

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

Department Biological and medicinal sciences

Study program: Pharmacy

Opinion of the Opponent Diploma Thesis

Year of defense: 2024

Student: **Mahya Mozaffar**
Thesis Tutor: Assoc. Prof. PharmDr. Miloslav Hronek, Ph.D.
Consultant:
Opponent: PharmDr. Daniela Suchánková, Ph.D.
Thesis title: **Propolis and its effects as a supplement**

Scope of work, number of: 63 pages, 5 figures, 3 tables, 204 citations

Evaluation of the work:

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|---|-----------|
| a) Topicality/ originality of the topic: | Excellent |
| b) Processing of the theoretical part: | Good |
| c) Transparency and clarity of the text: | Good |
| d) Concision and adequacy of conclusions: | Good |
| e) Meeting the objectives of the work: | Very good |
| f) Quantity and up to date of references: | Good |
| g) Language level (stylistic and grammatical level): | Good |
| h) Formal level of the work (text structure, graphic design): | Very good |

Comments on the evaluation:

Student Mahya Mozaffar developed a research paper on the topic of Propolis and its effects as a supplement. This topic is very interesting for the reason, that natural substances and drugs, whether they are of vegetable or animal origin, are very valuable means in the therapy of diseases. Unfortunately, I have to state that the work disappointed me with its content. Just its scope, when the text itself is only 35 pages long. The introduction and conclusion are also very short, which in my opinion is very little for a research paper. The author uses very long sentences, whereupon the reader loses the meaning of the sentence. Some sentences are missing words and are poorly ordered. Chapters 3.1 to 3.9 could be elaborated more, especially the part that deals with the preparation of extracts.

From the author's description, it is not entirely clear which extracts are the most advantageous to prepare, which substances it contains and its benefits. He writes about various solvents, but subsequently mentions only water, ethanol and glycerol, while only water and ethanol extracts are used in the chapter on biological activity. I also miss the concrete and practical use of propolis in practice, as preparations containing propolis can also be purchased in pharmacies. The author often contradicts himself by describing one issue and denies it in several parts. For example: - what is extracted - or. solvents x water, insolubility in water. Some sentences are confused, do not make sense and contradict each other. e.g.: Propolis is made up of lipids, waxes, and resins with a large molecular weight, leading to poor bioavailability and absorption. As polyphenolic compounds are important for the therapeutic effects of propolis, its bioavailability is also measured by its polyphenol contents. Its poor bioavailability might arise from digestive defects, poor transcellular absorption in the intestine, a high metabolism rate, and rapid excretion.

A large number of citations do not correspond to the cited parts, and the reader cannot therefore verify the information if it is written in confusion. eg: 28, 31, 33, (PEG), 35, 38, 39, 41, 43, 42, 182, etc. - where did the author get the information? You write that ultrasound, etc., are more effective extraction methods, according to citation 33. However, there is no mention of this in this citation, on the contrary, in citation 28 they describe an experiment that these methods are less effective, and your other chapters also support this. So where did you get the information? The description of extraction using ultrasound is not from citation 35. It deals with plant material. Where did you get your information? Although the author has over 200 citations (On 20 pages, which is also 2/3 of the work), how many of them are actually used? There are also errors in the citations (cit. 37) and the formatting should be the same as in the rest of the thesis.

I don't understand this sentence? What did the author mean by that? The citation does not match the quoted part: The process of soaking crushed propolis in ethanol, glycerol, or water yields propolis extracts as poly (vinylidene fluoride) membranes that could be employed to reduce their solvent with the least possible loss of bioactive ingredients in the extract (30).

The author incorrectly introduces and uses abbreviations, repeated introduction of the same abbreviations. I don't understand why there is a chapter on Health benefits of polyphenol when the chapter on Pharmacological properties of propolis follows. Table No. 2 is confusing and it seems to me that it tells us nothing in the end. Even in the text there is no comment about what to expect from its. What do the years mean? To which groups and in what form was propolis administered? 2ml/day of what? mg/day of raw propolis? what is the meaning of the line Healthy individuals if it says nothing?

Latin names of species of microorganisms, animals and plants must be written in italics.

The part where the author describes biological activities is better. It contains interesting information about the effects of propolis. However, even this part could be written more clearly and better organized. This section also lacks concentration and quantity of the preparations used in individual activities, which is key for claims of effectiveness and for comparing individual studies.

Although the work has a number of shortcomings and errors, I rate the work as good and recommend it for the defense. I have the following questions and comments about the work.

Questions and comments to student:

1. What substances are found in individual types of extracts and in what quantity? At least approximately.
2. Can you explain the terms standardized extract and quantified extract? Would you try to suggest preparing these extracts from propolis?
3. You write that flavonoids form chelates during collection with ions such as lead. I don't think, that beekeepers use lead tools. So what other ions do they chelate with and why is this bad? In other part, you wrote, that chelates are more activ. Can you clarify these statements.
4. It is not clear from the description of the preparation of the ethanol extract, therefore, how it is best to prepare it for use. Can the author provide any concrete examples of the preparations used in practice?
5. What is the bioavailability of phenolic substances (mainly favonoids)? How does the presence of wax, resins and lipids affect it? What is the difference between flavonoids, phenolic compounds, polyphenols, terpenes, terpenoids and coumarins?

Evaluation of the thesis: Good

**For the
defense:**

Recommend

In Hradec Králové

21. srpna 2024

signature of the opponent