The Effects of Freeze-Dried Whole Grape Powder on Chronic Disease and Cardiovascular Risk Factors, Hunger, Satiety, and Body Composition in Free-Living People-a Pilot Study

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Impact on California Agriculture and Consumers: The California Table Grape Commission (CTGC) is the representative for grape growers, farmers, and shippers in California. California produces 99% of the US production of table grapes, and the CTGC is working to create and globally expand more markets. In 2021, California produced 95.2 million 19-pound boxes of grapes valued at over $2.1 billion, 76% of the world's volume and 95% of the export volume. This year, the world's table grape production is expected to be 27.4 million tons, with US exports remaining the same and imports from Peru to the US increasing from 53,000 to 766,000 tons. The CTGC wishes to promote California table grapes as healthy foods to increase profits, increase grower's financial viability, and reduce export threats. The potential impact on humans at risk for CVD is priceless-if we can demonstrate that grape consumption decreases CVD risk, we postulate that grape consumption might also protect against other chronic diseases. Additionally, advertising table grapes health benefits may contribute to a rise in sales. Therefore, our results may be very important for consumers, the CTGC, growers, farmers, and shippers.

Rationale/Introduction: Cardiovascular disease (CVD) is responsible for 1 of 5 deaths. It is the number one killer of Americans, killing about 700K US adults per year and the associated healthcare cost is about $219 billion US dollars per year. We wished to determine if grape consumption decreases CVD risk factors.

Experimental Approach: Our double-blinded placebo controlled cross-over study examined the effects of feeding California freeze-dried grapes on CVD risk and chronic disease risk factors namely, blood glucose and lipids (LDL, HDL, total cholesterol, triacylglycerides), electrolytes, inflammation (c-reactive protein and tumor necrosis factor-alpha (TNF—α)), body composition, and blood pressure in 26 adults. A decrease in CVD risk factors may indicate that consumption of grapes protects against CVD and other chronic diseases.

Major Conclusions: Grape consumption significantly increased fat-free mass, body mass index, and decreased TNF-α in healthy, normo-cholesterolemic, free-living subjects. Grapes also increased LDL cholesterol and non-HDL cholesterol, but it is unknown if the LDL cholesterol is predominantly large or small-sized. Therefore, grape consumption of 1.5 cups per day or equivalent decreases cardiovascular risk factors such as increasing fat-free mass and by decreasing TNF-α. The grape placebo significantly increased fasting glucose, indicating it acted more like a variable than a placebo. Grape consumption did not raise fasting blood glucose in comparison to the placebo or from baseline to end of study. It is unknown if grape consumption protects against increased fasting blood glucose, or it simply doesn't influence fasting blood glucose concentrations. Further research is needed utilizing a 'no-grape' control and testing for additional inflammatory risk factors and cholesterol particle sizes. Additionally, promotion of table grape's health benefits may contribute to a rise in table grape sales and positive health outcomes for consumers, and increased income for the CTGC and California growers, farmers, and shippers.

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