



The Effect of Mango on Glycemic Indices, Cardiovascular Health, and Body Composition in Overweight and Obese Pre-Diabetics



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BACKGROUND

According to the Centers for Disease Control and Prevention (2016), at least 100 million adults in the United States are currently diagnosed as pre-diabetic or Type 2 diabetic. With the number of cases steadily increasing in this population, healthcare costs have subsequently increased for both the patient and the health care system. To date, there is minimal data in both animal model and human studies, however the literature does suggest that mango may have a positive effect on glycemic indices and cholesterol values. With more definite evidence from human studies, mangoes can be implemented into the U.S. diet to help mitigate the advancement and diagnoses of pre and Type 2 diabetes and, as a result, aid in a reduction of healthcare costs.



AIMS

- Aim 1:** To determine how daily consumption of fresh mango affects glycemic control in the intervention group compared to the control group through the results of blood glucose, HbA1c, insulin, HOMA-IR, and HOMA-β at the initial baseline 6-, 12- and 24-week study visits.
- Aim 2:** To determine the extent to which daily consumption of fresh mango affects indicators of cardiovascular health in intervention group compared to the control group at the initial baseline, 6-, 12- and 24-week study visits: a) systolic and diastolic blood pressure b) flow mediated dilation c) pulse wave velocity and pulse wave analysis d) biomarker of inflammation (C-reactive protein) e) lipid profiles
- Aim 3:** To evaluate the degree to which daily consumption of fresh mango affects body composition in intervention group compared to the control group through examining the followings at each study visits: a) body composition via bioimpedance spectroscopy (BIS), lean mass, fat mass, and phase angle (PA) b) anthropometrics [weight, height, waist circumference (WC), hip circumference (HC), waist to-hip ratio (WC/HC)]

INCLUSION/EXCLUSION CRITERIA

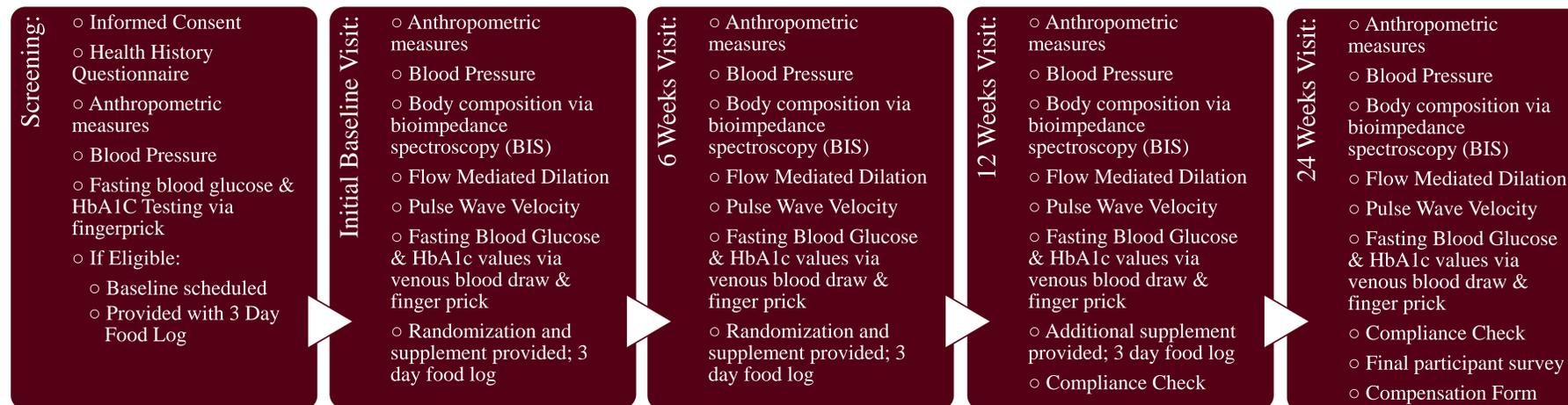
Inclusion:

- Body mass index between 25 kg/m² and 34.9 kg/m²
- Fasting blood glucose from 100 mg/dl to 125 mg/dl
- HbA1C of 5.7-6.4 %
- Non frequent mango consumers (< 5 mango in the past two weeks)
- Confirmed postmenopausal (women only)

Exclusion:

- Diagnosed with diabetes, CVD, uncontrolled hypertension (≥ 160/100 mmHg)
- Diagnosed with active chronic diseases such as cancer, thyroid, kidney, liver and pancreatic disease or who are on hormone replacement therapy
- On specific diet
- Smokers
- heavy drinkers (> 12 alcoholic drinks per week)

TIMELINE



METHODS

- Forty overweight or obese (body mass index (BMI) of 25.0 kg/m² to 34.9 kg/m²), pre-diabetic men and women (women must also be post-menopausal) between the ages of 50 to 70 years from the area of Tallahassee, Florida. The study is randomized, and calorie-matched controlled. Participants will be randomly assigned into one of two groups: one fresh Tommy Atkins mango (120 g), or an isocaloric granola bar (control group) per day for 24 weeks. Upon qualification from the phone and in-person screening, enrolled participants will complete the following visits: baseline, 6 weeks, 12 weeks, and 24 (final) weeks.

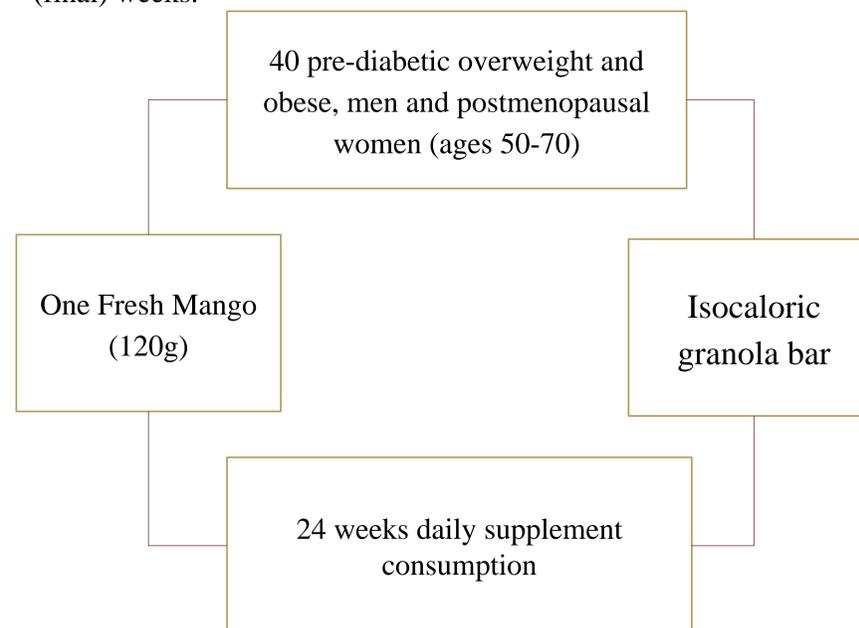


Figure 1. Flowchart of methods used in analysis of glycemic control and body composition in overweight and obese men and postmenopausal women consuming freeze-dried mango

STUDY STATUS AND DISCUSSION

- Study Status:**
 - 45 phone screens; 6 on site screening visits; 1 qualified and enrolled participant
- Discussion:**
 - Mango has bioactive compounds and antioxidant properties known to have beneficial effects on blood glucose control. Specifically, the mice-based studies in a high-fat diet showed that freeze-dried mango improves blood glucose and lipid profile and positively affects adiposity. Additionally, in the human studies, mango supplements have been shown to positively affect postprandial glucose (blood sugar after a meal), insulin functionality, and pro-inflammatory biomarkers in obese and type 2 diabetic individuals. If the results were as predicted, the evidence of this experiment could be used to implement mangoes for the pre-diabetic population to reduce Type-2 diabetes indirectly

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REFERENCES

- CDC Press Releases. CDC. Published January 1, 2016. Accessed July 2, 2020. <https://www.cdc.gov/media/releases/2017/p0718-diabetes-report.html>
- Lucas Ea, Li W, Peterson Sk, et al. Mango Modulates Body Fat and Plasma Glucose and Lipids in Mice Fed a High-Fat Diet. The British journal of nutrition. doi:10.1017/S000711451100206
- Evans SF, Meister M, Mahmood M, et al. Mango Supplementation Improves Blood Glucose in Obese Individuals. Nutr Metab Insights. 2014;7:77-84. doi:10.4137/NMI.S170286