

## ABSTRACT

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Title of diploma thesis: **Synthesis of azaphthalocyanines substituted with moieties derived from trimesic acid**

Aim of this work was a synthesis of new photosensitizers from the group of water-soluble azaphthalocyanines (AzaPc) with future potential to be used in PDT.

The starting compound for synthesis, trimesic acid, was esterified by ethanol and the triester was partially hydrolysed to mono carboxylic acid. Subsequently, the carboxyl group was selectively reduced to hydroxyl followed by oxidation to aldehyde. Benzoin condensation of this aldehyde gave acyloin that was oxidized to tetraethyl 5,5'-oxalyldiisophthalate. Substituted pyrazine-2,3-dicarbonitrile, a precursor for AzaPc, was obtained by condensation of diaminomaleonitrile with this vicinal diketone. Cyclotetramerization using magnesium butoxide as initiator gave magnesium(II) AzaPc substituted with sixteen butoxycarbonyl groups. Magnesium complexes were converted to metal-free AzaPc in acidic medium and then to zinc(II) AzaPc by reaction with anhydrous zinc acetate.

Tetraethyl 5,5'-oxalyldiisophthalate was also hydrolyzed to diketone with four free carboxylic groups. Substituted pyrazine-2,3-dicarbonitrile, a precursor for AzaPc, was obtained by condensation of diaminomaleonitrile with this vicinal diketone. AzaPc substituted with sixteen free carboxylic groups was synthesized in a template reaction with zinc(II)acetate in pyridine. This zinc(II) AzaPc was converted into the sodium salt and product was then purified by gel chromatography. The photodynamic activity and toxicity of both zinc(II) AzaPcs were tested *in vitro* on HeLa cancer cells.