

## THE EFFECT OF FRUITS AND LEAVES OF SWEET CHERRY ON SELECTED BIOCHEMICAL MARKERS AND FAT METABOLISM IN WISTAR RATS

Obesity, described by the WHO as an epidemic of the 21st century, is still a growing problem. The changes of dietary habits, including functional foods rich in bioactive compounds, can be helpful in the prevention and treatment of obesity. The great source of polyphenols and other bioactive components is fruit of sweet cherry (*Prunus avium* L.). Literature data suggest, that not only fruit but also other parts of fruit trees are characterized by large amount of these compounds and high antioxidant activity.

The aim of this dissertation was to compare the chemical composition and the content of bioactive compounds in fruit, leaves and petioles of selected cultivars of sweet cherry. The second equally important aim of this work was to assess the effect of the addition of sweet cherry fruit and leaves to the high fat and high fructose diets on selected biochemical parameters, biomarkers of oxidative stress and inflammation as well as expression of genes involved in fatty acids metabolism in Wistar rats.

In the first stage of research, fruit, leaves and petioles of nine cultivars of sweet cheery, collected in 2015 and 2016, were used. The basic chemical composition, the content of vitamin C, polyphenols, anthocyanins, carotenoids and antioxidant activity were determined. In the second stage of study, two experiments with growing Wistar rats were carried out. Animals were fed with high fat and high fructose diets. In both experiments, the additions to diets were 5% and 10% of fruit as well as 1% and 3% of leaves.

The results of the first stage indicated that the chemical composition differed in the particular parts and cultivars of sweet cherry. The leaves were the richest source of vitamin C and carotenoids, however the petioles had the highest content of total polyphenols. Anthocyanins were detected only in fruit. The fruit of cultivar Kordia and leaves of cultivar Regina harvested in 2016, were characterized by the highest content of polyphenols and antioxidant activity, so they were chosen for the second stage of research. The results of the second stage showed that the addition of fruit and leaves to high fat and high fructose diets in Wistar rats resulted in:

- reduction of activity of alanine aminotransferase and aspartate aminotransferase as well as lipid content in the liver (improvement of liver function);
- changes in lipid metabolism by regulating the expression of genes involved in synthesis and  $\beta$ -oxidation of fatty acids;
- reduction of oxidative stress by influencing the activity of antioxidative enzymes;
- reduction of chronic inflammation by decreasing the level of C-reactive protein and pro- and anti-inflammatory cytokines.

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