



The Effects of Mango on Glucose and Lipid Parameters in High Fat Diet-Induced Obesity

The Big Picture:

Cardiovascular disease, a group of negative conditions affecting the heart and circulatory system, is the number one killer of men and women in the U.S. Because eating a high-fat diet can increase one's chance of developing cardiovascular disease, incorporating more fruits and vegetables into the diet has long been recommended by the medical community.

Mangos have been studied previously for their antibacterial, antiviral and anticancer properties, but little had been done to ascertain the effect of mangos on cardiovascular health. To help determine how mangos may help combat cardiovascular disease, the National Mango Board commissioned a research study to see what effect mangos would have on cardiovascular risk factors caused by a high-fat diet. Specifically, researchers tested how mango helped to regulate glucose and lipids in an animal model.

Glucose (sugars) and lipids (fats) provide the body with energy, but inappropriate levels of glucose and lipids can lead to conditions like obesity, high cholesterol, insulin resistance and plaque build-up in the arteries. People with cardiovascular disease (or the precursory signs of this disease) can use prescription drugs to address their symptoms, but drugs can have undesirable side effects. Using natural substances, like mango, to prevent or reduce cardiovascular disease risk factors is highly desirable.

In a research study led by Dr. Edralin Lucas of Oklahoma State University, Stillwater, Okla., the flesh from whole Tommy Atkins mangos were studied with the hope that mangos may some day be offered as a novel nutritional strategy to regulate glucose and lipid parameters associated with diet-induced obesity.

Study results found that mangos show promise as a food that could help to lower the risk of cardiovascular disease.

Overall Findings:

- **Mango is effective in reducing fat mass of those subjects fed a high-fat diet.** In fact, mango was shown to be as effective as the glucose-lowering drug rosiglitazone and lipid-lowering drug fenofibrate in reducing fat mass in this animal model. Mango regulated the rise in plasma glucose, cholesterol, and free fatty acids in mice on a high-fat diet for two months. After two months on treatment, mice on a 1% mango diet had the best response after a glucose challenge. Findings show that mango can help prevent metabolic syndrome, a cluster of conditions like obesity, insulin resistance, high cholesterol, high blood pressure, etc., that can increase the risk of cardiovascular disease.
- **Preliminary studies show that mango has a positive effect on bone mineral content in those subjects with a high-fat diet.** Whole body bone mineral density and bone mineral content were highest for mice fed mangos for two months and were better than those of mice fed rosiglitazone. Having more bone mass and more minerals in the bone (calcium, potassium, phosphorous) can help to prevent bone loss.
- **Mangos show potential in helping to prevent other health conditions like osteoporosis.** Clearly further studies are needed to determine exactly how mangos affect the bones, but based on this study, mangos should be examined for their ability to help prevent osteoporosis in at-risk populations such as postmenopausal women.

- **Although mango lowered fat mass in those with high-fat diets after two months, no further effects were observed after 4 months.** Mango won't harm a subject after four months, but its benefits are less than during the first two months. However, the mango's strength lies in the fact that it does not cause undesirable side effects like the two drugs that were tested in this study. Mice given the glucose-lowering drug rosiglitazone in the study showed increased risk of bone loss after two months. Mice given the lipid-lowering drug fenofibrate showed an enlargement of the liver after two months. It is not clear yet if continued long-term intake of mango would offer long-term benefits to those with high fat-diet induced obesity.

Looking ahead:

Ongoing research will be necessary to fully develop the concept of using mangos as a nutritional strategy for preventing cardiovascular disease and other conditions. Currently the National Mango Board is further researching how mangos affect bone parameters. More research will also be necessary to determine exactly how mangos affect certain genes with regard to certain health benefits. (For instance, in regulating glucose and lipid levels, researchers need to dig deeper to find the causes of the results – does mango block the synthesis of cholesterol? Does mango cause glucose to be efficiently used by the body? How does mango affect metabolism?)

Additional varieties of mangos should also be studied to determine any varietal differences in how other mango cultivars influence these health benefits. If certain mango varieties show superior health benefits, producers may want to consider growing those cultivars, especially if there's evidence that marketing such health benefits would increase demand for mangos overall.