

ABSTRACT

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Title of diploma thesis: The impact of selected isoflavonoids on the activity of enzymes participating in cytostatic drugs biotransformation

More and more people are suffering from cancer. Scientists are striving to turn to nature and find the help there. One of the possible answers to their questions would be usage of natural substances in either prevention or even treatment of cancer. Isoflavonoids, polyphenolic compounds occurring e.g. in soybeans, are one of them. Many scientists have already tested their influence on the human body. This thesis focuses on the possible effect of isoflavonoids on the activity of enzymes participating in biotransformation of cytostatic drugs.

Experiments were performed on human breast cancer cell lines MCF-7 and MDA-MB-231 exposed to isoflavonoids for 24, 48 and 72 hours. Cell line MCF-7 showed greater changes in the enzymatic activity than MDA-MB-231. Of the four enzymes tested (AKR1A1, AKR1C, CBR and GST), two enzymes showed no change in activity after exposure to isoflavonoids – enzymes CBR and AKR1C. Only one experiment brought the desired result for all isoflavones, genistein, daidzein and formononetin. Activity of GST enzyme on the MCF-7 cell line, after 24 hours of incubation with isoflavonoids was reduced. Isoflavonoid formononetin was responsible for the significant change of activity in four cases, in the MCF-7 cells, aside the above mentioned reduction in the GST enzyme, it was responsible for the increase in the activity of the enzyme AKR1A1 where

4-pyridinecarboxaldehyde was used and of the enzyme GST after 72 hours of incubation. The influence of formononetin on the cell line MDA-MB-231 resulted in the increased activity of the enzyme AKR1A1 using glyceraldehyde as a substrate after 24 hour incubation. Daidzein demonstrated twice the impact on the cell line MCF-7: once the inhibitory effect on GST (mentioned above) and once activating effect on the enzyme AKR1A1 after 72 hours incubation after using 4-pyridinecarboxaldehyde. The effect of genistein on the activity of the enzymes was shown only once. Genistein only reduced activity of GST in the MCF-7 cell line after 24 hours of incubation.