In Adults with Elevated Levels Bran-Enriched Corn Flour Lowers LDL Cholesterol

Researchers investigate the effects of various corn flours on cardiometabolic outcomes and gut microbiota (GM) changes in adults with elevated low-density lipoprotein (LDL) cholesterol levels.

Study

The present study enrolled healthy male and female participants between 18 and 70 years of age with mild-to-moderately elevated LDL cholesterol levels of 110 mg/dL or more. Individuals with LDL cholesterol levels exceeding 190 mg/dL were required to provide physician's clearance for study participation.

Exclusion criteria included significant weight fluctuations in the past three months, supplement use, specialized or restrictive diets, allergies to specific foods, recent antibiotic use, and various medical conditions. Individuals prescribed lipid-lowering medications, those who engaged in regular, intense physical activity, those with certain medical histories, and pregnant or lactating women were also excluded from the study.

Potential participants completed an online pre-screening questionnaire to ensure eligibility. Qualified individuals were contacted for further screening, including a 12-hour fasting blood draw to verify cholesterol levels. Eligible participants then provided informed consent, completed baseline health and diet questionnaires, and submitted a fecal sample for GM assessment.

Study participants consumed 48 g/d of either whole-grain corn meal (WCM), refined corn meal with bran (RCM + B), or RCM. Each intervention phase lasted four weeks, separated by two-week washout periods.

Study participants received corn-based foods, including muffins and pita bread, to incorporate into their regular diets and replace other grain products. Weekly compliance and gastrointestinal symptom surveys were conducted. Blood and fecal samples were collected at baseline and at the end of each intervention period.

Compliance was defined as consuming over 80% of the provided food items. Dietary intake was monitored using three-day diet records, and nutritional data were analyzed using the Nutritional Data System for Research software.

Blood lipid levels were measured using automated chemistry analyzers, whereas fecal samples were processed for microbiota sequencing. Statistical analyses included mixed-effects

modeling, Analysis of Variance (ANOVA), and permutational multivariate ANOVA (PERMANOVA) to assess treatment effects on cardiometabolic outcomes and GM composition.

Results

Of the 131 individuals who completed the initial blood lipid screening, 54 were randomly assigned to the intervention groups. Eighteen study participants were lost to follow-up for various reasons, including decreased interest, unspecified reasons, health status changes, coronavirus disease 2019 (COVID-19), relocation, adverse reactions to food, antibiotic use, personal reasons, and pregnancy.

Ultimately, 36 participants completed the study between March 2018 and August 2023. About 58% of the study cohort was female and 64% White, with ages ranging from 18 to 67 years and body mass index (BMI) values between 18.9 and 40.4 kg/m2. Compared to females, males had significantly greater body weight and height and lower high-density lipoprotein (HDL) cholesterol levels.

Compliance was over 95% for all treatment groups. Nutrient intake prior to each intervention was not significantly different. Furthermore, body weight did not change substantially over time between treatments.

Mixed-effects model analysis revealed no significant main effects of treatment, time, or period for total cholesterol (TC) and LDL cholesterol levels. However, a significant interaction was observed between treatment and time for LDL cholesterol levels.

RCM + B significantly decreased LDL cholesterol levels over time, with reductions exceeding 5% in about 70% of participants. This effect was not observed for WCM or RCM.

A significant main effect of treatment was observed for HDL cholesterol levels, with a significant difference observed between WCM and RCM + B, but not between WCM and RCM or between RCM + B and RCM. After adjusting for outliers, TG analysis showed no significant effects or interactions, thus indicating uniform responses across treatments.

GM metrics assessed using mixed-effects modeling showed no significant main or interaction effects for α diversity metrics. Likewise, β diversity metrics did not differ significantly between treatments.

Differential abundance analysis identified an unclassified genus from the Lachnospiraceae family and Agathobaculum, with a notable increase in Agathobaculum abundance observed in the WCM group compared to RCM. No significant correlations were found between these taxa and reductions in LDL cholesterol levels.

Stool characteristics, gastrointestinal symptoms, and product satisfaction were not significantly different between treatment groups. All treatments had similar changes in Bristol stool scale ratings, self-reported gastrointestinal symptoms, and product satisfaction scores. Both pita and muffin products were well accepted by participants, with median ratings of “good” for appearance, consistency/texture, flavor, and overall satisfaction.

Conclusion

The current crossover study evaluated the effects of consuming 48 g/d of three corn flour variants on cardiometabolic outcomes and GM in adults with elevated LDL cholesterol levels. RCM + B significantly reduced LDL cholesterol levels by 10 mg/dL, with 70% of participants experiencing reductions greater than 5%. Minimal changes in GM composition were observed.

The study findings support the use of bran-enriched corn products for managing LDL cholesterol.

Source:

https://www.news-medical.net/news/20240808/Bran-enriched-corn-flour-lowers-LDL-cholesterol-in-adults-with-elevated-levels-study-finds.aspx