ABSTRACT

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Title of Thesis	Synthesis of tetrapyridoporphyrazines with potential photodynamic activity

Substituted tetrapyridoporphyrazines represent new structural type of potential photosensitizers with interesting properties for application in photodynamic therapy. The aim of this work was to synthesize two types of tetrapyridoporphyrazines with hydrophilic substituents as potential photosensitizers. Photosensitizers are substances with an ability to produce singlet oxygen after activation by light. Singlet oxygen is the key toxic species in photodynamic therapy.

2-Chloro-5,6-dimethylpyridine-3,4-dicarbonitrile (**1**) was prepared in the first step by condensation of tetracyanoethylene and butan-2-one. In the next step, a hydrophilic substituent was attached by nucleophilic substitution. The first precursor was prepared by reaction of compound **1** with 2-mercaptoethanol in the presence of sodium hydroxide. Similarly, the second precursor was obtained by reaction of compound **1** with diethylaminoethanol in the presence of sodium hydride. The third step involved cyclotetramerization with magnesium butoxide as initiator that gave magnesium complexes of corresponding tetrapyridoporphyrazines. Magnesium complexes were converted to metal-free derivatives and then to zinc complexes. Complex with diethylaminoethoxy substituents was subsequently quaternized by ethyl iodide to the final compound. Final zinc compounds were tested for photodynamic activity and toxicity on HeLa cells.