

Soyfoods and Diabetes

ENSA Scientific Advisory Committee Position Paper

Introduction

Diet plays a key role in both the prevention and management of Type 2 diabetes (T2D) and its complications. One specific eating pattern that is proving to be particularly effective is plant-based eating. According to results from observational studies, the prevalence and incidence of T2D is significantly lower among vegetarians than non-vegetariansⁱ and clinical trials show switching to a vegetarian diet leads to improvements in glycaemic control.ⁱⁱ Furthermore, vegetarian diets are associated with a lower risk of cardiovascular disease (CVD), one of the main complications of T2D.

Features of a vegetarian diet that may account for these benefits include higher intakes of fibre, whole grains, legumes, unsaturated fat and lower intakes of saturated fat. Soy is also a common food found in vegetarian diets and studies suggest this may have favourable effects on several aspects of diabetes.



Soy and Risk of Diabetes

According to a recent meta-analysis of observational studies, a high intake of soy, compared to a low intake, was associated with a 13% lower risk of developing T2D.ⁱⁱⁱ However there are inconsistent findings among these types of studies. Some studies show benefits, while others find no advantages. A few reasons for these discrepancies have been proposed such as differences in quantities of soy consumed among the different population groups (low intake in US cohorts versus Asian cohorts). At this point, while there is some evidence suggesting soyfood intake is protective against T2D, the data is too mixed to reach firm conclusions.

Soyfoods and Glycaemic Control

Maintaining good glycaemic control is crucial in preventing complications associated with T2D such as heart disease, renal failure, nerve damage, blindness and other chronic conditions. Soybeans support good glycaemic control due to their favourable nutritional composition:

- Soybeans are much lower in carbohydrate than most beans - 30% of calories coming from carbohydrates compared to 70% in other beans – and approximately half of soy's carbohydrate is made up of poorly absorbed oligosaccharides. Recently this type of carbohydrate was shown to beneficially affect insulin and glucose levels in pregnant women with gestational diabetes.^{iv}
- Many soyfoods have a low glycaemic index (GI) and glycaemic load (GL), helpful in controlling blood glucose levels. The low GL reflects the low GI as well as the low carbohydrate content of the soyfood.

- There are other components besides its low carbohydrate content that may contribute to the low GI of soybeans. For example, one study found an association between the polyphenol content of foods and the GI - the higher the polyphenol content, the lower the GI of the food when tested in both healthy and diabetic patients.^v Of the foods examined, legumes, particularly soybeans, had the highest polyphenol content. Another study partly attributed the very low GI of a soy drink to the low carbohydrate content, but also to components in soy which increase incretin levels. Incretins are hormones released from the gut after eating which modulate insulin response to lower blood glucose levels.^{vi}
 - The fibre found in soybeans is mainly insoluble and this type of fibre has been linked with increased insulin sensitivity and decreased risk of diabetes.^{vii}
 - Soybeans, and consequently soyfoods, are relatively high in the essential polyunsaturated linoleic acid. Clinical evidence shows linoleic acid favourably affects glycaemic control and reduces insulin resistance.^{viii} Data from observational studies has found higher blood levels of linoleic acid are associated with a lower risk of T2D.^{ix}

Adopting a vegan diet, which included soy protein, was recently shown to markedly lower glucose levels and insulin resistance, compared to an omnivore diet, after just three days.^x

Since foods are rarely eaten in isolation several studies have examined the impact of soy on the glycaemic response of other foods. Consuming soy, either as soy drinks or soy protein, with a high GI food or meal appears to favourably impact the glycaemic response.^{xi,xii,xiii,xiv,xv}

The Role of Specific Soybean Components in Glycaemic Control

Isoflavones

Isoflavones, naturally found in soy, have been examined in relation to their impact on glycaemic control. Twenty-five studies have been conducted, mainly in postmenopausal women, with seven studies including women with abnormal glycaemic control. Most of the studies used isoflavones in tablet form and compared these to placebo, although three intervened with soy protein containing different amounts of isoflavones, one used a cereal bar fortified with isoflavones and one compared soy protein with casein. Doses of isoflavones ranged from 40mg to 132mg/day and the types of isoflavones used varied in studies.

Four meta-analyses have pooled these results together and concluded it appears the isoflavone genistein favourably affects glycaemic control.^{xvi,xvii,xviii,xix}

Soyfoods and Complications Related to Diabetes

Two of the main complications associated with T2D are CVD and renal failure. Current evidence indicates soyfoods can be useful in managing CVD, and possibly renal disease.

Soyfoods potentially reduce the risk of developing CVD through multiple mechanisms. Soy protein has been found to directly reduce low density lipoprotein cholesterol (LDL-C), and can further reduce blood cholesterol by improving the fat profile of the diet when used as a direct replacement for common sources of protein in Western diets. Whole soyfoods provide good quantities of linoleic acid, which, when used to replace saturated fat in the diet, can help reduce the risk of CVD. Other compounds found in soy, such as isoflavones, may also have benefits on CVD risk factors unrelated to blood lipids.

Some studies have found soy protein places less stress on renal function compared to animal protein, as well as help maintain favourable serum creatinine and phosphorous levels, and possibly decrease inflammation and proteinuria. These would benefit both individuals at risk of developing kidney disease and those with existing disease.

In conclusion, based on the current evidence, people with, or at risk of developing T2D, should consider including soyfoods into their diet.

Keypoints

- Vegetarian diets have been associated with a reduced incidence of Type 2 Diabetes (T2D) and better glycaemic control
- The incidence of cardiovascular disease (CVD), one of the main complications of T2D, is lower in vegetarians compared to omnivores.
- Vegetarian diets are generally higher in fibre, whole grains, legumes, unsaturated fat and lower in saturated fat which could account for these benefits
- Soy is a common food found in vegetarian diets and studies suggest this may have positive effects on several aspects of diabetes
- Several observational studies have found a higher soy intake is associated with a lower risk of developing T2D
- Soy's favourable nutritional composition, including a low glycaemic index and glycaemic load, can help support good glycaemic control
- Components found in soy, including soy protein, unsaturated fats, the isoflavone genistein, and other polyphenols may also benefit glycaemic control
- Soyfoods have been found to be useful in managing CVD, and possibly renal disease, two common complications of T2D
- Individuals with, or at risk of, developing T2D should consider incorporating soyfoods into their diets

About ENSA

Established in January 2003, the ENSA represents the interests of natural soyfood manufacturers in Europe. The term “natural” refers to the production process used by ENSA members to produce food using whole soybeans. Soy food products from ENSA members are produced without any use of GM (genetically modified) material or GM beans.

ENSA is an association of internationally operating companies, ranging from large corporations to small, family-owned businesses with an annual turnover of €0.8 billion. Since its establishment in 2003, ENSA has been raising awareness about the role of soy and a plant-based diet in moving towards more sustainable food production and consumption patterns.

For more information about ENSA, please visit www.ensa-eu.org or contact the Secretariat.

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