

# ABSTRACT

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Title of diploma thesis: The effect of flavonoids on selected biotransformation enzymes

In recent years, catechins which belong to flavonoids have been studied polyphenolic constituents of green tea. Especially their beneficial effects on the human health are mostly studied. The popularity of dietary supplements with high levels of flavonoids is growing and thus they can affect a wide range of biotransformation enzymes and also the metabolism of many drugs. The aim of this diploma thesis was to find out how the selected catechins – catechin (C), epicatechin (EC), epicatechin 3-gallate (ECG), epigallocatechin (EGC), epigallocatechin 3-gallate (EGCG) and the green tea extract – polyphenon 60 (P) influence the viability of the Caco-2 cells and the activity and expression of the selected biotransformation enzymes in these cells – cytochromes P450 (CYP) isoforms 1A1, 1A2, and 3A, aldehyde reductase (AKR1A1), aldo-keto reductase 1C (AKR1C), carbonyl reductase 1 (CBR1), UDP-glucuronosyltransferase (UGT), sulfotransferase (SULT) and glutathione S-transferase (GST). The viability tests (NRU test and MTT test) proved that catechins (EGC, EGCG and P) in higher concentrations (10  $\mu$ M and 25  $\mu$ M) decreased the viability of proliferating Caco-2 cells. The viability of non-proliferating Caco-2 cells was affected by selected catechins differently. The effect of catechins on the activity of reduction enzymes AKR1A1, AKR1C and CBR1 was not proved in non-proliferating cells. The activity of CYP (1A1, 1A2, 3A) was not detected at all. Contrariwise the effect of catechins on conjugation enzymes was proved, C decreased the activity of UGT and EC decreased the activity of SULT. The activity of GST was decreased in the samples affected by EC and EGC. Using western blotting, reduction of GSTP expression by all catechins was confirmed and using the qRT-PCR decrease of GSTP gene expression in the samples affected by EGCG and P was confirmed. The obtained results show that selected catechins affect cell viability and have also effect on activity and expression of some biotransformation enzymes.