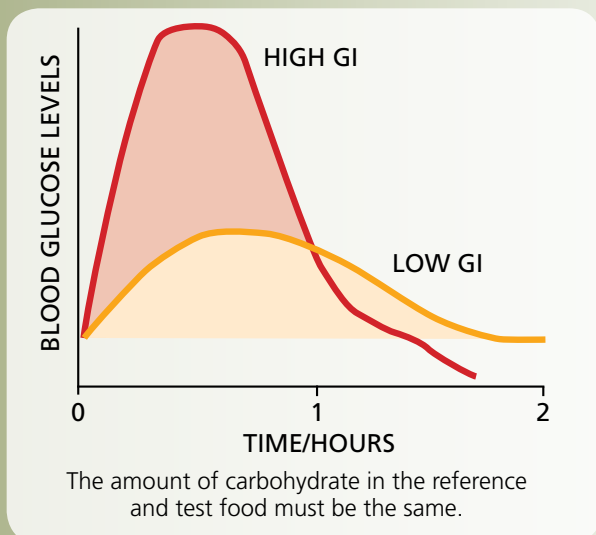


Pulses and Diabetes Control

Pulses are a good food choice for diabetes

- Low glycemic index
- High fibre and complex carbohydrates
- Low fat, saturated fat and sodium*
- Contain no cholesterol or trans fats



* The sodium content of canned pulses can be reduced by up to 41% if the product is drained and rinsed.¹

Research has shown that pulse consumption can be beneficial in the management of blood sugar levels.

Pulse Canada 

PULSES:



Why Pulses are Well Suited for People with Diabetes

LOW GLYCEMIC INDEX – Pulses (chickpeas, beans, peas, lentils) are a good source of slowly digestible carbohydrate, fiber and vegetable protein and a valuable means of lowering the glycemic index (GI) of the diet. The GI is a measure of the effects of carbohydrates on blood sugar levels. Carbohydrates that break down quickly during digestion and release glucose rapidly into the bloodstream have a high GI; carbohydrates that break down more slowly, releasing glucose more gradually into the bloodstream, have a low GI.

FIBRE – Pulses are rich in fibre containing about 30% of the fiber daily value in ½ cup cooked.² The fibre in pulses is both soluble and insoluble. Dietary fibres promote beneficial physiological effects including laxation, blood cholesterol lowering and blood glucose attenuation.³

RESISTANT STARCH – Resistant starch refers to carbohydrates that are not absorbed in the small intestine because they are resistant to the effects of certain gut enzymes. They have similar physiological effects and health benefits as fiber including improved colonic and digestive health and management of blood sugar and body weight.⁴

SLOWLY DIGESTIBLE STARCH – This term refers to starch that is digested completely in the small intestine but at a slower rate compared to Rapidly Digestible Starch which causes a sudden rise in blood glucose levels after ingestion. The potential benefits of Slowly Digestible Starch are a better blood sugar response and satiety.⁵

NUTRIENT DENSE – Pulses are nutrient dense meaning they provide substantial amounts of vitamins and minerals and relatively few calories.

LOW FAT – Pulses are low in fat, saturated fat and are free of trans fats and cholesterol.²

Pulses Fit With Nutritional Recommendations for Diabetes

- ✓ The 2008 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada from the Canadian Diabetes Association (CDA)⁶ recommend replacing high-glycemic index carbohydrates with low-glycemic index carbohydrates in mixed meals because this has a clinically significant effect on glycemic control in people with type 1 or type 2 diabetes.
- ✓ The 2008 CDA Guidelines⁶ also state that people with diabetes should follow the healthy diet recommended for the general population in *Eating Well with Canada's Food Guide* which suggests that people regularly choose beans and other meat alternatives such as lentils to minimize the amount of saturated fat in the diet.⁷
- ✓ Another recommendation from the 2008 CDA Guidelines⁶ is that foods should be low in energy density to optimize satiety and discourage overconsumption, help achieve and maintain a healthy body weight, and ensure an adequate intake of carbohydrate, fibre, protein, essential fatty acids, vitamins and minerals. Research suggests that pulses may help to increase satiety over the short term and weight loss associated with energy restriction over longer periods.⁸
- ✓ The 2011 Clinical Practice Recommendations from the American Diabetes Association (ADA)⁹ recommend weight loss for all overweight or obese individuals who have or are at risk for diabetes. For weight loss, the guidelines suggest that either low-carbohydrate, low-fat calorie-restricted, or Mediterranean diets may be effective in the short-term (up to 2 years). High consumption of pulses and legumes is one of the key elements of the Mediterranean diet.
- ✓ These 2011 ADA Guidelines also suggest that for primary prevention of diabetes, individuals at high risk for type 2 diabetes should be encouraged to achieve the U.S. Department of Agriculture (USDA) recommendation for dietary fiber (14 g fiber/1,000 kcal) and foods containing whole grains (one-half of grain intake). As described above, pulses are high in fiber.



Research on Pulses and Blood Sugar Control

Eighteen **glycemic index studies** have reported the GI of various pulse types and pulse food forms (at the 50 g available carbohydrate level) compared to controls including white bread, glucose, or dextrose. These studies have ranged from 60 – 210 minutes in length and have been done in people both with and without diabetes. All of these studies found that pulses had a significantly lower GI than the controls.¹⁰ The GI of pulses compared to control foods is shown in Table 1.¹¹

More than 30 published **postprandial studies** have compared pulses or pulse products (dose ranging from 30 to 762 g) to controls (e.g. potatoes, rice, white bread, pasta, grains, glucose, isolated fibers, etc). The majority of these studies (~83%) found significant reductions in postprandial peak glucose or area under the curve compared to the control.¹²

Pulse consumption has also been shown to improve the blood lipid profile, reducing total cholesterol, LDL-cholesterol, triglycerides, and increasing HDL-cholesterol, and has been associated with decreased body weight.¹⁴









Better blood sugar control has been shown to reduce complications in diabetes. The UK Prospective Diabetes Study (UKPDS) in people with type 2 diabetes showed that each 1% reduction in HbA1c was associated with a 37% decrease in risk for microvascular complications and a 21% decrease in the risk of any end point or death related to diabetes.¹³ Similarly, the Diabetes Control and Complications Trial (DCCT) showed that tight control of blood sugar decreased complications in people with type 1 diabetes.¹⁴

A 2009 meta-analysis of 41 **randomized controlled long term experimental trials**¹³ found that when eaten on their own, pulses significantly lowered fasting blood glucose and insulin levels. In studies where treatments were pulse-containing high-fibre or low-glycemic diets, pulses significantly lowered glycosylated hemoglobin (HbA1c). In fact, the significant reduction in HbA1c seen in people with Type 2 diabetes (~0.48%) was comparable to that achieved by oral medications.¹³

Of the 41 trials included in the meta-analysis¹³, 11 trials investigated the impact of **pulses alone**. The average number of participants in each study was 23 and the mean study duration was 6.7 weeks. Pulse treatments included chickpeas, black-eyed peas and various beans (red and white kidney, black, pinto, fava and white at a mean dosage of 152.1 g/day which is equal to about 1 cup. **Pooled analysis showed that fasting blood glucose and fasting blood insulin were significantly decreased by pulses alone**. No significant changes in glycosylated blood proteins (GP) and HOMA of insulin resistance was seen in studies with pulses alone.

Pulse consumption has also been shown to improve the blood lipid profile, reducing total cholesterol, LDL-cholesterol, triglycerides, and increasing HDL-cholesterol, and has been associated with decreased body weight.¹⁴

TABLE 1. GLYCEMIC INDEX (GI) OF SELECTED FOODS¹¹

	FOOD ITEM*	GI
	CHICKPEAS	39
	LENTILS	42
	NAVY BEANS	43
	SPLIT PEAS	45
	PINTO BEANS	55
	WHITE RICE	80
	WHITE BREAD**	100
	POTATOES	121

* 150 g cooked except for white bread

** White bread was used as the reference food in an amount equal to the carbohydrate available in the test food

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Pulse Canada 

1212-220 Portage Avenue
Winnipeg, Manitoba,
Canada R3C 0A5

Telephone: 204.925.4455
Fax: 204.925.4454
Email: office@pulsecanada.com
www.pulsecanada.com