

## Fenugreek (*Trigonella foenum-graecum L.*): Its potential to lower glycemic and lipid status

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Fenugreek, a legume grown in the Middle East and South Asia, has been reported to have hypoglycemic and hypocholesterolemic properties. The unique dietary fiber (galactomannan), amino acid (4-hydroxy-isoleucine) and saponin (glycosidic steroid) contents in the crop, especially in its seeds, are thought to be responsible for these health benefit potentials. In recent years, fenugreek has become an experimental forage crop in the Canadian western Prairies. It has been found to be ideal for a short-term crop rotation due to its high adaptability to dry climatic conditions, annual nature, and ability to fix atmospheric nitrogen in soil. Proximate analyses of the Alberta-grown fenugreek seeds have revealed that they contain 33.8% protein (4-hydroxy isoleucine rich), 3% lipids (mainly unsaturated fat) and 47.4% dietary fiber (galactomannan rich). According to an *in vitro* study, involving sections of small intestine, taken from model rats for insulin resistance (JCR rats), the presence of galactomannan (extracted from Alberta-grown fenugreek seeds) markedly diminished intestinal uptake of glucose. The effect was found to be dose-related and that no difference was observed between the genetically determined lean and obese rats. The viscous property of galactomannan was essentially responsible for impeding the *in vitro* intestinal absorption of glucose. These results were confirmed in a metabolic study involving normal Sprague-Dawley rats, which were fed a diet containing up to 5.0 % galactomannan for 4 weeks. The postprandial blood glucose response was markedly decreased with galactomannan. Compared with the control counterpart, the animals fed a diet containing galactomannan for 4 weeks had significantly less body weight gain, which was accompanied by a reduction in epididymal adipose weight, reductions in food intake, and plasma insulin levels. Furthermore, the galactomannan-fed animals had significantly reduced plasma levels of triglycerides and total cholesterol. Further studies in our laboratory have shown that saponin, extracted from the Alberta-grown fenugreek seeds has also the ability to modify cholesterol status by its capacity to bind both cholesterol and bile acids. In addition to galactomannan and saponin the amino acid, 4-hydroxyisoleucine, found in fenugreek has the ability to release insulin through stimulating pancreatic  $\beta$  cell. Based on these data, it appears that Alberta-grown fenugreek crop has multiple components that have the potential to provide health benefits when included in the daily diet. There is, however, a need for these data to be substantiated by well-designed clinical studies.

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