

ABSTRACT

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Title of Diploma Thesis: Evaluation of antioxidant activity of natural compounds

The aim of this thesis was to evaluate antioxidant activity of natural compounds by chemiluminescence detection in flow system based on sequential injection analysis (SIA). The advantages of this system are high sensitivity, simplicity and high repeatability of individual analyses. The antioxidant activity was evaluated like dependence of chemiluminiscent signal on the concentration of tested antioxidant and then index Q was derived. Luminol was used as chemiluminiscent reagent, which showed chemiluminiscent emission in alkaline environment during oxidation of hydrogen peroxide together with a catalyst. As the catalyst, solution of potassium ferricyanide was used and whole measurement was conducted during working voltage of 435 mV. Chemiluminescent signal was monitored for a period of 60 seconds. For each tested substance, 3 cycles of measurement were conducted. The results of testing were evaluated using the area and height of the chemiluminescent signal and compared with the experiment without the tested antioxidant.

At first, individual selected substances with antioxidant activity (quercitrin, caffeic acid, epicatechin, phloretin and phloridzin) were evaluated, then they were compared with Trolox, which is used as the standard for evaluation of antioxidant activity. The evaluation concluded that quercitrin, caffeic acid and epicatechin are stronger antioxidants than Trolox and phloridzin with phloretin are slightly weaker. Then mixtures of substances with antioxidant activity contained in extracts of varieties of elderberry and extracts of peel and pulp of apple variety Golden Delicious were also evaluated. It was confirmed that in case of elderberry, wild elderberry has the highest antioxidant activity, then variety Samyl and the least variety Sambu. In apples testing, methanol extracts showed higher antioxidant activity than aqueous extracts and at the same time, it was confirmed that higher antioxidant activity has apple peel than apple pulp.