

ABSTRACT

Charles University
Faculty of Pharmacy in Hradec Králové
Department of Biochemical Sciences

Candidate: Lenka Štětková

Supervisor: prof. RNDr. Lenka Skálová, Ph.D.

Title of diploma thesis: The effect of thujone and piperitone on the expression of biotransformation enzymes in liver slices

Monoterpenes are natural substances that are widely distributed in the essential oils of many plant species. Thujone and piperitone are found in certain plant species that can be part of dietary supplements, herbal preparations or used in foods as flavourings.

The aim of this diploma thesis was to find out how thujone and piperitone affect the expression of selected biotransformation enzymes from the cytochrome P450 superfamily, the sulfotransferase and the UDP-glucuronosyltransferase superfamilies. Precision-cut liver slices obtained from the livers of 3 human donors were used for these experiments. Slices were incubated with thujone or piperitone for 24 hours at 10 μM and 50 μM concentrations. After incubation, the amount of mRNA and protein was quantified.

The obtained results showed considerable interindividual variability. CYP1A2 gene expression was significantly increased in one donor sample after incubation with thujone (50 μM) and piperitone (10 μM , 50 μM). Piperitone (50 μM) increased the amount of mRNA of UGT1A9 in one patient sample. Increased amount of CYP3A4 mRNA was observed after treatment with piperitone (50 μM) and thujone (50 μM) also only in one patient sample.

Statistically significant decrease in CYP3A4 protein level caused by thujone was observed in 1 patient out of 3.

Due to the fact that the changes in expression of selected enzymes were mostly small or non-existent, the occurrence of clinically significant interactions due to induction or inhibition of biotransformation enzymes is unlikely.