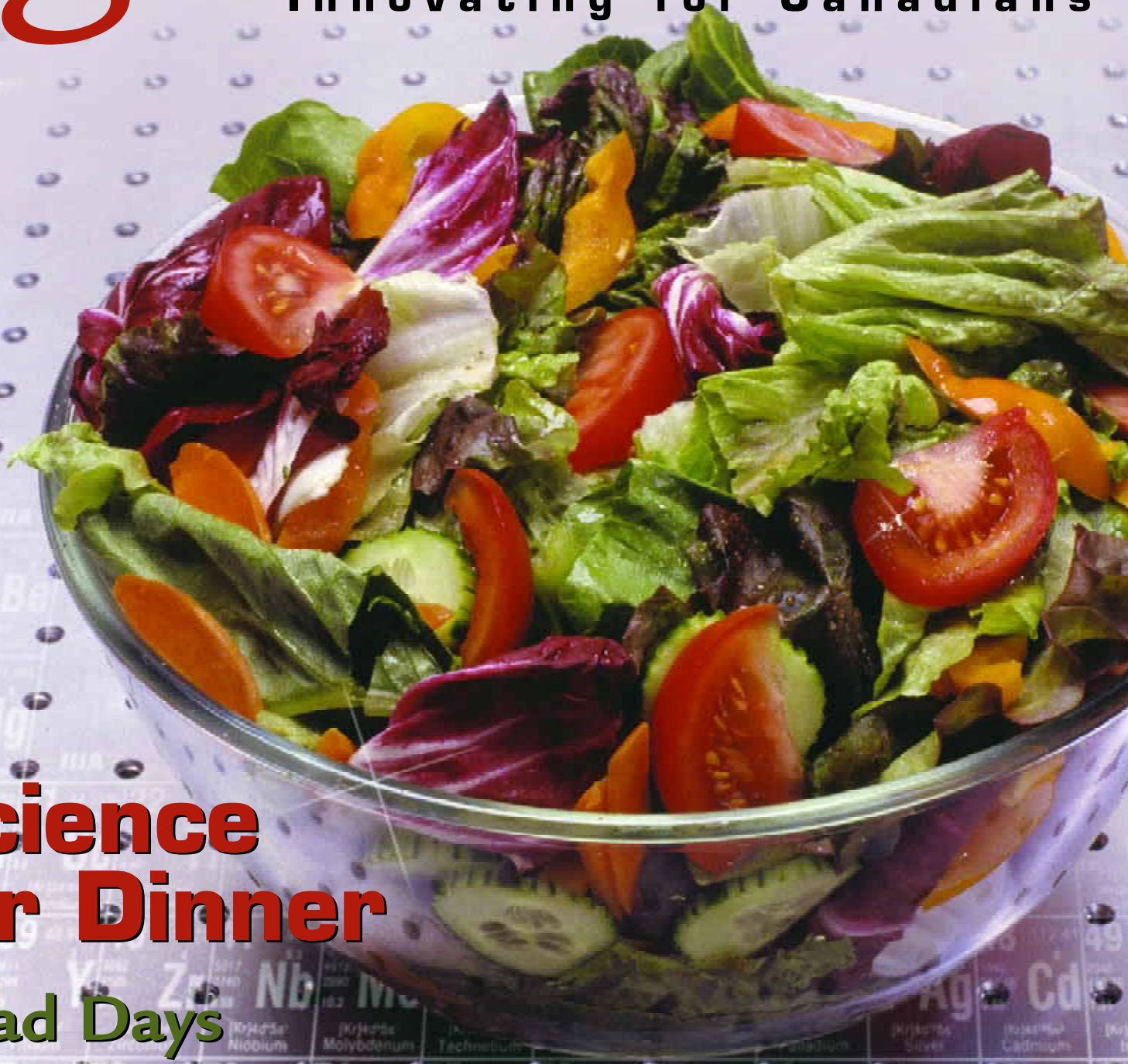
Agriculture et  
Agroalimentaire Canada

Canada

Vol 1, No 1

# agri-science

Innovating for Canadians



## Science for Dinner

### Salad Days

### Feeding the Garden





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# So much science behind a summer meal

Welcome to the inaugural edition of *Agri-Science, Agriculture and Agri-Food Canada's* new quarterly newsmagazine.

The goal is to tell you about the agricultural and food research that takes place in our labs across the country. Not just what we do, but why we're doing it, and what it means to you.

It's about how science makes your life better by laying the foundation for a sustainable agri-food sector.

That's a topic that touches all Canadians in a number of ways. Certainly, there's the contribution to a safe, nutritious and abundant food supply. But the impact runs deeper than that. Science also leads the way to a healthy environment. And it promotes economic growth through innovative new products and processes.

These objectives are met by having the best practitioners working in state-of-the-art labs. Whether it's unraveling the genomic mysteries of life, boosting the bioavailability of nutrients, or using satellite technology and computer modelling to fine-tune farming practices, agri-food science is a wellspring for improving the Canadian quality of life.

Which brings us to dinner. For our first issue, we have chosen to illustrate the

impact of our work by describing just some of the science that takes place before a summer meal gets to the table.

The magazine also features regular departments. Here's what you can expect to see — an introductory editorial to set up the issue's theme, a close-up of one of our research centres, a scientist profile, and a round-up of some of the recognition our people have recently received.

Your feedback is key to helping us keep this product dynamic and relevant. So take a good look, and tell us what you like, and what you'd like to see. We have some great stories to tell. We hope you enjoy them. ::

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# Cereal breeder garners nation's top honour

Cereal breeder  
Ron DePauw's Prairie  
roots run deep to  
homesteaders who first  
broke sod in 1908.

The Agriculture and Agri-Food Canada (AAFC) researcher is proud of his lineage and has given back much to the Canadian farming community where he grew up.

In fact, he has contributed so much to wheat growing in Western Canada that he has been appointed a Member of the Order of Canada for his 'significant role in shaping our agricultural industry.'

Dr. DePauw's efforts as a scientist in Swift Current, Saskatchewan, have been recognized in international plant breeding circles. But for him, nothing compares to this honour he has received from his own country.

"I'm just blown out of the pond by being awarded the Order of Canada," Dr. DePauw said. "It's a humbling experience."

And he is a humble man. Although he is known as the lead architect of important new classes of wheat, Dr. DePauw is quick to compliment his research team and gives its members much credit for developing cultivars with high yields and high protein content.



**Ron DePauw receives the Order of Canada from Her Excellency, Governor General Adrienne Clarkson, on May 14 of this year.**

Working vigorously since 1980, the Cereal Breeding Team at Swift Current has contributed significantly to the competitive edge held by Western Canadian producers.

"The team has released 34 cereal cultivars in four classes of wheat, triticale and winter rye, which I guess makes it pretty likely that most Canadians have eaten some of our work," mused Dr. DePauw.

Varieties from the breeding program have come to fill a large portion of Canadian wheat acreage. In recent years this has extended to more than 98 per cent for Canadian Prairie Red Spring wheats, 80 - 90 per cent for durum, more than 50 per cent for



Canada Western Red Spring wheat, more than 95 per cent for rye, and nearly 80 per cent for triticale.

“Our Canadian Western Red Spring varieties are environmentally friendly,” Dr. DePauw said. “They use water very efficiently, take up nutrients very effectively, are disease resistant and are less susceptible to pre-harvest sprouting.”

He sees this adaptation to climate and resources as a fundamental contribution to reducing business risk for farmers.

The Canada Western Red Spring varieties such as AC Barrie, AC Elsa, AC Cadillac and AC Intrepid help the bottom line. They are drought resistant, require less fertilizer and fewer pesticides. They possess a combination of qualities that make them more likely to end up as bread on the table.

The breeding team doesn't just guess at what cereals will take off in the marketplace. It takes cues from its close contact with the Canadian Wheat Board and Canada Grain Commission, and nurtures good working relationships with producer crop clubs, agri-food primary industries including seed companies and line elevators, and provincial organizations.

Investment in development of new cereal varieties returns more than \$40 for each dollar invested. Producers, processors and other segments of the Canadian economy share in this return, according to Dr. DePauw.

“We use our collective knowledge and our natural resources to boost the bottom line for grain producers in Western Canada, and for Canadian society,” he said. “Not only my team in Swift Current, but the AAFC cereal scientists and technicians across Canada are doing a fantastic job.”

Dr. DePauw won't spend time basking in any of the award's glory because, as he noted, neither the market nor growing conditions remain static.

“As we look to the longer term and the possibility of climate change, we must continue building into our grain varieties much better drought tolerance and other essential characteristics,” he said. “With each new development comes another possibility, another door to walk through, that will allow us to put out a better product.”

Across Canada, AAFC cereal breeders are developing cultivars that meet the market needs of Canadian producers, meet consumer needs for safe, nutritious food, and preserve or improve the quality of the environment. ∴

[Please see also \*Weed scientist\* p.22](#)



# Food Research Centre plays pivotal role in food safety science

There are times when thinking small pays big dividends.

That's how it is with Agriculture and Agri-Food Canada's Food Research Centre (FRC) in Guelph, where scientists are taking a hard look at food on a micro level. It's an approach that's helping them come up with new perspectives in food safety and nutrition.

The FRC is the newest member of AAFC's network of research centres located across the country. From its home on the campus of the University of Guelph, the centre is ideally positioned to tap a wealth of expertise both within and beyond its labs.





The focus of the centre's activities is to improve food quality, reduce processing costs, add value to agricultural raw materials for food and non-food uses, and support a healthy diet for Canadians. One of the ways to do this is to take foods apart to learn the properties of the various components.

For instance, oats have long had a reputation for positive effects like lowering the bad cholesterol levels in blood. But to fully exploit this effect, scientists need to know what's doing it and how it works, if it works in isolation and if it can be extracted. At the FRC, scientists have been studying the beta-glucans taken from oat bran, and have found validity for the health claims. Similarly, nutraceutical research is looking at lycopene in tomatoes, certain compounds in wheat, and various forms of starch and dietary fibre, to name but a few. The goal is to develop new processes and ingredients that add value to food and non-food products.

Another key area of research is in food preservation technologies. It's essentially the battle of the bugs, where spoilage is the unwanted result. Scientists at the centre are researching so-called hurdle technologies which involve the use of multiple preservation techniques. What this means is that once one line of defence is breached, another steps in to thwart the attack.

Scientists are also developing biological strategies to curb diseases such as salmonella. Researchers are looking at beneficial bacteria to control pathogens in livestock, as an alternative to the use of antibiotics. They're also investigating the possibilities of using a virus that attacks bacteria, to control human pathogens on food and vegetables, and for the treatment of dairy cattle. ::



# Nancy Ames, Cereal Chemist

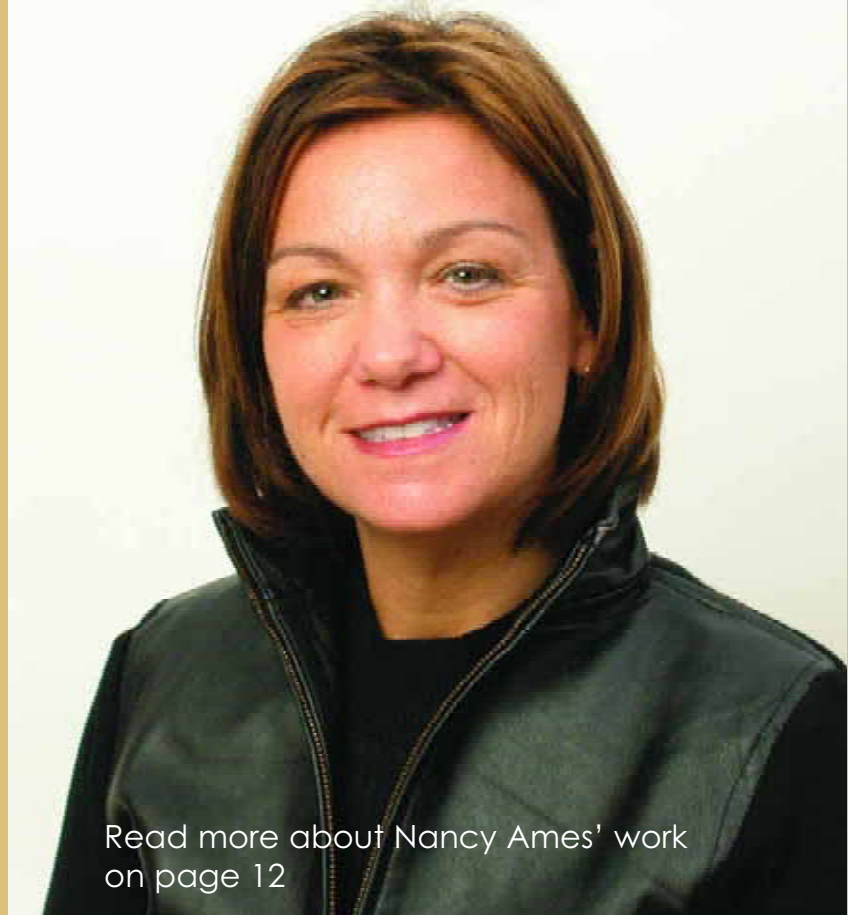
As a cereal chemist, Nancy Ames explores promising links between selected grain components and human health.

As an innovator, Dr. Ames has identified new opportunities for barley as a healthy food choice. Her work in developing barley-based food products like tortillas and taco chips — products high in beta-glucans and fibre — has sparked the interest of health-conscious consumers and food manufacturers.

"I've been interested in food since grade school," says the University of Manitoba food science graduate. "Back then I'd ask myself, 'Why does a cake rise? What does baking powder do?' A colleague calls this 'kitchen chemistry'. I think I knew even then that I would make a career out of food science."

At university, it was a female professor who became her mentor, encouraging Nancy to pursue graduate studies. But first, Dr. Ames wanted to spend some time in the field. She worked for two years as a forage specialist at Manitoba Agriculture.

"I have always had strong ties to agriculture," she says. "When I was with the province I worked closely with producers. I listened to them and helped them find solutions to problems." Nancy did post-graduate work in crop science, earning a Ph.D. from the University of Guelph. The combination of food studies, field experience and plant science provided the researcher with a solid foundation and a clear set of goals.



Read more about Nancy Ames' work on page 12

"I feel privileged to work in a public research institution," says Dr. Ames. "Every day is different and every day we discover something new. We have an opportunity to actually make a difference, to improve the foods we eat."

Dr. Ames considers herself lucky to be working in an area where many of the things she does in her day-to-day life relate to her work.

"I use my daily interactions with family and others to think about what I might work on next," she says.

As a mother of two, she is naturally concerned with her children's diet. She studies their eating habits and can recognize their need for food that's not only tasty, but high in fibre, for example. It was this less-than-scientific observation that led Ames to experiment with using barley for tortillas. "My children loved wraps as an alternative to sandwiches. I knew that barley packed



a nutritional punch, so experimenting with barley wraps (tortillas) seemed like a logical thing to do in the lab.”

Dr. Ames is proud of her success to date with her barley studies, but her involvement in the project will not end with the completion of the lab work. “When we thought about the value of some of the components of barley, we followed it right through to the development of a product. We’re still trying to get barley tortillas on the store shelves. That’s not the normal job of a scientist, but we go where we need to go to make sure that our research isn’t left on the shelf, so to speak.”

As she explores new areas of study, Ames believes that several societal issues could be addressed through her research. She sees childhood obesity as an emerging health issue.

Another may be our aging population and the inherent health problems associated with growing old, including macular degeneration.

Research has shown that a diet rich in lutein, a yellow pigment found in wheat, can reduce vision loss caused by macular degeneration. “Unfortunately, lutein has been bred out of our wheat because millers do not like the yellow colour it gives the flour,” notes Dr. Ames.

Although lutein is a component of spinach and can be extracted from marigolds and sold in pill form, providing lutein in every day foods like bread and pasta would make it more widely available. “Bread and pasta are foods that are common around the

world,” says Ames. “If we can improve the nutrition of these common products, we have an opportunity to improve the health of society in general.”

Nancy Ames likes to look at grains in new ways. She sees real opportunities for collaboration with crop breeders and geneticists. “We can mine our grains for untapped nutritional resources that we have yet to capitalize on.

“Traditionally, there wasn’t a need to look at breeding this way. Now we know the importance our society places on nutrition, health, longevity and quality of life. Linking genetics and nutrition is exciting.”

What advice does Nancy Ames have for students

contemplating a career in science? “Keep in mind that science is not one subject or particular area,” advises Dr. Ames. “I once heard a young girl say that she wasn’t interested in science because she wanted to be a veterinarian! We have to teach children that science is everywhere. It encompasses so much and it’s part of our everyday lives. Even though I specialize in food science, I have tremendous variability in my job. It’s full of mystery and everyday I find something new to explore.”

*Dr. Nancy Ames is a cereal chemist specializing in quality evaluation of wheat, oats and barley. She has been with AAFC for 15 years, beginning her career at the Plant Research Centre in Ottawa. She transferred to the Cereal Research Centre in Winnipeg in 1995. ::*

“I use my daily interactions with family and others to think about what I might work on next.”



# Barley chip strikes a tasty new chord

It's time for a pre-dinner appetizer, and a bowl of nacho chips sounds about right.

As consumers are calling for foods with improved nutritional value, AAFC is responding with a fascinating new array of barley-based products. A team led by Dr. Nancy Ames, a cereal chemist at AAFC's research centre in Winnipeg, Manitoba, investigates expanded food uses for barley. Currently, less than five per cent of Canada's barley crop is aimed at food markets.

"There is real opportunity in barley as a healthy food choice," says Dr. Ames.

Barley contains several components, most notably beta-glucan, an insoluble dietary fibre that has the potential to reduce cholesterol and lessen our risk of heart disease and stroke. Barley also contains tocopherols, which are rich in vitamin E, a powerful antioxidant believed to protect the heart and blood vessels, help prevent cancer and boost the immune system.

Barley tortillas and barley taco chips represent Dr. Ames's first efforts at creating new foods from barley. Ames uses 100 per cent barley flour in place of the corn or wheat flour that is traditionally used to make tortillas. Low amylase or so-called 'waxy' barley cultivars are best suited to tortilla production. They are less likely than non-waxy types to crack when rolled.

How do barley tortillas stack up against the standard type for taste? Much like a wheat flour

tortilla, claims Ames. Taste testers say the product may be a little more flavorful than a wheat tortilla, with a slightly nutty taste.

Dr. Ames has recently received a US patent on the tortillas. "We want to see these products on the store shelves," she says. Sensory evaluation of the products is ongoing; consumer feedback and acceptance will be key to commercialization. While Dr. Ames continues to evaluate barley tortillas and chips, she also has two new products under development.

The first product is a micronized barley snack. Micronization, a heat and moisture treatment, stabilizes enzymes that could otherwise lead to rancidity and degrade quality.

"Barley kernels puff up when micronized, similar to popping corn," explains Dr. Ames. When popped and spiced, the kernels have a nutty flavour and crunch and provide a healthful change from high-fat, deep-fried snacks. Puffed barley may also find a niche as an alternative to nuts in baking or salads.

The second product is also micronized. It resembles pearled barley (typically used in soups and casseroles) but by this new method, the pearling process has been optimized, resulting in a whole-grain product with superior texture, acceptable colour and the highest possible beta-glucan content. It is an easy-to-prepare, quick-cooking product with potential as an additive or as a whole grain substitute in recipes that call for grain or rice. Dr. Ames has used this product in salads, tacos, desserts, pilafs, tabouli, risotto and several other side dishes. ::









# Flax, oat bran boost nutritional value

A hamburger without a bun is hardly a hamburger.

Yet many people in these low-carb times are passing up on the bun in an effort to reduce body weight. But the science coming from the bench at AAFC labs suggests that such people are also passing up on the many nutritional benefits to be gained from eating the bun.

Aside from the wealth of vitamins and minerals grain products offer, fibre is an attribute with demonstrated health benefits. But many people, and especially children, it would seem, prefer the low-fibre white breads.

Breads are typically baked with hard red wheats, whose bran imparts the colour as well as the fibre of brown breads. Scientists at AAFC's cereal research labs in Winnipeg are working with a new hard white variety whose whole-wheat bread is a pure white. Taste tests have shown that even the harshest critics, the hard-to-please children, like it.

And there's more. Oat bran is a cereal product that is very high in soluble fibre, most notably beta-glucans. Food scientists in Guelph are working with this product on numerous fronts. Tests confirm the







cholesterol-lowering impact of beta-glucans on people, making oat bran a valuable ingredient in baked goods.

Similarly, flax contains several beneficial components, from the omega-3 acids in the oil to the lignans in the gum. Scientists in Saskatoon are working with flax fractions (the term for refined components) to broaden their uses in food, pharmaceutical and other applications. Flax can be ground and added to baked goods, or sprinkled on top, like sesame or poppy seeds.

There's a host of cereal and seed products that add a nutritional punch to breads and other baked goods. Researchers are constantly on the lookout for more ways to use and improve these. ⋮

# Keeping tabs on the burgers

The burgers are done and ready to serve. You've done your part by cooking them to the correct internal temperature, but what else is going on to make sure your burgers are safe?

Food safety is a key priority for Agriculture and Agri-Food Canada, where scientists are working hard to keep Canada's beef the safest in the world.

The vigilance is applied from the very beginning of the production cycle. Researchers at Lacombe and Lethbridge, Alberta, begin with the steer itself, studying diet, environment and other factors that could have an impact on safety. They also conduct tests on beef before it is cut into steaks and roasts to find ways to improve pre-processing safety.

In St-Hyacinthe, Quebec, researchers are looking at various models and methods to determine effective

cooking and cooling cycles of meat. Others are working on rapid detection technologies. Again, the goal is to make the product safer.

Using the latest in DNA detection technologies, computer modeling techniques and many other state-of-the-art innovations, scientists go all out to make our great beef even better. These research efforts help assure Canadians and our trading partners that the burger on the grill is the safest and the best the world has to offer, in keeping with Canada's reputation for the safest, high quality, nutritious food available. ⋮











Greenhouse tomato research  
in Harrow, Ontario

Salad is a s  
of science





# morgasbord



## A cool, refreshing salad is just perfect for those sweltering summer evenings.

And just as the salad bowl can contain an almost unlimited variety of food combinations, so too does it represent a mix of science from a wide range of disciplines. Although some aficionados may question the originality, lettuce forms the foundation of the majority of salads. But lettuce is as perishable as it is ubiquitous. Scientists in Summerland, B.C., have been studying the issue from several angles. On one front, they've found that a bath of mostly water at a certain temperature helps keep head lettuce crisper for longer. And packaging technologies allow for an extended shelf life of prepared, mixed greens.

Tomatoes are another key component of salad. With their lycopene content, a compound touted to help fight some cancers, tomatoes are a healthy choice for this summer classic. Researchers in Guelph are studying lycopene with a view to extracting it from tomatoes, and ultimately providing data to lead breeders to more lycopene-rich varieties.

Tomato and other vegetable production poses plenty of challenges, especially for dealing with pests. As consumer and environmental concerns come to the fore, scientists are evaluating new and not-so-new pest control technologies. Sterile insect releases and pheromone traps disrupt mating, thereby reducing the damage threshold. Computer models crunch numbers that show whether any control strategy is even necessary. Predators are enlisted to either eat or otherwise fend off pest attacks. Simple traps that capitalize on a pest's weakness, such as a tendency to fly at a certain height, can also offer some protection.

Companion plantings, where another plant species is grown near the crop, can also ward off attack, either by repelling the pest or providing a tastier choice. Some weeds may be vulnerable to naturally occurring soil organisms.

The list goes on.

please see  
*Salad is smorgasbord*, page 22

# Potatoes that leave a good impression

Producing the humble tuber can require some deft environmental management.



As stewards of the land, farmers are well aware of the need to produce their crops in a sustainable manner. AAFC scientists across Canada are helping by coming up with new production strategies.

Nitrogen is an essential plant nutrient that can also become an environmental nuisance when it contaminates wells and ground water. Researchers have developed technologies that determine the

need and quantity of nitrogen fertilizer applications. A schedule for soil testing, for instance, combined with guidelines for appropriate soil nitrogen levels, allows for the efficient use of nitrogen while minimizing its potential negative impact.

Knowing which parts of the field need more or less nitrogen than the rest can also help potato growers manage their fertilizer more effectively.



Potato test plots in Prince Edward Island



AAFC scientists in New Brunswick and Quebec are evaluating the “N sensor”, a piece of equipment used with a Global Positioning System that senses the “greenness” of the crop. The greener the crop, the less nitrogen that’s required.

Mulching, long popular among home gardeners, is likely to have a big payoff when applied on a commercial scale to prevent the water erosion of soil. Hay mulch applied after a potato harvest could save some of the \$12 million that annually washes out of New Brunswick farms as productive land is lost due to soil degradation. In the province’s northwestern potato belt, AAFC research demonstrates hay mulch actually maintains and sometimes increases potato yields, while minimizing erosion. The further development of new soil and crop management technologies could mean better incomes for farmers and reduced potential environmental impacts.

Scientists have also obtained encouraging results using paper waste to absorb nitrogen in potato fields. They have found that applying fibre clay, a paper waste product, on potato fields after harvest can reduce the risk of nitrate leaching into the groundwater by as much as 50 per cent. ⋮



Environmental management is essential





## Weed scientist receives accolades from peers

Dr. John O'Donovan has been selected as the recipient of the Outstanding Research Award by the Weed Science Society of America (WSSA). The honour, presented in March, 2004, recognizes Dr. O'Donovan's research in weed ecology, integrated weed management and weed resistance to herbicides, the development of estimating crop losses due to weeds and the economics of weed control, and his commitment to the discipline of weed science. Dwight Camper, chair of the WSSA awards committee, said that the society is privileged to recognize Dr. O'Donovan's outstanding work.

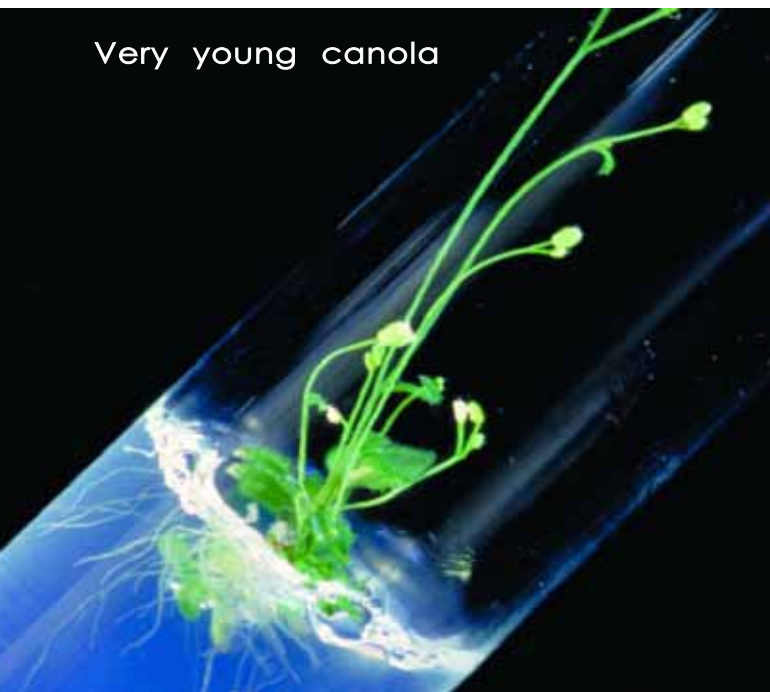
"We in WSSA are fortunate to have him as a leader in the field of weed science," he said.

Dr. O'Donovan conducts his research at AAFC's research farm in Beaverlodge, Alberta. He is currently president of the Canadian Weed Science Society, and has served as editor on various scientific journals. ::



John O'Donovan knows his weeds

### Very young canola



### *Salad smorgasbord* from page 19

And don't forget the dressing. Canola oil is consistently in the top two or three healthful oils, both for salads and cooking. Scientists in Saskatoon have developed a whole new type of oilseed plant -- a conventionally bred mustard with canola-quality oil. Since mustard is more drought resistant than canola, it means that rainfall is less of a factor for getting a good harvest.

Finally, why not jazz up the salad a bit by adding chickpeas? A good source of fibre, chickpeas are also high in protein. Researchers in Saint-Jean-sur-Richelieu, Quebec, are studying postharvest technologies that will retain the nutritive qualities of the crop. Chickpeas are also low in fat, and contain phytoestrogens and antioxidants. ::



# Yogurt's growing appeal

Those who consider a meal to be incomplete without a dessert will be delighted with this offering: a blueberry parfait with a coulis of tasty maple syrup.

But wait — this isn't the traditional favourite, ice cream, but a tasty and refreshing yogurt, velvety smooth with a creamy texture. And not the sharp, tangy product we remember as kids. Today's yogurt is produced by strains of bacteria specially chosen for their ability to transform milk into a modern-day ambrosia. AAFC scientists are currently on the lookout for new and better bacterial strains that boost the quality of this popular dairy product.

Those early strains were selected for their rapidity in transforming milk into yogurt. But they would often go too far, resulting in a lot of lactic acid in the yogurt. Modern strains of *Lactobacillus* and other lactic bacteria know when to stop before their medium becomes too acidified. The result is a less acidic yogurt, but this at first came with a price: the whey tended to separate and float on top, leaving the consumer wondering whether to stir it back in or drain it off. This dilemma was solved with the introduction of bacteria that also thicken the yogurt and prevent it from separating.

It looks good and it tastes good, but let's not forget its nutritional wallop.

Canada's Food Guide recommends that we eat and drink dairy products every day because of the health benefits of the calcium, vitamin D and conjugated linoleic acids that they contain. Even people with lactose intolerance can tolerate yogurt, because its bacteria has pre-digested it, as it were. Moreover, the yogurt bacteria family has acquired new members.

While traditional cultures were mainly designed to preserve milk and give it the expected sensory properties, the new additions offer health benefits, as well. These friendly bacteria, known as probiotics,



live in the digestive tract, where they help prevent attacks of pathogenic bacteria and viruses. Medical researchers are now discovering evidence of a probable role against the development of hypercholesterolemia, certain cancers and coronary diseases. There's even evidence to suggest that probiotic bacteria can help prevent allergies. ::

# Blueberries have a colourful future

The blueberry is such a popular summertime delight, that it's no wonder it's part of our dessert offering.

It might not be so if it weren't for AAFC scientists who figured out a few key points about blueberry crops. For instance, what bees do for them, how to improve the soil they grow in, and what puts the blue in the berry.

First, the bees. About 20 years ago, wild bees (bumblebees and digger bees) were the main pollinators of blueberries. But the market has since burgeoned, and the wild bees could no longer keep up with the demand. To obtain a better crop, scientists looked to other pollinators such as the alfalfa leafcutter bee and domestic bees.

The "bee team," in effect an A-team of AAFC researchers in Kentville, Nova Scotia, was able to identify the most effective pollinator bees and change the time of their emergence to match the flowering period of blueberries. The team also determined that the bees need a variety of habitats and plants to turn to once the blueberries have finished flowering. The results of this research are already being used in the industry, and many lowbush blueberry growers have started to adapt their windbreaks and add flowering shrubs.



Low pollination is not the only potential limitation to blueberry production. Blueberry soils are susceptible to wind erosion, have poor moisture retention, and are not very fertile. These conditions can add up to fewer blueberries. An AAFC research team in Normandin, Quebec, has determined that a mix of paper mill sludge, wood ash and crushed bark can be an effective organic amendment and fertilizer for wild blueberry production. In the last two years of the trial, the researchers saw fruit yields increase by one-third on average, and better soil stability. Best of all, it didn't encourage weed growth.

And finally, there's the inner goodness of the blueberry. This small fruit is widely praised for its

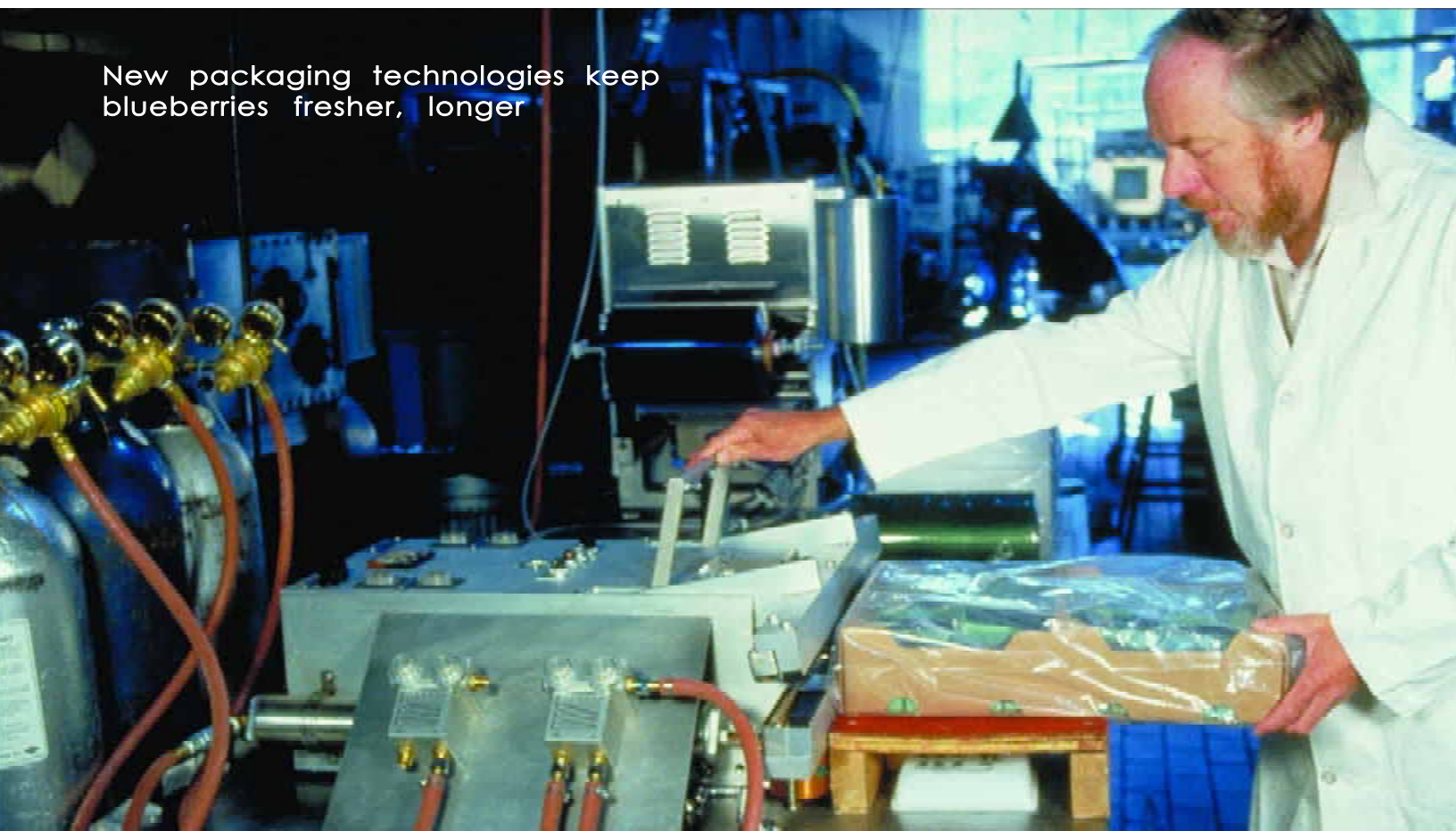


nutritional contribution, and with good reason. The blueberry tops the chart of the major fruits and vegetables rich in antioxidants. And AAFC researchers led by Wilhelmina Kalt have demonstrated that wild blueberries contain even more antioxidants than the bigger, domesticated highbush blueberries.

Antioxidants are getting a lot of attention these days, and for good reason. They are believed to reverse the cellular damage caused by free radicals. This repeated damage is thought to be the main cause of ageing. Studies in rats have shown that blueberry consumption not only slowed the process of cerebral ageing, but even led to the appearance of new neurons, a phenomenon that was considered impossible in adults. In collaboration with the United States Department of Agriculture, Dr. Kalt's team showed that the blood vessels of rats fed a wild blueberry-enriched ration were protected during an induced cerebrovascular accident (CVA). The

number of neurons lost in the CVA was significantly lower in the blueberry-fed rats. According to the specialists, the antioxidants and the anti-inflammatory properties of the phenolic compounds in blueberries seem to play an important role in this protection.

Hundreds of scientific articles cite the health benefits of cultivated blueberries, which range from reduced eye fatigue to control of diabetes and improved circulation. Researchers point to phenolic compounds known as anthocyanins as the active ingredient. These anthocyanins are also what give blueberries their vibrant colour. The blueberry is also touted as an alternative to the cranberry in preventing and treating urinary infections. And you don't need to eat very many blueberries to benefit from their protection. As little as half a cup of blueberries can produce perceptible changes in the blood's antioxidant capacity. ::



New packaging technologies keep blueberries fresher, longer

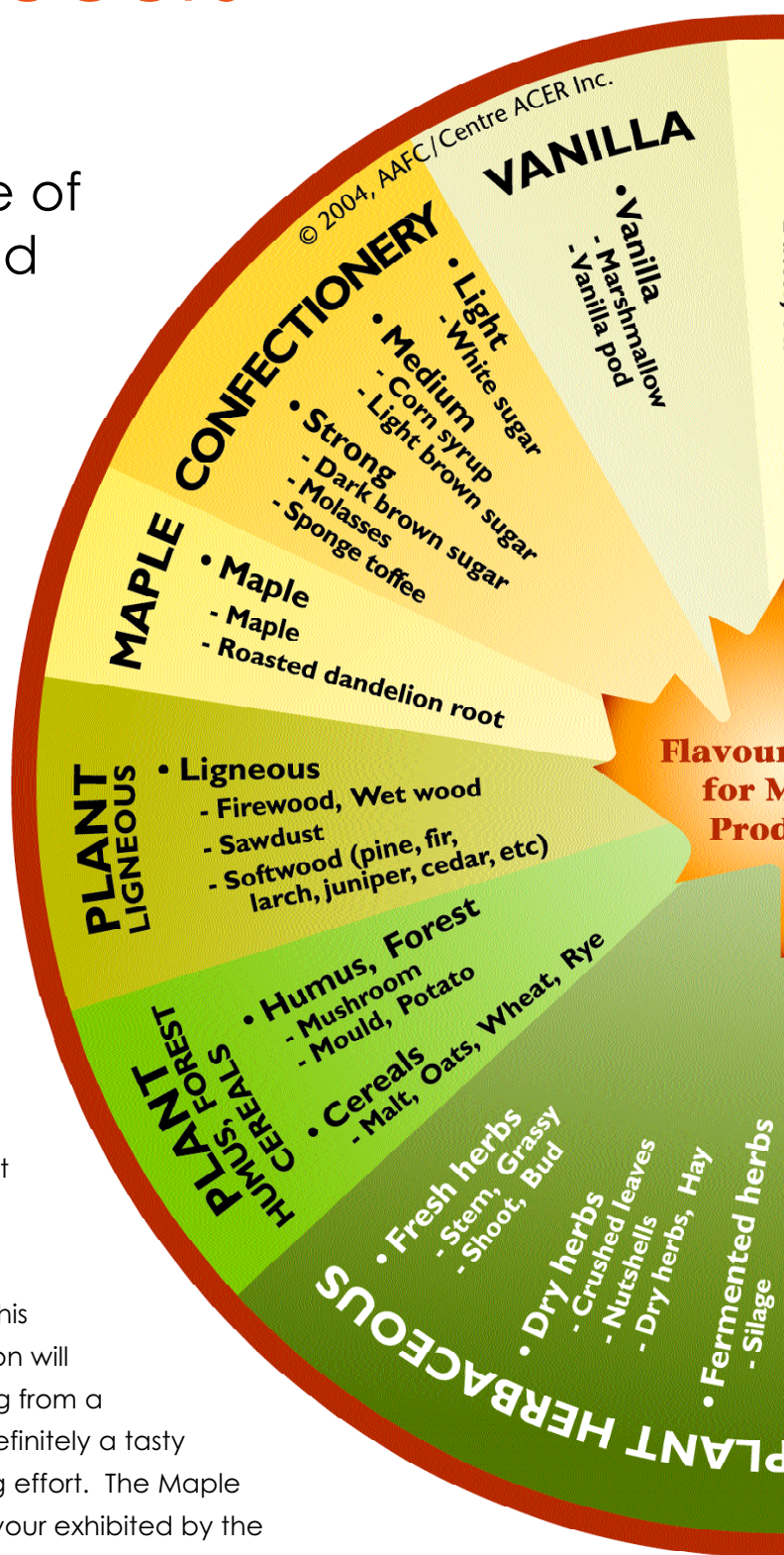
# Maple syrup wheel to boost fortunes of producers

Topping off our summertime treat is a lovely golden drizzle of pure maple syrup. Who could argue with that?

Well, until quite recently, lots of people, because the only way to tell one syrup from another was by the colour. This classification system was so rudimentary that maple syrup producers, each convinced that their syrup was the world's finest, sought the help of a research team to find an accurate way to describe their product.

The research team consisted of sensory evaluation specialists from Agriculture and Agri-Food Canada and maple products professionals from the Maple Syrup Research, Development and Technology Transfer Centre (Centre ACER Inc.). The fruit of their labours is the Maple Flavour Wheel, which has already made a big splash, even getting a write-up in the august Wall Street Journal. Similar in concept to wine and cheese flavour wheels, the Maple Flavour Wheel provides a visual representation of the flavours that may be found in various maple syrups.

Because describing taste sensations is always a perilous undertaking, we tend to taste with our eyes, as it were. This visual tendency is so powerful that even the smell of lemon will completely confuse the average person when it's coming from a piece of pink cardboard. The vocabulary of flavours is definitely a tasty language, but it is totally new and requires a real learning effort. The Maple Flavour Wheel helps by putting a name to the unique flavour exhibited by the tasted maple syrup.





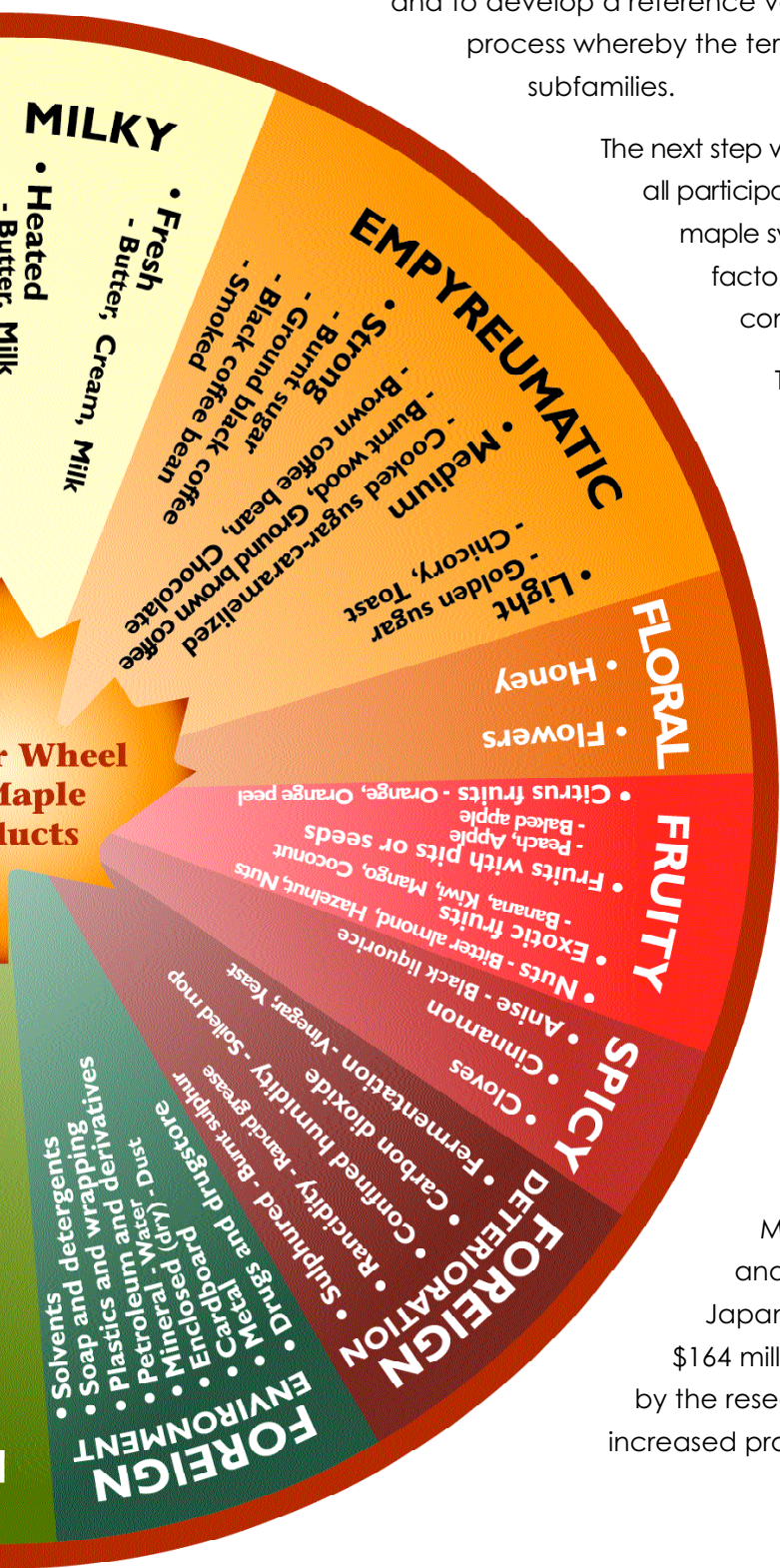
“There isn’t just one maple syrup,” says AAFC sensory evaluation specialist, Jacinthe Fortin. “given the large range of tastes and aromas, we can safely say that there are maple syrups galore!” To explore the breadth of this product, gastronomes, maple syrup processors, chefs and wine specialists gathered together to taste a number of maple syrups collected in all possible regions and under the most diverse conditions, and to develop a reference vocabulary. This lexicon was then subjected to a statistical process whereby the terms were interconnected and classified into families and subfamilies.

The next step was to form tasting panels. At the end of the panel training, all participants could consistently find the same attributes in a given maple syrup and at the same intensity. The panels acted as a de facto scientific tool, with the precision and range of descriptions comparable to the best scientific instruments.

This standardization of maple products vocabulary is key to improving the gustatory quality of maple syrup. After all, you can’t easily improve a product if you can’t describe its qualities. Researchers at the Centre ACER and AAFC will be able to use this reference tool to identify the influence that various practices have on taste, including maple forest management, the collection of maple sap, processing and storage.

And even when the taste effects of these parameters are known and understood, there will still be those uncontrollable variables such as climatic conditions and soil types. So, rather than aiming for uniformity and consistency, producers can market their syrup according to varietal differences, much like wines or cheeses. The wheel will allow consumers to explore maple syrups the way they now do with olive oils, vinegars and even fine salts, and choose the ones that suit their tastes.

Maple syrup is a source of delight for many Canadians, and is becoming increasingly recognized as a luxury item in Japan, Germany and the United Kingdom, which purchase \$164 million worth of the product every year. The tool developed by the research team will help open more markets by presenting increased promotional opportunities. ::



Maple wheel helps pinpoint flavour undertones of Canada’s signature product

# Scraps no more

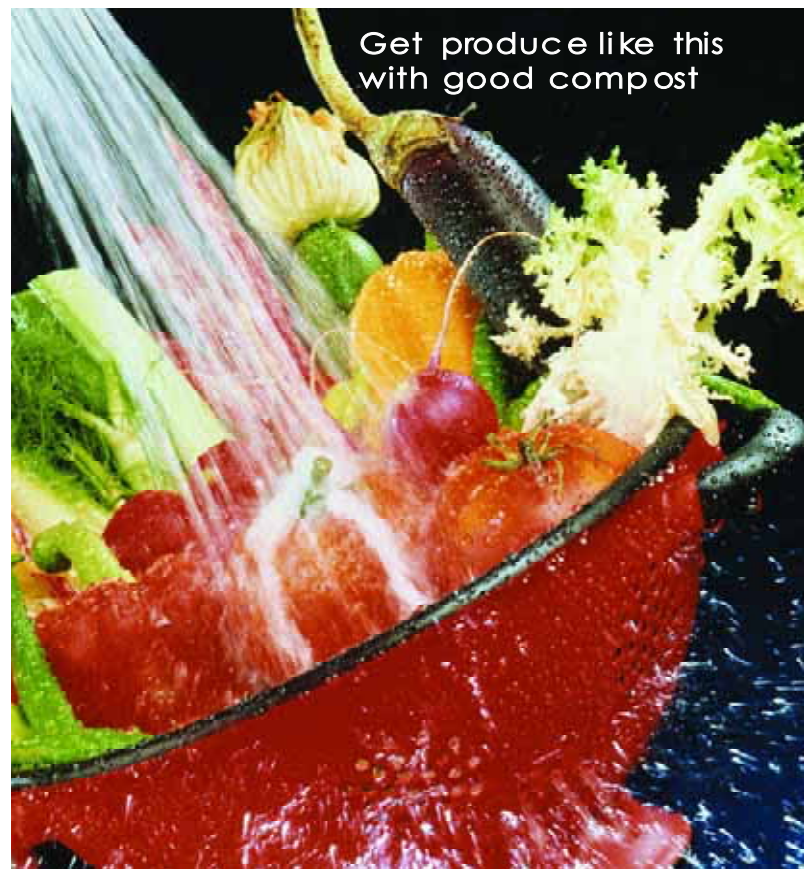
When the meal is done, the plates are carefully scraped before washing. Those plate scrapings can add value to agricultural soils, say scientists.

Composting of source-separated municipal waste has been gaining popularity with municipalities in Canada as a way to divert this solid waste from entering landfills. Communities across the country are now operating recycling programs as an alternative to disposing this waste. As more communities start producing this compost, there will be growing opportunity to add this material to agricultural crop land. Both organic farmers and commercial growers could use this resource to fertilize their crops. But more needs to be known about the compost value of kitchen scraps compared to commercial fertilizers and manure, its effect on soil properties, and how crops will perform.

Composting, once the domain of home gardeners, is rooted in the scientific realm. Agriculture and Agri-Food Canada scientists are conducting important research on composting as a viable alternative for management of animal manures and other organic residues, including urban yard and food wastes. AAFC scientists in Nova Scotia and researchers with the Nova Scotia Agricultural College have been involved in some of the most extensive experiments evaluating the feasibility of using Municipal Solid Waste (MSW) compost on agricultural land in Canada. These experiments were conducted in Nova Scotia under the support of the National Agricultural Composting Trials. The first part of the project took place at the AAFC research farm in Nappan, Nova Scotia. The purpose was to compare MSW compost and manure with and without fertilizer nitrogen on cereals and to identify any negative

environmental impacts. The second part of the experiment was conducted at the Nova Scotia Agricultural College to determine the effects of MSW compost on vegetable crops. The third and fourth area of the project were managed by AAFC scientist Dr. Peter Hicklenton in Kentville. He examined the use of compost to improve blueberry patches and the use of MSW compost as an alternative to peat moss for nursery production of small fruits.

Findings to date show that compost and manure can increase grain yields and improve soil organic matter. As well, there does not appear to be any detrimental effect, from an environmental and food safety perspective, of using MSW compost on cereals or vegetables. ::



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