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The effect of pea protein preload on postprandial glucose response and blood pressure: a randomized controlled trial in healthy adults

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Abstract

The rising prevalence of metabolic disorders underscores the need for dietary strategies to manage postprandial glucose levels and blood pressure. Protein has been widely recognized for its health benefits, to promote satiety and improve postprandial glucose control [(1)]. Studies have shown that whey protein can significantly lower postprandial glucose and insulin levels in both healthy and diabetic individuals, with greater effectiveness when consumed as a starter before meals [(2)]. However, a recent prospective cohort study indicated that while animal protein consumption may be linked to a higher risk of diabetes onset, incorporating plant-based proteins is advisable. This highlights the need to diversify protein sources in the diet to manage metabolic health and potentially reduce diabetes risk [(3)].

Therefore, the aim of the current study was to determine whether consuming pea protein isolate before a carbohydrate meal could effectively reduce postprandial glucose levels and blood pressure compared to the simultaneous consumption of protein and carbohydrates.

We examined pea protein isolate as a representative plant-based food source, known for its high protein content and accessibility. Ten healthy adults (2 male and 8 females; mean age: 25.6 ± 1 years; body mass index (BMI): 22.7 ± 1 $kg/m^{2)}$ participated in a crossover trial with three conditions, to consume 30g of pea protein isolate 30 min before (PrePP) or with (PP) a 50g carbohydrate meal, against a carbohydrate meal (control, CHO) provided with water. Continuous glucose monitoring and blood pressure were recorded over 180 minutes after the meal. The effect of the interventions on peak postprandial glucose responses and blood pressure were evaluated using a two-factor repeated measures ANOVA. Comparisons were made using Bonferroni's test whenever a significant difference was observed. All statistical analyses were performed using GraphPad Prism with a statistical difference of $p < 0.05$ considered as significant.

PrePP significantly delayed and reduced the postprandial glucose peak compared to PP and CHO (0.46 mmol/L at 60 min vs. 1.125 mmol/L for PP, $p<0.05$ and 1.89 mmol/L for CHO at 30 min, $p<0.01$). Diastolic blood pressure significantly decreased after both protein drinks compared to CHO, especially between 150 and 180 minutes (9.2 mmHg for PP and 4.2 mmHg for PrePP), while the control showed an increase of 1.6 mmHg from baseline ($p < 0.05$). Although systolic blood pressure also decreased in PP and PrePP, with reductions of 3.7 and 5.8 mmHg respectively, this change was not significant compared to the control, which decreased by 2 mmHg ($p > 0.05$).

This study indicates that pea protein preload can effectively reduce postprandial blood glucose levels and may also assist in managing blood pressure, offering a plant-based option for improving metabolic health. Further research is needed to better understand the mechanisms underlying these findings.

References

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