

Abstract for scientific popularization of the project

Recent studies have shown that improper diet and unhealthy lifestyle are of great importance in the spread of civilization-related diseases, including obesity, type 2 diabetes, coronary heart disease, hypertension and cancer. The World Health Organization (WHO) considers that diseases resulting from unhealthy diet reach epidemic proportion. It is believed that the metabolic syndrome is one of the greatest clinical and epidemiological problems at the present time. Metabolic Syndrome (MS) is defined as a clinical condition which is characterized by the coexistence of interconnected risk factors for cardiovascular diseases and type 2 diabetes, including abdominal obesity, hypertension, and carbohydrate and lipid metabolism disorders. Currently, MS affects approximately 20-25% of the adult world population, including 20% of Polish adults, and spreads rapidly reaching the status of the epidemic of the 21st century. The most important strategy in the prevention and treatment of MS involves a healthy lifestyle, physical activity and a balanced diet rich in fruits and vegetables, which contain natural bioactive compounds with the ability to body fat reduction and amelioration of disturbances in lipid and carbohydrate metabolism.

The aim of this project is to determine the biological potential of berry fruit extracts obtained from chokeberry, blackcurrant elderberry, lingonberry and raspberry in terms of their impact on the formation of mature fat cells and intracellular lipid accumulation. Studies will also focused on the evaluation of anti-inflammatory, antioxidant, antidiabetic and antiatherosclerotic properties, which are essential to reduce obesity-related metabolic complications. The ability of the extracts to reduce tissue dysfunction and metabolic disorders associated with an excessive growth of adipose tissue will be analyzed at both the cellular and molecular level. Analysis of the biological potential of berry extracts will be conducted with the use of tissue and cell culture models, that mimic physiological processes occurring in the body in adipose tissue and vascular endothelium, taking into account the concept of the Three Rs (Replacement, Refinement and Reduction) recommended by the OECD (Organization for Economic Co-operation and Development), which promotes the use of alternative research models not experiencing pain, to replace or reduce the number of laboratory animals used. The findings will provide a basis for design of the preparations, recommended as dietary supplements, targeted at the prevention and treatment of obesity and related complications: MS and diabetes.

The results of this project will allow for scientifically justified promotion of berries as a valuable source of bioactive compounds supporting the maintenance of a healthy body weight, according launched in 2015 an international campaign that recommends the consumption of berries under the slogan "Extraordinary properties of ordinary fruit", in which Poland plays an important role as one of the largest producers of berries in the world.