ABSTRACT

Charles University in Prague

Faculty of Pharmacy in Hradec Králové

Department of Biochemical Sciences

Candidate: Pavlína Klímová

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

Supervisor specialist: RNDr. Věra Králová, Ph.D.

Title of diploma thesis: Antiproliferative effect of Chinese bayberry oil

Bayberry, *Myrica rubra*, is a fruit tree growing especially in China. It is also used in traditional medicine. There are many studies confirming its biological activities. Lately, *Myrica rubra* essential oil (MRO) was isolated from its leaves and its anticancer properties were tested in several intestinal cancer cell lines. In this study, the anticancer effect of MRO was verified by performing a neutral red uptake test in cell lines SW480, SW620, HT29 and in non-cancerous human fibroblast cell line GF 6 for comparison. HT29 was the most sensitive cell line, contrary to GF 6, which was not affected by MRO. We also tested a possible mechanism of action, a production of reactive oxygen species (ROS). The essential oil significantly elevated the generation of ROS and this effect was concentration dependent. We also searched for the active substances in MRO. We conducted the tests with four sesquiterpenes - α-humulene, β-caryophyllene, caryophyllene-oxide and *trans*-nerolidol. The neutral red uptake test showed *trans*-nerolidol being the most effective substance in reducing proliferation of HT29, followed by α-humulene. Also the ROS production was increased mostly by *trans*-nerolidol, in both HT29 and GF 6 cells. However, the cytotoxic effect is probably caused by a combination of constituents of the essential oil. Subsequently, we used flow cytometry to find out if MRO, *trans*-nerolidol and α-humulene affected a distribution of cell cycle phases. The essential oil as well as sesquiterpenes slightly changed it but the changes were not significant.