

Fenugreek's future in food processing, nutraceuticals

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IT STARTED ABOUT 15 years ago, when Blaine Sudom and his business partner, Cal Kelly, heard University of Saskatchewan researchers talk about fenugreek.

They wondered if this ancient legume might be a viable crop in Saskatchewan and decided to give it a try.

Also known as Greek hay, fenugreek originated centuries ago in India and the eastern Mediterranean. Today, India, Ethiopia, Egypt and Turkey are the major seed producing countries.

In spite of its parentage in more temperate climates, fenugreek did well in south-central Saskatchewan — so well that Sudom and Kelly began experimenting with processing the seed. By 1998 they had a small on-farm plant and in 2003 they built a large one. Today, Emerald Seed Products is certified to produce food grade and health grade products. It includes facilities for processing organic seed and buys conventional and organic commodities.

Fenugreek is loaded with galactomannan, an important ingredient in the world of food processing and nutraceuticals.

"If you're a label reader, you'll have noticed words such as guar and zanthan in lists of ingredients. These are a couple of galactomannans," Sudom said.

"Galactomannans provide additional viscosity in liquid food ingredients and they also can act as emulsifiers. Because they can bind to oils, they can be used to prepare oil and water solutions."

In ice cream, for example, galactomannan improves texture and reduces melt. It is also used in cream cheese, fruit preparations and salad dressings.

Another lucrative market for fenugreek galactomannan lies in the nutraceutical market.

"Fenugreek galactomannan is probably the best one in terms of binding to oil, so that gives healthful properties when it's put into food or natural health products," Sudom said.

Emerald Seed's galactomannan products include FenuLife for diabetics, low cholesterol and glycemic balance market, various products for the food market and a variety of seed extracts and organic products classified as nutraceutical, cosmetic or food.

Although it's been known for years that fenugreek has high proportions of galactomannans, the only known methods of

extraction involved solvents such as methanol, ethanol or hexane, Sudom said.

"Our initial research was done with those systems but they were very expensive. We were able to develop a water based extraction. There's a kind of key process involved that we did discover and we were able to scale up a plant and now we're the only plant in the world that can

In the 12 years he's been growing fenugreek, Rennick has had yields as high as 50 bushels per acre and as low as six.

produce the kind of quality that we produce here and with a relatively economic system."

Joe Rennick, a pedigreed seed grower from Milestone, Sask., is a shareholder in the Emerald plant at Avonlea, Sask., and has been growing fenugreek since

1997. He uses a clover inoculant to encourage fenugreek's nitrogen-fixing abilities.

Eighty pounds of 26-30 fertilizer per acre seems to be sufficient, he said. Fertilizer should be side-banded near the seed or applied with a wider-spread opener. Odyssey and Poast have been registered for weed and wild oat control.

"The plant is really slow in starting," Rennick said. "It germinates within days but it only puts up two tiny little leaves, you hardly notice it's up. It might be three weeks before you can really see that it's up. . . . it puts down its tap root first and then it takes off. Blaine said the best thing to do is seed it and then go away fishing for two weeks. A watched pot never boils."

Insects and pests haven't presented problems on his farm but wireworms and cutworms have been known to damage seedlings. Grasshoppers, aphids and blister beetles can also be pests. Dipel 2X (*Bacillus thuringiensis*) is registered for control of some insects in fenugreek.

Fenugreek seedlings are susceptible to damping off and may be vulnerable to other root rot pathogens such as rhizoctonia and fusarium. *Cercospora* leaf spot can cause serious defoliation and can affect stems and pods but it has not been seen on fenugreek in Saskatchewan because it

prefers warm and humid conditions. Powdery mildew occurs on fenugreek but is not considered a serious problem. No seed treatments or foliar fungicides are registered for use on fenugreek in Canada.

The crop likes moisture, Rennick said. Yield will suffer in dry years. An average year should bring yields of 20 to 30 bushels per acre. In 12 years of growing fenugreek, Rennick's yields have been as high as 50 and as low as six bu. per acre. He harvests with a flex header on his combine and does not desiccate.

"Sometimes you have to wait a couple of weeks after you've harvested everything else but letting it mature naturally gives the good colour you want."

Fenugreek should be stored when it's cool and dry, at less than 12 percent moisture.

Sudom estimates annual Canadian fenugreek production at 1,000 acres, most of that in Saskatchewan and connected to Emerald Seed Products.

Some varieties can be used as a forage, useful for its non-bloating properties. Fenugreek has also been used for centuries as a spice in such things as curry. The variety grown for the spice market is highly aromatic.

"It's one of the ingredients in curry powder and some other foods but that's a very specialized market and we haven't made much headway in it," Sudom said.

A third type of fenugreek and the one mostly produced for Emerald is the variety Canafen, developed at the University of Saskatchewan. It has a higher galactomannan content as well as reduced odour and colour compared to traditional varieties.

Sudom said Emerald offers growers 18 cents a pound, or about \$11 per bushel. Contracts have been limited to Emerald shareholders but Sudom said that may change.

"We're developing bigger markets all the time and we think these markets are big enough that we're probably going to have to expand to other growers and other areas of the province. These products are produced and consumed in huge amounts around the world. So certainly there's tremendous potential there.

"We think it will be a good substitute for peas," he said. "If you can grow peas you can grow fenugreek." ♦