CHARLES UNIVERSITY
FACULTY OF PHARMACY IN HRADEC KRALOVE

Department Pharmacognosy and Pharmaceutical Botany

Study program: Pharmacy

Opinion of the Opponent of the Diploma Thesis

Year of the defense: 2023

Student:	**Laureen Reda Ibrahim**
Thesis Tutor:	RNDr. Jaroslav Jenčo, Ph.D.
Consultant:	---
Opponent:	prof. RNDr. Lubomír Opletal, CSc.
Thesis title:	**Analysis of selected nutraceuticals by liquid chromatography**

Scope of work, number of 70+viii pages, 25 figures, 7 tables, 114 citations

Evaluation of the work:

a)	Processing of the theoretical part:	Excellent
b)	The complexity of the methods used:	Excellent
c)	Preparation of the methodological part (clarity, comprehensibility):	Very good
d)	The quality of the experimental data obtained:	Very good
e)	Processing of results (clarity):	Very good
f)	Evaluation of results, including statistical analysis:	Very good
g)	Discussion of results:	Very good
h)	Clarity, conciseness, and adequacy of conclusions:	Very good
i)	Meeting the objectives of the work:	Good
j)	Quantity and up to date of references:	Excellent
k)	Language level (stylistic and grammatical level):	Very good
l)	Formal level of the work (text structure, graphic design):	Excellent

I recommend the thesis for recognition as a rigorous thesis ☐

Comments on the evaluation:

The graduate dealt with a topic that is very topical: the use of medicinal plants in dietary supplements, specifically the use of hops. From this point of view, the correlation between the title of the thesis and its content is a bit problematic, as there is no mention of hops.

The Aim of the thesis is very ambitious, I think the content was not formulated carefully enough. In this work, enriched fractions with active substances were prepared and their identity was assumed on the basis of modern instrumental chromatographic methods with appropriate detection; only lupulon was isolated.

The Theoretical part provides information about the taxon, its constituents and biological effects to the minimum extent necessary, the description of the family Cannabaceae is not necessary, rather it obscures the view of the botanical aspect of the taxon. I did not understand why there is 1 hop leaf in the picture when the drug is female cones. For the description of α- and β-acids, it would be beneficial to provide representative data on their stability, as this is an important issue for hop utilization. This section describes a suitable methodology for obtaining extracts from female flowers, which are an important user product, and discusses the methodology of isolation procedures.

I do not believe that it is necessary in the Experimental part Phytochemical section of the paper (and in the sections that follow) to describe the physical principles of separation using HPLC, GC, LC/MS and to supplement the text with photographs of the apparatus. The experimental work itself is impeccably performed, and no comments can be made on this part.

I believe that it is not necessary to describe the physical principles of separation by HPLC, GC, LC/MS in the Experimental part of the phytochemical character of the thesis (and in the following parts) and to supplement the text with photographs of the apparatus. The actual experimental work was performed flawlessly and no comments can be made on this part.

The Results and Discussion is somewhat of a hybrid form of the Experimental section; although the results are clearly described in detail and document a large body of work, many of the data would be more suited to the Experimental section. Only lupulon was isolated in this work, the isolation is described in great detail, and this substance was also monitored (in addition to the starting material) in HopsVital, which according to the attached graphic documentation appears to contain other, possibly also major phloroglucinol-type compounds, but these were not isolated. However, I have not found minimally a semi-quantitative estimate of the lupulone content, on a dry weight basis, of HopsVital. This part of the thesis is a hybrid combination of results and discussion, with the actual discussion not being clear from the communication.

The part Literature is recent, consisting of mostly imputed literature from recent times. However, the internet data lacks the date of acquisition.

I have the following reservations about the graphical aspect of the thesis:

1) Unusual description of terms in the text: alpha-acids, (correctly α-acids, etc.)

2) Missing italics: in vitro, etc.,

3) Occasional typos, little attention was paid to the revision of the thesis and these minor shortcomings unnecessarily lower the standard of the thesis.

However, the shortcomings that I mention in the text do not detract from the practicality of the work; this is the first work of this type in the department and, moreover, a taxon with complicated contents of secondary metabolities has been used.

Questions and comments to student:

1) What is 2-methyl-3-buten-2-ol (p. 1)?

2) What do you think is the reason that there are currently not enough relevant clinical studies to explain the sedative effects of hops?

3) Is there a multifidol and/or multifidols (p. 13)?

4) The article states that the 8-prenylnaringenin content is "low". However, such a statement is worthless; do you know the approximate content of this substance? Could there be synergism with other secondary metabolites of hops from point of view of estrogenic effect?

Evaluation of the thesis: Very good		**For the defense:** **Recommend**
In Hradec Králové	23. května 2023	signature of the opponent