Abstract

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Title of Thesis Anthocyanins in the fruit of Sambucus nigra L. cultivars – isolation and determination of antioxidant activity

The fruit of the European elderberry is rich in secondary metabolites such as anthocyanins and flavonoids. The fruit also contains vitamins, monosaccharides, saccharides and minerals. Thanks to these substances, the fruit possess antioxidant activity and it is used in the food and pharmaceutical industry. There are plenty of cultivars of this plant which differ in the content of the active substances and in antioxidant activity.

This thesis comprised the assessment of fruit of Sambucus nigra L. including following cultivars: Samdal, Samyl, Haschberg, Weihenstephan, Pregarten, Reise aus Voßloch, Körsör, Heidegg, Aurea and Dana. The group of anthocyanins was obtained by an extraction in acidified water in ultrasound water bath and by a chromatographic separation in a colon filled with a polyaromatic styrene-divinyl benzene resin. Antioxidant activity of anthocyanins was measured with the use of a free radical DPPH. The content of anthocyanins in the isolations and in the fruit of particular cultivars was determined using a pH-different spectrophotometric method - AUC.

The cultivars showed a difference in the content of anthocyanins. The highest amount of anthocyanins was in the isolate of the cultivar Samyl (2.12 mg C-3G/ml of the isolate) and Samdal (2.02 mg/ml). The highest amount of the anthocyanins in 100 g of dry fruit was identified also in the cultivars Samdal (5153.06 mg C-3G/100 g of fruit) and Samyl (4398.61 mg C-3G/100 g of fruit). The lowest amount of anthocyanins was identified in the cultivar Aurea (in the isolate: 0.52 mg C-3G/ml, in the fruit: 650.97 mg C-3G/100 g).

All of obtained pure isolates possessed antioxidant activity. The isolates of particular cultivars differed in the activity. The highest antioxidant activity was measured in isolation from fruit of the cultivar Samyl (IC$_{50}$ = 5.562 mg of dry extract) which was approximately
10times more active than the isolation of the cultivar Aurea (IC$_{50}$ = 59.093 mg of dry extract). Antioxidant activity in order from the most active cultivar was: Samyl, Samdal, Reise aus Voßloch, Weihenstephan, Heidegg, Körsör, Dana, Pregarten, Haschberg, Aurea.

The differences in a content of anthocyanins and antioxidant activity of cultivars of elderberry fruit determine the use of particular cultivars. According to the results of this thesis the most interesting cultivars for the pharmaceutical industry would be Samdal, Samyl or Reise aus Voßloch. These cultivars showed the highest amount of anthocyanins in their fruit together with the highest antioxidant activity of isolates. In Europe the most used cultivar is Haschberg. The fruit of this cultivar analysed in this thesis showed low content of anthocyanins and low antioxidant activity.