

Metabolic effects of Tart Cherries supplementation in an animal model of obesity

Michele Moruzzi¹, Ilenia Martinelli¹, Maria Vittoria Micioni Di Bonaventura¹, Maria Elena Giusepponi¹, Gabriella Gabrielli², Alessandro Fruganti², Andrea Marchegiani², Fabrizio Dini², Carlotta Marini², Massimiliano Cuccioloni², Matteo Mozzicafreddo², Carlo Polidori¹, Carlo Cifani¹, Giulio Lupidi¹, Francesco Amenta¹, Seyed Khosrow Tayebati¹, Daniele Tomassoni²

¹School of Medicinal and Health Products Sciences, University of Camerino, Italy

²School of Biosciences and Veterinary Medicine, University of Camerino, Camerino, Italy.

Fruits and vegetables contain non-nutritive phytochemicals that may contribute to their health-promoting effects. Anthocyanins are phytochemical flavonoids principally found in fruits and vegetables. Several studies have suggested that anthocyanin-rich plant extracts can modify lipid metabolism *in vitro* and can reduce hyperlipidemia *in vivo*. Tart cherries (*Prunus cerasus L.*) are a rich source of anthocyanins.

This study was designed to evaluate the effects of anthocyanin-rich tart cherries extract and seeds powder on Diet-Induced Obesity (DIO) rats, that provide a useful animal model sharing several common features with human obesity.

DIO rats were studied for 17 weeks of hypercaloric diet with the supplementation of 0,1 mg/kg of tart cherries seeds powder (DS) and seeds powder plus tart cherries extract, containing 1mg of anthocyanins (DES). DIO rats were compared to the control rats with not fat diet (Chow). To determine the systemic effects of caloric dense exposure we examined food consumption, fat mass content and fasting glycemia, insulin levels, cholesterol and triglycerides.

Ultrasonographic (US) and computed tomography (CT) evaluations were performed to detect adipose tissue deposition. In CT, also fat infarction of the liver was investigated followed by histochemical analysis

17 weeks of fat diet, rats increased significantly their body weight in comparison to the control group. Glycaemia and insulin levels were higher in DIO rats. No difference in body weight was found in DS and DES rats compared to age-matched DIO rats. Supplementation of tart cherries in DS and DES induce a decrease of the blood pressure and the glycemia. Furthermore, decreased the serum levels of thiobarbituric reactive substances.

The US and CT analysis indicated an increase of deposition of visceral adipose tissue and evidenced a decrease of hepatic attenuation in DIO rats, suggests a moderate hepatic steatosis prevented by tart cherries supplementation in DS and DES rats. The evidence of the CT was confirmed by histological analysis. DIO rats present a distinctive pattern of steatosis with hepatocytic ballooning degeneration at the perivenular areas. The steatosis elements decrease in DS and DES rats.

Tart cherries supplementation, although did not reduce the body weight in DIO rats, prevent the development of related risk factors. Further studies are needed to better clarify the benefits of tart cherry supplementation on health and disease prevention.

Keywords: _____

Obesity, Diet-Induced Obesity rats, tart cherries, liver, steatosis