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OPINION OF THE WORK

MSc. Latifah Al Shammari, a Ph.D. student, submitted a dissertation entitled "*Alkaloids of the genus Hippeastrum (Amaryllidaceae): isolation, identification, biological activity*", which has 96 pages of its own text with 39 images, 14 tables and 150 citations (including 27 from the last five years) and copies of three related works in impacted journals with quartiles 1, 2 and 3 each in the field of pharmaceutical sciences (twice as the first author). According to Theses.cz, the submitted work has 16% compliance with the work „Nina Vaněčková: Study of the inhibitory (toxic) effect of the alkaloids from chosen plants of Amaryllidaceae family on some human enzymatic systems (in vitro study) II." in particular in the text describing the laboratory equipment and some experimental procedures. According to the Turnitin output, the compliance is up to 61%, of which the most - 20% - falls on the source dspace.cuni.cz, which I, as an opponent, could not subsequently identify.

The work has an experimental character. The topic is topical, it includes the field of application of advanced techniques used in the study of plant extracts and plant secondary metabolites.

The submitted dissertation has the usual layout. The theoretical part (pp. 15-40) describes in detail the botanical characteristics of the family Amaryllidaceae and the genus *Hippeastrum*, the biosynthesis of typical groups of alkaloids and their biological activities. The information is presented in a comprehensive and clear manner. As is often the case, botanical nomenclature depends on the data source used. The opponent prefers the globally recognized databases www.worldfloraonline.org or www.theplantlist.org, and therefore found several discrepancies: *Hippeastrum solandriflorum*, *H. bifidum*, *H. bicolor*, *H. ananuca*, *H. candidum* and *H. brachyandrum* seem to be synonyms, only. *H. johnsonii* is not present at all in these databases.

The experimental part (pp. 41-56) describes in detail the material used, isolation and identification techniques. In the Results section (pp. 57-86) the dissertant compactly characterizes 18 obtained isolates, following the enclosed own publications, describes the cytotoxicity of selected compounds and activities against cholinesterase and prolyloligopeptidase. To increase the information value, I would welcome:

a) expression of the % yield of isolates on starting plant material,
b) marking the individual spots on the TLC chromatogram (Fig. 12) with the codes of the respective isolates, and
c) use of the same numbering system (Arabic or Roman) to indicate the principal numbers fractions of *Hippeastrum* x *hybridum* cv Ferrari for Fig. 12 and for the text itself.

Comparison of the number of major spots on the TLC chromatogram (Fig.12) in the individual fractions with the number of alkaloids isolated from them, as indicated in the main text, gives the impression that many major components of fractions were not isolated but only some of them (e.g. fraction 2 from TLC) contains four significant spots, but on p. 50 it is stated that two alkaloids, montanine and tazzetine, were isolated from fraction II.

The presented results do not need to be assessed separately, as they are the basis of three publications that have already undergone a demanding peer review process. From a pharmacognosist's point of view, I would like to know whether the biosynthesis of ismine, which differs in structure from the remaining isolated molecules, is known.

The Discussion acts as a summary of the achieved results and their confrontation with the results of other authors is modest and any new theoretical theses are not found in it.

The previous remarks do not reduce the quality of the achieved results, but should be an impetus for even more precise processing of available informations, resp. writing publication output.

I consider the isolation of eighteen compounds as well as the study of selected biological effects of some alkaloids is a significant contribution to the wider pharmaceutical knowledge.

In conclusion, it can be stated that the student achieved many original results and is able to use her theoretical knowledge to enrich knowledge in the field of pharmacognostic research. Therefore, in accordance with the applicable regulations, I suggest that after a successful defense of the dissertation, including answers to questions/comments in this evaluation report and in a possible discussion, the MSc. Latifah Al Shammari can be awarded the title of "Ph.D." in Pharmacognosy.

Bratislava, May 10, 2021 prof. Ing. Milan Nagy, CSc.