Dietary Pulses and Diabetes Mellitus

What We Know

› Pulses, also commonly known as dried peas or beans, are a subgroup of legumes that have been cultivated and grown for over 10,000 years and are consumed worldwide. The Food and Agriculture Organization of the United Nations (FAO) considers pulses those legumes with dry, edible seeds and a low fat content. Commonly consumed pulses include kidney, navy, cannellini, fava, and pinto beans, chickpeas, lentils, and split and black-eyed peas. Lupines are a less well-known pulse common to South America, and bambara groundnuts are pulses which are an important food source in Africa. All pulses are legumes, but not all legumes are pulses. Legumes used as vegetables, such as green peas or green beans, and those used for oil extraction such as soybeans or peanuts are not considered pulses

› Pulses are an inexpensive source of protein, complex carbohydrates, fiber, vitamin B6, folate, iron, calcium, magnesium, potassium, and zinc. Individuals who consume them as a regular part of their diet are less likely to consume less than the estimated average requirements for these nutrients. A 120 mL (0.5 cup) serving of most legumes provides on average 7.7 g of protein and 7 g of fiber, at a relatively low energy density. The complex carbohydrate they provide is slowly digested, rendering them a very low glycemic index (GI) food. Because of their nutritional profile, consumption of legumes has been shown to have many health benefits, including the ability to contribute to improved glycemic control and improvement in metabolic markers associated with type 2 diabetes mellitus (DM2). Consumption of pulses or legumes is a recommendation in several healthy eating plans including the Dietary Guidelines for Americans, the Dietary Approaches to Stop Hypertension (DASH) eating plan, and the Mediterranean diet. These dietary patterns have been found to be advantageous for those with DM2. Adding pulses is a small dietary change that may have potentially large health benefits, especially for this population(1,2,5,6,7,8)

• Results of a review and meta-analysis of 41 randomized controlled studies indicate that consumption of dietary pulses, either alone, as part of a high-fiber diet, or as part of a low GI diet, decreased fasting blood glucose and insulin levels in subjects with and without DM2. Pulses consumed in a high fiber and in a low GI diet resulted in a reduction in A1C of approximately 0.48%, which surpassed the clinically meaningful threshold of > 0.3% proposed by the U.S. Food and Drug Administration (FDA)(9)

• A 6-year study examined the effects of the amount of dietary pulses consumed on glucose metabolism in 1,421 Mauritian men and women with impaired fasting glucose. Researchers determined that in women those with the highest intake of pulses had a reduced risk of abnormal glucose metabolism and a smaller increase in body mass index (BMI) than those the lowest intake. No association with a reduction in abnormal glucose metabolism was seen in men with any amount of intake of pulses(10)

• Adding pulses rather than focusing on dietary restrictions may be a more favorable option for reducing metabolic syndrome risk. A study on 44 overweight or obese subjects examined the effects of 8 weeks of consumption of pulses on the risk factors for metabolic syndrome. One group of subjects consumed 5 cups of pulses per week as part of an 8-week ad libitum diet, while a second group was counseled on and followed a reduced energy (500 kcal/day reduction) diet. The study results showed that all subjects had reduced their energy intake and all showed improvements in metabolic markers, including waist circumference, systolic blood pressure, A1C, and insulin resistance.
Most measures were similar in both groups, but the pulses group experienced some additional benefits such as an increase in fasting HDL-cholesterol and C-peptide, a measure of insulin production\(^{(4)}\).

- A dietary strategy to increase pulse consumption is to incorporate flour made with pulses into more common foods. In a study, researchers looked for any differences in fasting insulin and insulin resistance between subjects who ate muffins made with different types of pea flour and those who ate muffins made with white wheat flour. Subjects in this randomized controlled trial were overweight and hypercholesterolemic, and consumed the equivalent of one half cup of pulses per day. Consumption of both whole pea flour and fractionated pea flour produced reductions in insulin resistance in the 28 days of treatment as compared to consumption of the control muffins, which made with white wheat flour. In addition, whole pea flour reduced android adiposity in the women\(^{(3)}\).

- Pulses and legumes are rich in resistant starch, oligosaccharides, and fiber, which pass through the gastrointestinal (GI) tract undigested. In the colon, these undigested fractions have prebiotic functions, acting as “food” for the colonic bacteria, as they are highly fermentable. Common adverse effects of consuming pulses include excess gas production, bloating, GI discomfort, and flatulence associated with the fermentation. Although digestibility issues may be a concern for many individuals, moderate consumption generally is well tolerated by most individuals\(^{(2)}\).

- To reduce the amount of fermentable starches and minimize GI symptoms, dried pulses should be soaked in a large amount of cold water for up to 12 hours and then rinsed well prior to cooking in fresh water. The pulses should be drained after cooking and then soaked again for one hour in more fresh, cold water. Prior to eating or using pulses in a recipe the water should be discarded\(^{(2)}\).

- Consuming small portions and increasing consumption of pulses gradually may also help mitigate digestibility issues\(^{(2)}\).

**What We Can Do**

- Learn about the benefits of eating pulses as part of a diabetes management and prevention strategy so you can accurately assess your patients’ personal characteristics and health education needs; share this information with your colleagues.
- Educate your patients who have or who are at risk for DM2 about the benefits of incorporating pulses into their diet as a strategy for management and prevention; stress the health benefits for glycemic control and reduced cardiovascular disease risk.

- Address any concerns about gastrointestinal distress and discuss ways to prepare pulses to minimize their effects.
- Help patients to identify ways to incorporate a 1 cup serving of pulses into meals or snacks at least 5 times each week, and stress the benefits of regular consumption.

**Related Guidelines**

For additional information on the health benefits of pulses see [Health Benefits of Pulses](http://www.fao.org). Food and Agriculture Organization of the United Nations website.
References


