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Title of diploma thesis: Determination of toxicity using a cell model

The subject of the diploma thesis was measure and evaluate the cytotoxicity in vitro of 22 newly synthesized substances with potential use for their antifungal, antibacterial and antimycobacterial activity on the standard HepG2 cell line. The tested substances were synthetized at the Department of Organic and Bioorganic Chemistry at the Faculty of Pharmacy in Hradec Králové, Charles University and their chemical structure is mafenide derivative. The compounds are MAF, MAF-4, MAF-8, MAF-9, MAF-10, MAF-11, MAF-12, MAF-13, MAF-14, MAF-16, A-5-F, A-3,5-F_2, A-3-Br-5-Cl, A-3,5-Cl_2, A-3,5-Br_2, A-5-Br, A-THIOF, A-SA, A-3,5-I_2, A-5-Cl, A-3-I-5-Cl, A-5-I.

Cytotoxicity has been measured using the CellTiter 96® AQueous One Solution Cell Proliferation Assay, which is a colorimetric method based on the reduction of the tetrazolium salt of MTS to the colored soluble formazan, and substances have been compared and evaluated according to the IC_{50} parameter.

In case of 9 substances, specifically MAF, MAF-8, MAF-11, MAF-12, MAF-16, A-5-F, A-3,5-F_2, A-SA, A-5-Cl, the IC_{50} was greater than 500 μM, so these substances can be considered non-toxic in the HepG2 line. The next 9 substances reached an IC_{50} between 168,1 and 470,3 μM, and the following substances: A-3-I-5-Cl, A-3-Br-5-Cl, A-3,5-Br_2, MAF-14, MAF-9, A-3,5-I_2, A-3,5-Cl_2, A-5-I, MAF-10. These substances have shown relatively low cytotoxicity and together with the first group of the above -mentioned compounds are suitable for further testing. The most toxic substances have shown: A-THIOF, MAF-4 and MAF-13.