

## Blueberry juice as a nutraceutical approach to prevent prediabetes progression in an animal model: focus on hepatic steatosis

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### Introduction:

Blueberries (BB) consumption has been recognized as beneficial for metabolic disorders through its antioxidant, anti-inflammatory and insulin-sensitizing properties; however, its effect against progression from prediabetes to diabetes remains unknown.

### Objectives:

To assess the effects of blueberries juice (BJ) in a prediabetic animal model displaying hepatic steatosis.

### Methods:

A rat model of evolutive prediabetes [Male Wistar rats, 8 weeks old] was developed by ingestion of a high-sucrose (HSu, 35%) diet for 9 weeks (W9), supplemented by a high-fat diet (HF, 60%) for further 14 weeks (HSuHF, W23), vs control with standard diet. Half of the animals (n = 8/group) daily received BJ (25g/Kg BW, orally) between W9 to W23. Glycemic, insulinemic and lipidic profiles were assessed, as well as markers of liver dysfunction/damage, including morphology, echogenicity, fibrosis/steatosis and mitochondrial function (ultrasonography, histochemical staining techniques and bioenergetics assays). (n = 16/group Values are means ± S.E.M. (ANOVA followed by post-hoc comparisons). **Results:** BJ treatment significantly (p < 0.05 or p < 0.01) prevented the HSuHF-evoked metabolic and liver impairments, with amelioration of glucose tolerance, insulin sensitivity and hypertriglyceridemia, together with attenuation of liver damage, as seen by improved mitochondrial function and hepatic steatosis.

### Conclusions:

This work provides novel evidence on BJ ability to prevent the aggravation of prediabetes induced by HSuHF diet with benefits against hepatic steatosis, although the precise mechanisms should be further explored. Bioactive compounds from BB are an exciting new area of food research and development of nutraceuticals that can be early used to prevent progression of prediabetes.

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