

ABSTRACT

Charles University, Faculty of Pharmacy in Hradec Králové

Department: Department of Pharmaceutical Chemistry and
Pharmaceutical Analysis

Candidate: Barbora Sidorová

Supervisor: prof. PharmDr. Petr Zimčík, Ph.D.

Consultant: PharmDr. Jan Kollár, Ph.D.

Diploma thesis: **Preparation of neutral amphiphilic phthalocyanines**

Phthalocyanines are synthetic planar macrocycles, with structure similar to porphyrins. They contain 18 delocalized π electrons, which give these substances unique photophysical features. These substances have many industrial applications. One of these applications is the use of phthalocyanines as photosensitizers in photodynamic therapy, for treating both oncological and non-oncological diseases. When photosensitizer is activated by radiation at a specific wavelength (in the visible light range), it enters its excited state. It dissipates the absorbed energy by transferring it to an oxygen molecule, creating thus reactive molecule of singlet oxygen, that causes tissue damage.

The subject of this thesis is synthesis of asymmetric derivatives of phthalocyanines with amphiphilic character, which, due to their structure, could be incorporated into cell membranes and subsequently used as photosensitizers. The first step of this synthesis was preparation of the precursor 4,5-bis(3,5-dimethoxyphenoxy)phthalonitrile by nucleophilic substitution. Phthalocyanines were then synthesized through cyclotetramerization, using a statistical condensation method of two structurally different precursors: 4,5-bis(3,5-dimethoxyphenoxy)phthalonitrile and phthalonitrile in 1:9 ratio. The next step was demethylation of methoxy groups, creating phthalocyanine with free hydroxyl groups.