ABSTRACT

For the millennia, many thousand medicinal plants have been used within the framework of traditional medicines across different cultures around the globe. Due to a very high number of medicinal plants, so far not all herbal materials have been systematically investigated and many herbs still wait for complex evaluation of their healing potential. In order to make up for this evident delay, particular attention should be paid to studying chemical composition and pharmaceutical properties of medicinal plants, as well as to developing methods enabling rapid screening of biological activity of plant material.

In this study, 12 samples of the *C. incanus* L. species were used as research material, differing in their origin (Turkey, Albania, Greece) and sold on the Polish market as herbal preparations.

The theoretical part of the dissertation presents general characteristics of the *C. incanus* L. species, discusses the main groups of compounds isolated from the plant material and the "Labdanum" resin, and presents potential therapeutic applications of this plant.

The aim of this study was to analyse the volatile and non-volatile fractions isolated from the commercially obtained samples of *C. incanus* L. and to evaluate selected biological properties exhibited by the compounds contained in the methanol and water-methanol extracts of these samples.

At the first stage of this study, composition of the volatile fractions of individual cistus samples was determined and compared with use of gas chromatography with the mass spectrometric detection (GC-MS). The efficiency of the two methods of sample preparation for the further chromatographic analysis was also compared.

The second part of this study is focused on the analysis of the composition of the methanol and the water-methanol sample extracts as well as on determination of their antioxidant, antibacterial and antineoplastic properties. The use of methods combining thin-layer chromatography with the tests of antioxidant and antibacterial activity (TLC-DPPH and TLC-DB) allowed separation of the components present in the tested extracts and an assessment of their biological potential. Antioxidant activity of the separated extracts was determined with use of the scavenging assays involving 2,2-diphenyl-1-picrylhydrazyl radical (DPPH), whereas antibacterial properties of the extracts were tested against the Gram-positive bacteria *Bacillus subtilis* and the Gram-negative bacteria *Aliivibrio fischeri*. Antimicrobial activity of six phenolic fractions (I to VI) obtained by means of the selective multi-step extraction of crude methanolic extracts was also evaluated. Investigations of antitumor activity were carried out using the colorimetric MTS assay for the methanolic extracts against two human colon cancer cell lines (HCT116): the wild type with normal expression of the TP53 gene ($p53^{+/+}$) and its derivative with the deletion of the TP53 gene ($p53^{-/-}$).

The last stage of this study focused on identification of compounds with the strongest effect inhibiting the growth of the tested strains of bacteria. The identified compounds with clearly marked antibacterial potential included apigenin, kaempferol-3-methyl-ether, *cis*- and *trans*-tiliroside, and the kaempferol-dicoumaroyl-glucose isomers. In order to identify these bioactive molecules, three independent HPTLC methods (multi-development on amino phase and two two-dimensional developments on the silica gel phase) were devised to *in situ* hydrolyze flavonoid glycosides and then to separate and detect kaempferol and glucose as the possible building blocks of the molecules of interest.