Wils D, J Altern Complement Integr Med 2024, 10: 476
DOI: 10.24966/ACIM-7562/100476

HSOA Journal of
Alternative, Complementary & Integrative Medicine

Short Communication

Short Communication of the Article Entitled "Slow Digestible Starch in Native Pea Starch (*Pisum sativum L.*) Lowers Glycemic Response with No Adverse Effects on Gastrointestinal Symptoms in Healthy Adults

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The number of diabetics and overweight people is increasing significantly year after year [1]. It seems difficult to counteract the situation. Fatty, salty, sugary, ultra-processed foods are highly appreciated by consumers and their negative health effects seem to be denied. Most consumers express the need for pleasure in their diet. These needs are satisfied by a Western diet. Carbohydrates represent a considerable part of the list of ingredients constituting foods. They are considered as bulking agents, they sweeten foods, they provide energy. Unfortunately, most of them are hyperglycemic and caloric. This is the case with sucrose, fructose, and glucose syrups used in confectionery, biscuits, and other pleasure foods.

Beside these foods, more nutritional foods are present on supermarket shelves, aimed at people concerned about their health and athletes, sick people, seniors... Specialized nutrition industry professionals search for ingredients with proven health properties. They also look for naturality, because if they are concerned about the health of their customers, they are also concerned about the health of the planet and their environment.

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Citation: Wils D (2024) Short Communication of the Article Entitled "Slow Digestible Starch in Native Pea Starch (*Pisum sativum L.*) Lowers Glycemic Response with No Adverse Effects on Gastrointestinal Symptoms in Healthy Adults. J Altern Complement Integr Med 10: 476.

Received: March 18, 2024; **Accepted:** March 26, 2024; **Published:** April 02, 2024

In 1981, David Jenkins invented the concept of the glycemic index [2]. At that time, most diabetics were type 1. These sick people who needed to consume foods that raised postprandial glycemia very little had a lot of difficulty finding them. In addition, Jenkins demonstrated that different types of rice or bread did not induce the same type of glycemic response at all. There was therefore a need to map carbohydrates and a need for nutritional education. The concept of the glycemic index allowed consumers who wanted to better understand and be actors in their health to answer these two questions. Most diabetics today are type 2. The need to better control postprandial glycemia has since been certified by scientists, both in diabetics and non-diabetics.

Among carbohydrate sources, the cultivated pea (Pisum sativum) is a plant from the legume family known for its richness in proteins. Widely used in livestock farming, its interest in human nutrition developed in the 2000s. It is a plant that is environmentally friendly because it requires less water, less fertilizer, and fewer pesticides [3]. It is an excellent source of digestible proteins in line with recommendations for vegetarian or vegan diets, which also interests many flexitarian consumers because it is more economical in water and surface area than meat. Climate change linked to the production of carbon dioxide and methane makes it an excellent choice compared to bovine protein sources.

Pea starch is very rich in amylose, this linear component of starch which in the grain has a crystalline helical structure resistant to the action of pancreatic α-amylase. Pea starch is very rich in amylose: from 24 to 49%, on average - 40% according to Farshi et al., [4] Cereals generally have lower amylose contents than 25% [5].

Slowly Digestible Starch in Peas

In 1992, Englyst proposed a test aimed at measuring the digestion rate of starch and carbohydrate foods [6]. The results are given in fractions: RDS, SDS, and RS for rapidly, slowly digestible, and resistant, respectively. Englyst and many scientists consider that the SDS and RS fractions are beneficial for health [7] and that there is a positive correlation between SDS and RS fractions and glycemic index [8].

The richness in amylose of pea starch explains its richness in slowly digestible starches. Perreau's team [9] estimated these fractions in peas with respectively 16% of rapidly digestible starch and 30% of slowly digestible starch. There are 54% of resistant starch in peas according to Englyst which would rather be very slowly digestible starches since only 11% of starch is fiber according to the AOAC method for measuring resistant starches [10].

Correlation with the Glycemic Index

The GI determination test performed according to ISO guideline with 13 volunteers who had a 12-hour fasting period gave a figure of 23% when compared to maltodextrin or glucose which give 100. This figure is therefore very low and perfectly correlated with the RDS content. When looking closely at the postprandial glycemia evolution curves, we observed a very low evolution of the glycemia; it starts after 15 minutes and lasts until 90 minutes.

Pea Starch and Recipes

It is possible to make low glycemic index recipes with native pea starch. However, these must contain very little water and not have to be heated at the risk of seeing the crystalline structure of amylose disappear, and then a decrease of the content of slowly digestible starch. The team of Perreau9 has succeeded in formulating a ready-to-use powder for flavored drinks. It is also possible to make biscuits with pea starch. By using other carbohydrate sources, it was possible to make puddings [11]. All these recipes have shown a richness in slowly digestible starches associated with a low glycemic index in humans. These foods can become valuable aids in glycemic management for people with diabetes or those who do not want to become diabetic.

If we focus on the digestion profile of pea starch, part of it is digested quickly and contributes to providing glucose to cells within 15 minutes after ingestion. Another part is digested more slowly between 15 minutes and 2 hours and contributes to maintaining postprandial glycemia. According to the Englyst test, an estimated fraction of 43% is very slowly digested, most likely in the jejunum and ileum. A last fraction is assimilated to dietary fiber (11%) and probably fermented in the colon into short-chain fatty acids, as most resistant starches are [12].

Subjects being fasted for 12 hours before the test, absorption capacities are very high in the duodenum [13], especially thanks to the SGLT1 transporter. Glucose absorption capacities are also present up to the ileum thanks to the GLUT2 transporter. Fasting should considerably influence the kinetics of glucose uptake and release by the liver, the latter suppressing its glucose production and switching to the use of postprandial glucose for its own energy. This could explain the very low influence of pea starch on medium-term glycemia [14].

Conclusion

There is an urgent need for new ingredients aimed at reducing postprandial glycemic response. The numbers of diabetes cases are becoming alarming with a projection of 700 million in 2050.

We have seen in this study that the low digestibility of native pea starch was correlated with its very low glycemic index and that it was possible to develop low GI recipes with native pea starch. The digestion pattern of pea starch makes it a very slowly digestible starch that responds positively to the concept of progressive glucose release [11]. Postprandial glycemia is attenuated and requires only small amounts of insulin for its regulation, which is very favorable for the nutritional management of diabetes.

References

1. Lin X, Xu Y, Pan X, Xu J, Ding Y, et al. (2020) Global, regional, and national burden and trend of diabetes in 195 countries and territories: an analysis from 1990 to 2025. Scientific Reports 10: 14790.
2. Jenkins DJ, Wolever TM, Taylor RH, Barker H, Fielden H, et al. (1981) Glycemic index of foods: a physiological basis for carbohydrate exchange. Am J Clin Nutr 34: 362-366.
3. Powers SE, Thavarajah D (2019) Checking Agriculture's Pulse: Field Pea (Pisum Sativum L.), Sustainability, and Phosphorus Use Efficiency. Front Plant Sci 10: 1489.
4. Farshi P, Mirmohammadali SN, Rajpurohit B, Smith JS, Li Y (2024) Pea protein and starch: Functional properties and applications in edible films. Journal of Agriculture and Food Research 15: 100927.
5. McKevith B (2004) Nutritional aspects of cereals. Nutrition Bulletin 29: 111-142.
6. Englyst HN, Kingman SM, Cummings JH (1992) Classification and measurement of nutritionally important starch fractions. Eur J Clin Nutr 46: 33-50.
7. Zhang G, Hamaker BR (2009) Slowly Digestible Starch: Concept, Mechanism, and Proposed Extended Glycemic Index. Critical Reviews in Food Science and Nutrition 49: 852-867.
8. Englyst KN, Vinoy S, Englyst HN, Lang V (2003) Glycaemic index of cereal products explained by their content of rapidly and slowly available glucose. Br J Nutr 89: 329-339.
9. Perreau C, Desailly F, Grard S, Thondre PS, Ahlstrom L, et al. (2023) Slow Digestible Starch in Native Pea Starch (Pisum sativum L.) Lowers Glycemic Response with No Adverse Effects on Gastrointestinal Symptoms in Healthy Adults. Journal of Medicinal Food 26: 760-767.
10. McCleary BV, McNally M, Rossiter P (2002) Measurement of Resistant Starch by Enzymatic Digestion in Starch and Selected Plant Materials: Collaborative Study. Journal of AOAC INTERNATIONAL 85: 1103-1111.
11. Gourineni V, Stewart ML, Skorge R, Sekula BC (2017) Slowly Digestible Carbohydrate for Balanced Energy: In Vitro and In Vivo Evidence. Nutrients 9: 1230.
12. Liu H, Zhang M, Ma Q, Tian B, Nie C, et al. (2020) Health beneficial effects of resistant starch on diabetes and obesity via regulation of gut microbiota: a review. Food Funct 11: 5749-5767.
13. Nakamura C, Ishizuka N, Yokoyama K, Yazaki Y, Tatsumi F, et al. (2023) Regulatory mechanisms of glucose absorption in the mouse proximal small intestine during fasting and feeding. Sci Rep 13: 10838.
14. Bideyan L, Nagari R, Tontonoz P (2021) Hepatic transcriptional responses to fasting and feeding. Genes Dev 35: 635-657.

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