



F O R A G E N VISIONS

Codena Inc.: Moving Forward with Bio-based Inputs

INDUSTRY

PROFILE

With all the activity in the natural products market in the past decade, it was only a matter of time until someone in the industry developed a new, revolutionary and proprietary plant-sourced pest control product.

Enter Codena, Canada's newest natural agri-products company, with its eye on the worldwide greenhouse and turf grass pest control markets.

This Quebec company has successfully bridged the gap between specialty plant products and the bio-pesticide industry, by developing a pest control formula based on an extract of a specially chosen plant.

The plant is a special strain of a wild Central American herbal perennial, which Urgel Delisle Associates (a well established Quebec-based consulting firm in the agricultural and environmental sectors) and Codena have successfully selected and adapted to thrive in Canadian growing conditions.



So, while other high-end natural products companies often rely on feed stocks grown in faraway developing nations, far from their quality control and processing facilities, Codena has provided for its raw materials supply right here in Canada.

The plant variety is exclusive to Codena, and its active ingredients are the subject of several patent applications worldwide.

Core product

The plant extract that forms the active ingredient, FACIN, has been formulated into an emulsifiable concentrate for foliar application, as well as a micro emulsion for soil applications.

The action of FACIN in their products is unique in that it acts as a broad- spectrum miticide, insecticide and fungicide, and is effective both in the field and in enclosed spaces such as greenhouses.

It has shown to be effective against some of the most troublesome insects on greenhouse crops: thrips, whiteflies, aphids and spider mites.

FACIN is also effective in preventing fungal diseases such as powdery mildew in a wide variety of tested crops, including turf grass and ornamentals.

At the same time, FACIN has been proven to have very low toxicity in a variety of clinical tests, prompting the USDA to grant it their "biochemical" classification. This will greatly facilitate the EPA registration process, allowing it to be labeled and sold in the USA.

FACIN is comparable or superior in its effectiveness to the majority of synthetic products currently on the market. It enjoys the lowest toxicity classification given by the USA EPA. The product degrades rapidly, leaving few residues, and providing maximum safety to farm workers.

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FACIN has also been shown to be non-lethal to beneficial insects such as those used in commercial greenhouses, and has shown no sign to date of forming resistance in targeted pests.

The product will fit nicely into any Integrated Pest Management program.

A “natural” fit for Foragen

Codena was the first major investment by Foragen in the province of Quebec. Dr. Roger Bernier, Foragen’s VP for Quebec and Atlantic Region, believes the Codena approach is poised to succeed in a sector where product and environmental safety are of paramount importance.

Says Dr. Bernier, “Codena is really in its early stage, but already we have developed several formulated and tested products, and are moving along nicely toward our first product being registered for use in the USA, probably by Fall 2005.”

Bernier, a former industrial microbiologist is also the acting CEO of Codena. The strategy of hands-on investment management by a technically and financially competent team is one of the qualities that set Foragen apart in the startup Venture Capital market.

Biopesticides: a rapid-growth sector

According to a 2002 report on floriculture worldwide trade patterns, supply for non-food agri-products such as flowers, bulbs and other ornamentals is growing faster than demand, combined with a shift in

consumer demands toward a more environmentally sustainable and safe product make this technology even more appealing¹.

Total non-food pesticide use in the USA alone costs growers \$3.5 billion yearly².

Codena has focused on the turf grass and ornamentals segment of this market, worth over \$300 million in the USA alone². They hope to capture a substantial portion of this with sales of its FACIN based product line.

Green pesticides

Rural homeowners who live near agricultural areas and environmentalists alike are pleased with the recent introduction of products such as these, which have proven to be “greener”, both at the production end (far less use of fossil fuels and toxic chemicals) and the product end (much less toxic to the environment).

“We should see a lot more products like these coming into the marketplace over the next decade, as regulators fast-track licensing of what are obviously safer products, and as companies come to realize that the market is real and that they can more easily retrieve costs on development of natural product based plant protectants,” states Dr Bernier.

But the proof is in the real-world effectiveness of these products in the field.

Dr Helene Chiasson has been managing field trials across Canada and the USA on a variety of greenhouse and turf crops, and is very impressed with the results.

“We have completed several rounds of field testing against a large number of

insect pests, and are excited about the very broad-spectrum potential for this product,” says Dr. Chiasson.



Dr. Helene Chiasson, Codena’s VP Research, manages all aspects of product development and testing.

Codena now has several years of positive field data, and is actively engaged in ongoing trials through in partnership with Agriculture Canada and academic and research stations in the USA and Canada.

Moving toward USA registration

Biochemical products such as FACIN are registered in the USA by the EPA’s Biopesticides and Pollution Prevention Division (BPPD).

In a successful presentation to the BPPD this past March, Dr Chiasson and the Codena team were granted a “biochemical” status for their product, greatly simplifying the registration process for a pest control product to be granted a label for sale in the USA.



“We are very pleased with how rapidly our application to the BPPD is progressing, following our presentation in Washington,” states Dr Chiasson.

“This type of application has been known to take several years for other biocontrol agents, but our team has so far managed to provide the BPPD with the required diligence and data in an extremely rapid and efficient manner. It’s an indication of the excellence of both the product and our research team.”

Dr. Bernier was delighted with the news so far from the BPPD process:

“I would like to personally thank Dr Chiasson and her research and production team for the quality and thoroughness of their work which allowed this technology to move ahead.”

“I would also like to thank Mr. Urgel Delisle and UDA Inc, who believed in this project from Day One, for their steady commitment, patience and dedication.”

World class team

Foragen has helped assemble a world-class team at Codena, both for product development and corporate management.

The Management Committee meets regularly to analyze the latest efficacy data from ongoing field trials. Decisions on which uses to target for FACIN are based on this data.

“Initially, we have decided to target the non-food markets for our product,” explains Dr. Chiasson. “This includes marketing our miticide, insecticide and fungicide products to the substantial ornamentals and turf grass markets worldwide.”

Codena has also assembled some of the world’s most noted experts in natural biocontrol products into a six-member Science & Technology Advisory Committee, whose ongoing job is to advise on technical issues related to product development, field testing, registration, and marketing.

Next steps

Next steps in the USA registration process include: “completion of further toxicity testing, and a complete physico-chemical characterization of each component of the product formulation,” explains Dr Chiasson.

“We look forward to having the registration process for our first FACIN product completed by the Fall of 2005.”

Codena is aggressively identifying distributors for their products in the USA, with future emphasis on Europe and South America.

Through Foragen’s network, the Company has identified further products relevant to its core technology know how on plant extracts that would complement its product portfolio.

To learn more about Codena, visit their web site: www.codena.ca, or contact:

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¹deGroot, NSP, 2002. Floriculture worldwide trade and consumption patterns, Agricultural Economics Research Institute, The Hague, Netherlands, p 1.

²1998-1999 Pesticide Market Estimates: Sales, USEPA online www.epa.gov/oppbead1/pestsales/99pestsales/sales1999.html

President's Message

Keeping our food sources safe



Dr. Murray McLaughlin PhD, P.Ag.

Food quality and food safety have become hot topics in the public forum. We are constantly exposed to disheartening media spots and articles warning us about threats related to food consumption. On any given day we are alerted to issues such as obesity, food-borne diseases, carcinogens, cholesterol, allergens and residual contaminants.

It sometimes appears there is no food product that doesn't carry a risk. We ask, "What can I eat that is safe?" The public forum buzzes with confusing and contradictory reports on organic food, engineered food, vegetable oil, potatoes, beef, chicken, grains and horticulture crops such as lettuce and fruit.

Nevertheless, with a little consumer research, we can find reliable data that help us make informed choices. There is scientific information available that can assist in determining what is best for ourselves and our families. In recent years, for example, the sciences of food analysis and food characteristic enhancement have

provided us with many helpful guidelines to promote health and well-being through diet.

We know that omega oils in flax can be a benefit to people who suffer from some types of arthritis, and can also help reduce type II diabetes. We know that lycopene in tomatoes can help decrease prostate cancer, while the antioxidants in cruciferous vegetables such as broccoli work to prevent other types of cancer as well as certain types of eye disease. We know that beta glucans in oats and barley have immune-boosting properties and cholesterol-reducing functions that can benefit heart health. We know that meats and fish are excellent sources of protein, iron and vitamin B12. As well, the list of foods with newly-discovered benefits is rapidly increasing: soybeans, canola, potatoes, blueberries, cranberries, citrus, apples, lentils— all have components with demonstrated health benefits.

With the help of biotechnology, as well as more traditional scientific approaches, food characteristics are constantly being enhanced. For example, we now have eggs in the supermarket that contain enhanced levels of omega 3 fatty acids. Research programs are under way to develop milk enhanced not only with omega 3 but with other selected healthful components as well.

In addition, new agricultural management initiatives are contributing to improved food safety by reducing the levels of chemicals required in crop production, and by alternative approaches to the use of antibiotics in animal production.

I believe that knowledgeable, motivated consumers can help control health costs through greater knowledge of foods and their benefits. Reducing heart problems, type II diabetes, obesity, cancer, and arthritis are all possible with the use of certain foods and/or specific food extracts. Foragen aims to help this happen. We concentrate on investing in advanced agricultural technologies. Our technologies portfolio favours corporations that emphasize healthy food, a healthy environment, and a healthy economy, which in turn leads to a healthier population.

In previous issues of Visions we have featured a number of Foragen's Portfolio Companies that contribute to enhanced food characteristics, better food quality, and increased food safety. Cevena BioProducts Inc., Radiant Technologies Inc. and MCN BioProducts Inc. all focus on technologies that support increased food safety as well as healthier food and feed. The company profiled in this issue, Codena Inc., is developing a natural pesticide for crops and turf. Codena's work will help produce better crops in a safer environment.

Healthier people and a healthier environment lead to a strong economy with reduced health costs. The leadership shown by the companies in the Foragen Portfolio is heartening reassurance that Canadian innovators are working to support these vital goals.

The Foragen logo features the word "foragen" in a lowercase, sans-serif font. A green curved line arches over the letters "o" and "r".

Good Bio-science Equals Good Results: Ontario sees Major Decline in Chemical Pesticide Use

A new report by the Ontario Ministry of Agriculture and Food (OMAF) indicates that in the past 20 years Ontario farmers have reduced their use of chemical pesticides by 52%. The capability to make this change is the result of advancements in education, science, integrated pest management and application of the tools of biotechnology. In many cases broad spectrum pest control products have been replaced with more target specific technology. Bio-based pesticides such as those produced by Codena Inc. have been of significant help in limiting the application of toxic products. When used in conjunction with genetically modified crops, bio-pesticides carry a significant punch in helping to reduce the risks associated with on farm use of pesticides.

According to a study carried out in 1997 by the University of Guelph, with the reduction of chemical pesticide application there is a corresponding reduction in:

- the overall environmental impact of agricultural pesticides
- the environmental impact per hectare of crop land
- the environmental impact per tonne of food produced (reflecting both the reduction in pesticide use and an increase in productivity through GM crops)
- the risk to farm workers
- the risk to consumers
- the risk to the environment.

The five year review carried out by OMAF shows a consistent decline in agricultural pesticide use. Use of pesticides in the production of fruit and vegetable crops decreased by 20%. Insecticide use in fruit declined by 57%. Fungicide use decreased by 54%. The study credits increased adoption of Integrated Pest Management techniques and alternative pest control strategies, including the use of bio-pesticides, as major reasons for the large declines.

Notables

PEOPLE

Armand Lavoie joins WestLink Board of Directors

Armand Lavoie, Vice President Western Canada, Foragen Technologies Management Inc., joined the Board of WestLink at their annual meeting. Lavoie is responsible for Foragen's Western Canadian portfolio of investments. He has been acting as a mentor to many West Link interns. As a board member, he looks forward to continuing to mentor and provide support to this excellent program.

At the request of Mr. Derek Gratz, CEO of WestLink Innovation Network Lavoie has been involved in many aspects of WestLink. "We are pleased to have Armand join the Board," says Gratz. "Armand has been a strong supporter of Innovation in Western Canada through Foragen. As a member of the Board, he provides both knowledge and support to the WestLink program."

WestLink is a mentoring and training program in Western Canada. It provides support to University students and graduates interested in technology transfer and commercialization of technologies.

For more information see *Visions 2.1* or visit <http://www.westlink.ca>

Jamie Patmore joins Radient Technologies

Ms. Jamie Patmore, a WestLink intern, who spent the last 8 months with Foragen (Saskatoon), has joined Radient Technologies for the last segment of her internship.

Steven Splinter, CEO of Radient looks forward to having Patmore work with the Radient team for the next two quarters. "Her Masters in Food Science will bring another level of expertise to targeting and assessing opportunities for Radient," says Splinter.

Radiant is a Foragen investee company specialising in custom contract extraction; technology development and proprietary product development using microwave assisted processing system (MAP).

For more information on Radient please see *Visions 2.2*

Saskatoon Researcher's Service Recognized

Dr. Kutty Kartha, Director General of the National Research Council Plant Biotechnology Institute (NRC-PBI) has received the Gold Medal Award for his research and strategic support of agricultural biotechnology in Saskatoon.

PBI's mission is to carry out and promote strategic research in plant biotechnology. The purpose of the Institute is to improve and diversify Canadian industry and strengthen Canada's competitive position in the global economy.

Kartha's role as Director General is to ensure that the PBI mandate is fulfilled through its three major research program themes:

Strategic and Enabling Technologies

Genomics, Proteomics, Transformation Methodologies, Cell Culture Technologies, Selectable Markers, Gene Expression/Promoters, Molecular Diagnostics

Plant Product Modification

Seed Oils, Starch, Phenolics, Natural Health Products, Isoprenoids, Phytate, Chlorophyll and Molecular Farming Products

Plant Performance

Molecular Pathology/Disease Resistance, Plant Adaptation/Stress Tolerance, Phytoremediation/Climate Change

The Gold Medal Award, established to recognize excellence in public service by the Professional Institute of Public Service of Canada, was presented to Kartha June 15, 2004.

For information on NRC-PBI visit www.pbi.nrc.ca



THE FORAGEN TEAM

In addition to our 5 full time employees, Foragen has a strong Board and Science Advisory Team, along with interns that work with our three regions.



Dr. Murray McLaughlin PhD, P.Ag.



Dr. David Gauthier PhD, MBA



Roger Laurent Bernier, Ph.D., P.Ag.



Armand Lavoie MBA; P.Ag.

FORAGEN BOARD OF DIRECTORS'

A strong part of our team, providing advice and guidance on governance, investments, and strategy.

Susan Smith, RBC Ventures Inc., Ontario

René Douville, RBC Ventures Inc., Ontario

John Oliver, Maple Leaf Bio-Concepts

Janet Wightman, Investment Saskatchewan

Murray Mucha, Investment Saskatchewan

Michel Charlebois, SGF-SOQUIA, Quebec

Bertrand Venne, SGF-SOQUIA, Quebec

Jacques Goulet, Ph.D., Laval University, Quebec

SCIENCE ADVISORY TEAM (SAT)

A critical part of our Foragen Team providing directional advice on areas of the agri-food sector that will create future opportunities, contacts for existing investments, and strategic input into our present portfolio.

Dr. Larry Milligan, Professor, University of Guelph

Dr. Alan Wildeman, V.P. Research, University of Guelph

Dr. Ralph Hardy, President, NABC (National Agriculture Biotech Council)

Dr. Deborah Buszard, Dean, MacDonald College, McGill University

Dr. Lorne Babiuk, Executive Director, VIDO (Vaccine and Infectious Disease Organization)

Dr. Wilf Keller, Director, NRC -Plant Biotechnology Institute

Dr. Roger Wyse, Burrill and Company