









# Peas, Beans, Lentils and Diabetes Control

## Research has shown that pulse consumption helps in the management of diabetes:

- Peas, beans, lentils, and chickpeas are known as pulses. They are the dry seeds of plants belonging to the legume family which is characterized by pods containing seeds of variable size, shape and colour. Research has shown that pulse consumption can be beneficial in the management of diabetes.
- Dietary pulses (chickpeas, beans, peas, lentils, etc) are a good source of slowly digestible carbohydrate, fibre and vegetable protein and an effective valuable means of lowering the glycemic index (GI) of the diet.
- Eighteen published research 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.<sup>1</sup> The GI of pulses compared to control foods is shown in Table 1.<sup>2</sup>
- 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 fibres, etc). The majority of these studies (~83%) found significant reductions in postprandial peak glucose or area under the curve (AUC) compared to the control.<sup>3</sup>
- A recent meta-analysis of randomized controlled longer term experimental trials 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.<sup>4</sup>

TABLE 1. GLYCEMIC INDEX (GI) OF SELECTED FOODS<sup>2</sup>

	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

- 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.<sup>5</sup>

## Recommendations for Pulse Consumption

The Canadian Diabetes Association recommends eating more high fibre foods including whole grain breads and cereals, lentils, dried beans and peas, brown rice, vegetables and fruits.<sup>6</sup> The American Diabetes Association also suggests that people with diabetes include dried beans (like kidney or pinto beans) and lentils into meals.<sup>7</sup>

Pulses are also recommended as a healthy food choice in Canada's Food Guide and the USDA's MyPyramid. The 2005 Dietary Guidelines, developed by the USDA, recommend eating 3 cups of legumes per week, including beans, peas, lentils and chickpeas. That is equal to approximately ½ cup per day.

Pulses provide dietary protein that is low in fat and saturated fat and as well as increase the amount of fibre, vitamins and minerals in the diet. In fact, analysis of dietary intake data from the 1999-2002 NHANES found that adults consuming approximately ½ cup dry beans or peas resulted in higher intakes of fibre, protein, folate, zinc, iron and magnesium with lower intakes of saturated fat and total fat.<sup>8</sup>

## Nutritional Information

### Chickpeas

Nutritional Information<sup>9,10</sup> (per 100 g dry)

Amount	% Daily Value
Fat 5.9 g	9%
Carbohydrate 66.5 g	22%
Total Fibre 18.8 g	75%
Protein 22.7 g	
Calcium 107 mg	11%
Iron 5.5 mg	31%
Potassium 1127 mg	32%
Vitamin C 1.34 mg	2%
Thiamin 0.49 mg	33%
Riboflavin 0.26 mg	15%
Niacin 1.22 mg	6%
Vitamin B6 0.38 mg	19%
Folate 299 mcg	75%

### Dark Red Kidney Beans

Nutritional Information<sup>9,10</sup> (per 100 g dry)

Amount	% Daily Value
Fat 1.1 g	2%
Carbohydrate 66.5 g	22%
Total Fibre 21.9 g	88%
Protein 28.5 g	
Calcium 96.3 mg	10%
Iron 8.8 mg	49%
Potassium 1778 mg	51%
Vitamin C 0.09 mg	0%
Thiamin 0.56 mg	37%
Riboflavin 0.16 mg	9%
Niacin 1.1 mg	6%
Vitamin B6 0.21 mg	11%
Folate 52.5 mcg	13%

### Lentils

Nutritional Information<sup>9,11</sup> (per 100 g dry)

Amount	% Daily Value
Fat 1.1 g	2%
Carbohydrates 60 g	20%
Fibre 15 g	60%
Protein 27 g	
Calcium 86 mg	9%
Iron 8 mg	45%
Potassium 1015 mg	29%
Vitamin C 1 mg	1%
Thiamin 0.3 mg	20%
Riboflavin 0.3 mg	17%
Niacin 2.2 mg	12%
Vitamin B6 0.25 mg	13%
Folate 183 mcg	45%

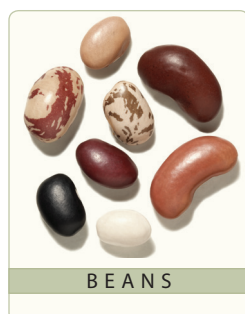
### Whole Peas

Nutritional Information<sup>9,12</sup> (per 100 g dry)

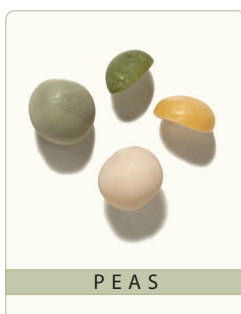
Amount	% Daily Value
Fat 1 g	2%
Carbohydrates 65 g	22%
Fibre 23 g	86%
Protein 23 g	
Calcium 78 mg	8%
Iron 6 mg	33%
Potassium 1155	35%
Vitamin C 0.55 mg	1%
Thiamin 0.51 mg	34%
Riboflavin 0.18 mg	11%
Niacin 1.55 mg	8%
Vitamin B6 0.05 mg	3%
Folate 35 mcg	9%

## REFERENCES:

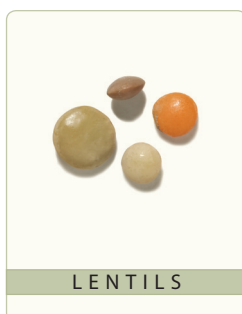
- Araya H et al, 2002, 2003; Bornet FR et al, 1987; Brand JC et al, 1990; Chan HM et al, 2001; Dilawari JB et al, 1987; Hall RS et al, 2005; Jenkins DJ et al, 1983; Lock DR et al, 1988; Mani UV et al, 1992; Mbanya JC et al, 2003; Noriega E et al, 2000, 2001; Pathak P et al, 2000; Vorster HH et al, 1987; Wolever TM et al, 1986, 1987, 1988.
- Foster-Powell K et al, 2002. Am J Clin Nutr: 76: 5-56.
- Akanji AO et al, 1989; Bornet FR et al, 1989; Bourdon I et al, 2001; Brand-Miller JC et al, 2003; Calle-Pascual AL et al, 1986; Collier G et al, 1984, 1986; Coulston AM et al, 1984; Dilawari JB et al, 1981; Golay A et al, 1986; Gustafsson K et al, 1993; Hamberg O et al, 1989; Jarvi AE et al, 1995; Jenkins DJ et al, 1980; Jenkins DJ et al, 1980; 1980; 1982; 1982; 1984; 1987; Johnson SK et al, 2005; Kamath PS et al, 1982; Krezowski PA et al, 1987; Mariotti F et al, 2001; O'Dea K et al, 1983; Oli JM et al, 1982; Potter JG et al, 1981; Schafer G et al, 2003; Schweizer TF et al, 1990; Seewi G et al, 1999; Shaheen SM et al, 1987; Slyper A et al, 1991; Sud S et al, 1988; Tappy L et al, 1986; Thomas DE et al, 1994; Thorburn AW et al, 1986; Torsdottir I et al, 1984, 1986; 1989; Traianedes K et al, 1986.
- Sievenpiper JL et al, 2009. Diabetologia. 52: 1479-1495.
- Anderson JW and Major AW, 2002. B J Nutr. 88: S263-S271.
- Canadian Diabetes Association. www.diabetes.ca
- American Diabetes Association. www.diabetes.org
- Mitchell D et al, 2009. J Am Diet Assoc. 109:909-13
- Wang, 2004. The Chemical Composition and Nutritive Value of Canadian Pulses. www.pulsecanada.com; Wang, 2005. Quality of Western Canadian pulse crops-2005. Canadian Grain Commission. www.grainscanada.gc.ca
- Fiber calculated by Carbohydrate – (Starch + Oligosaccharides + Sucrose).
- Wang and Daun, 2006. Food Chemistry 95: 493-502.; Canadian Grain Commission, 2008. Unpublished data.; Values represent average for whole green and red lentils.
- Centre for Agri-Industrial Technology and Alberta Agriculture, Food and Rural Development. 2005. Development of a Compositional Database for Alberta Pulse Crops.; Values represent average for whole yellow and green peas.



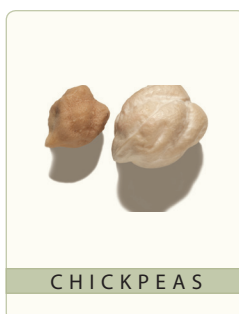
BEANS



PEAS



LENTILS



CHICKPEAS

Pulse Canada 

Canada

This material has been made possible through Canada's Agricultural Policy Framework (APF), a Federal-Provincial-Territorial initiative.