

**CHARLES UNIVERSITY**  
**FACULTY OF PHARMACY IN HRADEC KRALOVE**

Department: Pharmaceutical Chemistry and Pharmaceutical Analysis Master's degree  
program in Pharmacy

**Opponent's review of Master's thesis**

Student's name: Anita Mulaku

Mentor of the thesis: Assoc. Prof. PharmDr. Petr Zimčik,  
Ph.D.

Year of the thesis  
defense: 2018

Opponent of the thesis: Assoc. Prof. Miroslav Miletin, Ph.D.

Title of the thesis:

**Stability evaluation of magnesium complexes of phthalocyanines and  
azaphthalocyanines under acidic conditions.**

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Formal comments: number of pages: 65, number of figures: 41, number of tables: 0, number  
of references: 12.

Type of work: Experimental work

- a) The aim of the thesis is: Fulfilled
- b) Language and graphic level: Very good
- c) Processing of the theory: Very good
- d) Methods description: Very good
- e) Results description: Excellent
- f) Discussion and conclusions: Excellent

I recommend Diploma thesis for the recognition as Rigorous thesis .

Opponent's comments:

Student Anita Mulaku elaborated a diploma thesis titled "Stability evaluation of magnesium complexes of phthalocyanines and azaphthalocyanines under acidic conditions".

The thesis is arranged in the usual way.

Its aim was to study the stability of some phthalocyanine and azaphthalocyanine magnesium complexes in water environment under various conditions.

In the chapter called "Introduction", basics of fluorescence theory are outlined, its application shortly mentioned and then the construction and functions of fluorimeter are described in detail. In the next part of the Introduction chapter, the properties and possible applications of the subject compounds types, phthalocyanines and azaphthalocyanines, are mentioned.

The next chapter is "Experimental part" which described the employed methods and performed experiments.

The "Discussion part" chapter interprets the data and results obtained, and the "Conclusion" summarizes the extent to which the goals set have been achieved.

The work is formally and graphically very well processed, with only a few misspellings and minor deficiencies, which are listed below.

I have the following comments on the thesis:

Big part of theory is devoted to the construction and functions of fluorimeter. This is somewhat irrelevant, as the fluorescence measuring is only small part of the thesis.

P. 29, below part, p. 30, upper part: ...S, Se and Te are not of Group 16; P, As and Sb are not of Group 15.

P. 34 upper part: The statement that alkylsulfanyl AzaPcs are better choice as fluorescent probes than their oxygen counterparts is not quite correct, since oxygen derivatives show usually higher fluorescence quantum yields compared with their sulfur analogues.

P. 35, the middle paragraph: There are mentioned both TPyzPzs and TPyPzs. I think the other are mentioned incorrectly(?).

P. 36 below: Really TPyPz as pH sensors are described in the cited publication?

P. 38, The buffer preparation: Which "appropriate" volumes were used to make the buffers?

Discussion part, generally through the chapter: The formulas are too tiny, smaller than in other chapters. Even if the molecules are complicated, there is a space to make them bigger.

P. 43, 4<sup>th</sup> line: Really the time mentioned was 21 hr and 41 min exactly?

Number of references is rather low considering the fact that a literature survey was/should have been performed. The vast majority of information in the theoretical sections is taken from one publication, the Principles of Fluorescence Spectroscopy book, which is essential, but not the only source available.

Misspellings and incorrect formulations:

P. 26, 2<sup>nd</sup> line: ...condensed of - instead of with - isoindoline subunits...

P. 38, General: The mark of protected name should be in upper index.

Discussion part, 1<sup>st</sup> line: We have performed (instead of conducted) numerous experiments...

Conclusion: Why there is a smaller letter font than elsewhere?

2<sup>nd</sup> paragraph: Considered stability was not tested in pure water.

Reference: only few publications for the overview of fluorescence.

There is a mistake in the name of publication 8.

The lines of references should have the same spacing like other chapters.

Questions:

Have you considered another surfactant except of th Cremophor EL? The microemulsion character and ability of protection could be relevant to the surfactant system used.

Overall, the thesis is of a very good level, it is a contribution to scientific work in the field, and it fully meets the requirements for qualification work of this type, so I recommend it for the defense.

**Evaluation of Master's thesis: Very good**

**Recommendations for the thesis defense: Recommended**

In Hradec Kralove May 29<sup>th</sup>, 2018

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Opponent's signature