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**File: ■ Flaxseed (*Linum usitatissimum*, Linaceae)
■ Postprandial Glycemia
■ Diabetes**

HC 102251-701

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RE: Golden Flaxseed Reduced Hyperglycemia in Men with Type 2 Diabetes

Moreira FD, Reis CEG, Welker AF, Gallassi AD. Acute flaxseed intake reduces postprandial glycemia in subjects with type 2 diabetes: a randomized crossover clinical trial. *Nutrients*. September 10, 2022;14(18):3736. doi: 10.3390/nu14183736.

Diabetes mellitus is associated with postprandial glucose peak. The postprandial glucose peak has a positive correlation with the production of reactive oxygen species, oxidative stress, protein damage, the glycosylated hemoglobin level, the glycated albumin concentration, and the hepatic de novo lipogenesis. Flaxseed (*Linum usitatissimum*, Linaceae) has been used for its antihyperglycemic properties with no reported severe side effects. Long-term consumption has shown a reduction in blood glucose, glycated hemoglobin, triglycerides, total cholesterol, and blood pressure for patients with type 2 diabetes mellitus (T2DM). In patients with prediabetes, it has indicated a decrease in blood glucose and insulinemia and an improvement in individuals with prediabetes. Acute consumption has also shown a reduction of the blood glucose area under the curve; however, there have been no studies investigating the effects of flaxseed on postprandial hyperglycemia in patients with T2DM. The authors conducted a crossover clinical trial to evaluate the acute effects of flaxseed on postprandial hyperglycemia in patients with T2DM.

This study was conducted between June and November 2019 in Brazil. Inclusion criteria included men with T2DM between the age of 30 and 60 years who consumed breakfast regularly, were willing to eat all test foods, had no allergies to the foods provided in the study, and had no reported sleep disorders. Exclusion criteria were individuals with any other clinically diagnosed health conditions, were on current exogenous use of insulin, had health complications from diabetes, a reported gastrointestinal disorder, had irregular intestinal rhythm, or were smoking.

After an 8-12 h overnight fast, patients reported to the clinical laboratory. Patients were instructed not to take any diabetes medication in the morning until after the lab portion was completed. Patients were also instructed to abstain from exercise and alcohol for 24 h. A venous blood collection was obtained before consumption of study product. Glucose and insulin levels and glycated hemoglobin (HbA1c) were calculated. Body weight, height, and body mass index were also obtained.

Participants were put into one of two groups. The first group consumed 15 g of ground raw golden flaxseed and were instructed to wait 15 min to eat breakfast. The control group was given breakfast without the flaxseed. Water (150 mL) was given before breakfast. All breakfast meals were identical. Capillary finger-stick blood samples were obtained at fasting and at 15, 30, 45, 60, 90, and 120 min postprandially. After blood samples were obtained, participants could take their normal diabetes medication. Participants also completed a visual analog scale pertaining to palatability parameters and taste intensity 15 min after breakfast. Patients underwent a 3-10 day washout period and were placed in the opposite group they were in during the first test.

Of the 93 patients screened for eligibility, 22 were selected to participate. Of the 22 patients, 19 completed the study. Three participants were lost to follow up due to research abandonment, change in working hours, and change of residence. Nine participants used one prescription to manage diabetes, seven used a combination of two, and three combined three. There was no change in type or dosage of medication during study.

The fasting glucose was not different between groups at baseline. The glucose peak rise was reduced by 17.25% in the flaxseed group ($P = 0.001$), and the 2 h glycemic area under curve was decreased by 23.99% ($P < 0.001$). There was also a decrease in the post prandial glycemic response at 30, 45, and 60 min compared to control ($P < 0.001$). There were no significant differences in the time-to-glucose peak between groups. There were no differences between groups for the palatability scores or taste intensity indicating that flaxseed did not affect the overall palatability.

The authors conclude 15 g of ground raw golden flaxseed before breakfast can decrease the 2 h postprandial glycemic response in men with T2DM. Limitations in this study included excluding patients using exogenous insulin, patients not being blinded, not including women, small number of participants, and being a short, acute study. The authors suggest a long-term trial, a trial with women while monitoring hormone levels, and a trial using a placebo. Flaxseed is widely available in many countries and could be a viable natural remedy for mitigating T2DM. The authors state no conflict of interest.

—*Dani Hoots*

Referenced article can be accessed at <https://www.mdpi.com/2072-6643/14/18/3736>.