UNIWERSYTET MEDYCZNY W ŁODZI

**FACULTY OF PHARMACY**

# PhD Thesis

entitled

# "Fluoro-substituted hydrazine derivatives of benzo-γ-pyrone. Synthesis, spectroscopic analysis, assessment of biological activity, complexes with copper (II) ions."

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## ABSTRACT

PhD thesis entitled "Fluoro-substituted hydrazine derivatives of benzo-γ-pyrone. Synthesis, spectroscopic analysis, assessment of biological activity, complexes with copper (II) ions."

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Hydrazone and hydrazide derivatives of benzo-γ-pyrone with fluorine substituents remain little-studied group of chemical compounds.

In the dissertation I described the chemical synthesis, performed the assessment and structural analysis, as well as carried out preliminary microbiological tests and studies on the effect of synthesized compounds on the proliferation of cell lines: L929 (mouse cell line, fibroblasts) and EA.hy926 (hybrid of somatic human cells, umbilical vein endothelium).

I synthesized eight new hydrazone (**2**, **3**, **4**, **6**, **7**, **8**, **9**, **10**), one hydrazide (**5**) of 3-formylchromone derivatives and one new complex with Cu(II) ions (**11**) using the hydrazide derivative of 3-formylchromone.

I determined the structure and confirmed the chemical purity of the new compounds based on elemental analysis and further studies: melting point, IR, $^{1}$H NMR, $^{13}$C NMR, MS. X-ray studies for selected compounds were performed in the Department of Physics of Crystals, Institute of Physics at the University of Silesia.

I tested antimicrobial activity on reference strains of pathogenic microbes for humans and animals, representing various families of bacteria and fungi. I found that the tested compounds: **2**, **4**, **7**, **9**, **10** and **11** show antimicrobial potential at concentrations of 100 and/or 200 μg/ml and inhibit the growth of microorganisms of selected bacterial species of the genus *Staphylococcus* (compounds **4**, **7**, **10**, **11**), *Streptococcus* (compounds **2**, **11**) and *Neisseria* (compound **9**).

I found that tested compounds at concentrations of 0,01-1250 μmol/l are characterized by antiproliferative or proliferative properties against L929 and/or EA.hy926 cell lines depending on the concentration used. I noticed significant antiproliferative properties for compounds **5**, **8** and **11**, which showed better results compared to cisplatin on both cell lines (except **8** for L929), whereas compound **2** had such an effect on the EA.hy926 line only. I found that the complex **11** have more pronounced anti-proliferative properties than its ligand **5**. Compounds **2** and **4** showed weak stimulatory effects on the proliferation of both cell lines, whereas compounds **3** and **7** slightly stimulated cell proliferation of EA.hy926.

The compounds obtained, can be used in the further stages of scientific research as substrates for subsequent chemical syntheses, including the synthesis of appropriate complexes with other metal ions, and for subsequent studies to assess biological activity.