

DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

Sea buckthorn is a thorny shrub with greyish-green lanceolate leaves and small yellow or orange fruit, native to Europe and Asia. This plant has gained popularity over several decades, mainly because of the high nutritional value and medicinal properties of its fruit, rich in vitamins C and E, β -carotene, as well as many other antioxidants and bioactive substances. Due to the astringency and sour taste of buckthorn fruit and juice, they are usually processed to jams, syrups, drinks, etc., also after mixing with other fruits, or are used as food additives. Cultivation of sea buckthorn is the most popular, inter alia, in Russia, China, Germany and Finland. In Poland this plant is still relatively little known, but its popularity is gradually growing. Fruit, leaves and other organs of sea buckthorn are used in traditional medicine, especially in Tibet, China, Mongolia, and countries of Central Asia. Sea buckthorn products are also used in conventional medicine, as well as in the cosmetic industry. Experiments demonstrated that extracts from different parts of sea buckthorn, and/or some of their components have diverse biological activities, including antioxidant, antibacterial, anticancer, anti-inflammatory, antithrombotic and antiulcer activity. However, most studies were carried out using different kinds of extracts, the composition of which was not always determined, and their active constituents were, in most cases, not unambiguously identified.

The aim of the proposed project is to isolate bioactive compounds from fruit, leaves, and twigs of sea buckthorn, using chromatographic methods. Preparations made from different parts of this plant will be tested for their antioxidant, antibacterial, antifungal and antithrombotic activity. Their influence on different types of normal and neoplastic human cells will also be determined. Preparations used in successive steps of the purification procedure will be selected on the basis of their bioactivity. In the final stage of the experiment, pure compounds will be isolated, and their biological activities and precise structures will be determined.

The proposed project is interdisciplinary: it combines phytochemical analyses with methodically advanced research on biological activities. The obtained results may help to better understand mechanisms of bioactivity of preparations obtained from sea buckthorn, and to fill current gaps in phytochemical characterization of this plant. It may also contribute to broader use of different parts of this useful plant as sources of nutraceuticals or medicinal compounds. Sea buckthorn fruit are often harvested by cutting whole twigs, so the use of leaves and twigs of sea buckthorn as sources of bioactive secondary metabolites could also be a way to manage harvest waste.