In Pilot Trial Short-Chain Oat Fiber Helps Steady Glucose and Ease Gut Symptoms

A recently published found that a novel short-chain oat fiber supplement was associated with improved post-meal glucose responses and reduced gut symptoms in healthy adults.

Study

The current study focuses on a novel fiber called short-chain oat fiber. This was developed to retain the benefits of dietary fiber while minimizing the viscosity and less favorable sensory associations.

Short-chain oat fiber is free-flowing but has shown attractive functional attributes in vitro. For instance, it acts as a prebiotic, stimulating SCFA production by the gut microbiota. It inhibits digestive enzymes and sodium glucose co-transporters (SGLT-1). These could potentially slow down post-meal glucose responses independent of viscosity.

The current pilot study sought to provide proof of concept in a real-world exploratory setting. The researchers performed an open-label trial on 63 healthy adults at three dosages (5, 10, and 20 g/day). These doses resemble real-world use, thus helping to evaluate tolerability at levels above discomfort thresholds for commonly used dietary fibers like inulin or psyllium husk. The intervention period was two weeks.

The fiber was in the form of a water-soluble powder, with 20 g representing as much fiber as in four servings of oatmeal. The ingredient was 91.3% oat fiber, with the oat fiber fraction containing 90.4% β-glucan and minor residual starch and free sugar below 3%.

In addition to post-meal glucose concentrations, the authors also recorded changes in mood, energy, appetite, and sleep.

The fiber was well tolerated across groups, with no increase in overall gastrointestinal symptom scores. The most common gut symptoms included gas, bloating, and/or constipation. Gas was reported by 26 participants, while bloating and constipation were reported by 15 and 13 participants, respectively. These events were generally mild, transient, not dose-limiting, and did not show a dose-dependent pattern. One participant discontinued the study due to gastrointestinal symptoms, but because Zofran (ondansetron) was also being used at the same time, the role of the oat fiber remains unclear.

These data suggest that short-chain oat fiber is well tolerated and safe at up to 20 g/day.

Over the study period, gut symptoms improved in the 5 g/day and 10 g/day groups, particularly for total gastrointestinal symptom scores and abdominal pain. Constipation symptoms also decreased by the end of the study. The authors suggest short-chain oat fiber may have structural and compositional advantages. The predominant β-glucan content mostly feeds a narrow range of gut microbiota, compared to inulin or fermentable oligosaccharides. This more selective fermentation profile may explain why it can support SCFA production while generating less gas than inulin or short-chain fructans.

Findings

Only 38 of the participants had acceptable glycemic data for the rice challenge analysis. The analysis showed that peak glucose concentrations decreased over time, with a 13% reduction by two weeks in the 20 g/day group. The authors point out that this is comparable to that achieved with prior research on dietary fiber. Both the dosage and the duration of use appeared to increase the downward trajectory.

With a rice challenge, significant group-level reductions in peak glucose were observed in the 10 g/day and 20 g/day groups. The proportion of participants who showed improvement increased with dosage. Thus, 54% of participants in the 5 g/day group showed a decreasing peak glucose response over time, compared with 69% in the 10 g/day group and 83% in the 20 g/day group.

The magnitude of the glucose peak showed a dose-related pattern, although glucose spike height declined significantly only in the 20 g/day group. Overall, these findings suggest a dose- and time-dependent effect of short-chain oat fiber on postprandial blood glucose regulation. The effect was greatest at 20 g/day, and after two weeks.

Participants in the 10 g/day and 20 g/day groups spent more time in the target blood glucose range, and this increased over time. The proportion of participants showing an increase in ideal time in range increased with dosage, from 69% in the 5 g/day group to 90% in the 20 g/day group.

Blood glucose appeared to remain steadier over time in the higher-dose groups, with reductions in glucose variability metrics in the 10 g/day and/or 20 g/day groups. This suggests that short-chain oat fiber consumption may have helped improve baseline blood glucose regulation.

Moreover, the total 4-hour glycemic exposure, measured by AUC and iAUC, was not significantly changed. The authors suggest that these effects indicate a slower, more sustained rate of glucose digestion and absorption, with possible improvements in insulin sensitivity and metabolic regulation, though these mechanisms were not investigated in this study.

Notably, the study suggests that the role of β-glucans in regulating glucose absorption and blood glucose levels is not solely determined by fiber viscosity. The authors suggest a possible role for the gut microbiome, which produces SCFAs via fiber fermentation, thus improving insulin sensitivity and glucose regulation.

The investigators emphasize that they performed only preliminary analyses in healthy adults, with mental health analyses restricted to participants with at least mild baseline symptoms and pooled across dosage groups. The findings suggest improvement in mild symptoms such as

worry, irritability, a lack of enjoyment in life, and the feeling that life is difficult over time. Appetite remained intact. Morning energy slumps were relatively uncommon.

According to the authors, short-chain oat fiber could be fermented by the gut microbiome, leading to SCFA production. Previous research shows that SCFAs are linked to improved gut-brain crosstalk and better functioning due to their anti-inflammatory profile.

Conclusion

The study suggests that short-chain oat fiber is safe and well-tolerated over 14 days in selected healthy adults. It appears to have a favorable effect on glucose regulation, and possibly on mental health. Coupled with its improved sensory characteristics, the findings suggest that short-chain oat fiber could potentially offer advantages as a food additive to boost fiber content.

Though promising, these findings must be confirmed in larger trials with placebo controls, including individuals with glucose dysregulation or mental health symptoms at baseline. Direct comparisons with other dietary fiber sources would also be valuable for understanding how each type of fiber exerts its effects and for assessing their relative effectiveness.

Source:

https://www.news-medical.net/news/20260614/Short-chain-oat-fiber-helps-steady-glucose-and-ease-gut-symptoms-in-pilot-trial.aspx