

Review of PhD Thesis: "Nanocomposites for Medical Applications"

Reviewer: RNDr. Jiří Zedník, PhD.

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The presented doctoral work has resulted in the publication of five articles in peer-reviewed journals and has been accompanied by several conference presentations. The following points outline the strengths and areas to be addressed during a defense.

- Formatting errors occur throughout the whole text and seriously affect its readability.
- There are numerous grammatical errors, typos, and language problems throughout the text.
- Subchapter titles need to be numbered throughout the thesis.
- Some figures, tables, and diagrams are not accurately presented. Additionally, some of them lack specificity in their captions.
- The numbering of the tables is quite random and disjointed. This fact very negatively affects the readability of the text.
- In many instances throughout the text, tables, and graphs, there are inaccuracies in value presentation, precision, depiction of deviations, and the usage of digital separators. Additionally, decimal commas are used instead of decimal points, which is incorrect.

The frequency and severity of formal errors approach the threshold of acceptability. Below, I will highlight only a selection of these errors.

Selected Specific Points:

- The introduction provides a comprehensive overview of drug delivery systems based on polymers and polymer nanocomposites. While valid, the remarks regarding typos, grammar, and formatting are pertinent here.
- Table 3 (page 21) lacks sufficient citations for each polymer system. Specific citations and distinctions between biopolymers and biocompatible polymers should be provided. Poly(L-lysine) is presented upside down and mirrored.
- Figure 6 (page 25) needs a more detailed caption for clarity.
- The purpose of Figure 8 is unclear; combining Figures 8 and 9 (Pages 28 -29) for direct comparison may enhance clarity.
- Figure 12 (page 33) requires clarification regarding the type of lipid involved.
- Figure 14 (page 37) lacks context without reference, making it difficult to understand.
- Scheme 5's caption (page 40) needs a more detailed explanation, and the term "In situ polymerization" requires correction.
- References should be provided for each silane in Table 4 (page 40). Introduce at least partially before a defense.
- Page 43: typo in the subchapter title, I prefer the term "rate of degradation" on page 43.
- Table 8 (page 63) - incorrect presentation of values, invalid numbers of valid digits, incorrectly stated deviations.
- Table 4 (page 64) – 1st page 4 after table 8? Explanation of the abbreviations is also missing.
- Table 5 (page 65) improper standard deviations presentation

- Table 9 (page 57) typo in the unit (pore volume), improper data presentation, and inconsistent numbers of valid digits.
- Figure 19 has an error in the axis descriptions.
- Page 61, Table 3 follows Table 9, insufficient caption, all abbreviations should be explained.
- Figure 21 is unreadable. The curves are all black and hard to distinguish.
- In Figure 23 on page 67, the meaning of the graph inset and the explanation of the graph content are unclear. The same remark applies to Figure 24 on page 69.
- Table 8 on page 61 follows Table 3 on page 63; the numbering of tables seems random. Elemental analyses are typically presented in percentages; why are they in milligrams? The presentation of valid decimal digits and deviations appears inconsistent and should be unified.
- Table 4 (page 64) presented data should be plotted for better readability.
- Table 5 (page 65) content is unclear. Explain given precision, please.
- Table 10 (page 69) Explain the table content, please.
- Table 11 on page 72: The formatting is improper, and the names 'Higucci model' are introduced without explanation in the caption. Please provide a reference.
- On page 76, the chapter title is placed at the end of the page, which serves as an example of a recurring issue throughout the text.
- Figure 26 has improper data presentation and an unreadable scale.
- Table 12 presentation is subpar without explanation in the caption.
- Figures 28, 29, 30, 31, and 32 suffer from unclear data presentation, making it challenging to identify the sample codes and abbreviations. Specifically, the presentation of Figure 31 is unacceptable; the fingerprint region should be expanded, and energetic levels should be emphasized on each peak (introducing peak picking would be beneficial). Furthermore, clarification is needed regarding the methodology used for the measurement.
- On page 91, it's unclear what is undergoing in vitro dissolution. The text in this chapter is challenging to follow.
- The explanation and caption provided for Table 15 (page 92) is unclear.
- Figure 36 has wrong axes description; curves are indistinguishable.
- Figures 37, 38, 39, 40, 41 have improper data presentation and wrong axes description

Recommendations:

- I have many critical remarks about the current data presentation level of the thesis. However, I dare say that despite the huge number of typos, formal errors, and other presentation flaws approaching the level of acceptability, the current thesis contains enough scientific results to meet the criteria required for this type of thesis.
- The reviewer recommends the defense of Kateryna Filatova's dissertation and supports the conferral of the academic title "Doctor" (Ph.D.) upon the successful completion of the defense process.

In Prague, March 1, 2024 Reviewer: Jiří Zedník, PhD

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