

## OPINION

By: Prof. D.Sc. Ekaterina Krasteva Kozhuharova, Faculty of Pharmacy, Medical University – Sofia appointed as a member of the scientific jury, pursuant to Order No. 42 / 02.05.2025 of the Director of IBER–BAS.

Re: The dissertation of **Gabriela Ivanova Haist** for acquiring the educational and scientific degree "DOCTOR" in the higher education area: "4. Natural Sciences, Mathematics and Informatics", professional field: "4.3. Biological Sciences", scientific specialty: "Botany", within the research group "Chemoecology and Natural Products", section "Applied Botany", Department "Plant and Fungal Diversity and Resources" at the Institute of Biodiversity and Ecosystem Research – BAS, supervised by Prof. Dr. Strahil Hristov Berkov, and dissertation topic: **"Investigation of the biosynthesis of galanthamine in *Hippeastrum papilio* (Ravenna) van Scheepen"**

The dissertation submitted for defense complies with the requirements of the Regulations on the conditions and procedures for acquiring scientific degrees and holding academic positions at IBER–BAS and for the preparation of dissertations for obtaining the educational and scientific degree "Doctor". It consists of 93 pages and is presented in the form of compiled scientific publications. The following 8 main sections are outlined:

1. Introduction;
2. Literature Review;
3. Aim and Tasks;
4. Exposition (covering 4 publications);
5. Conclusion – main findings and a declaration of originality and authenticity;
6. Contributions;
7. References / Used Literature – 173 scientific publications; and
8. List of scientific publications with full bibliographic descriptions and citations.

The work is well structured and formatted. The aim and tasks are clearly defined. A variety of scientific research methods have been applied and mastered. The results obtained are well presented and formatted.

The practical value lies in elucidating details regarding the productivity (expressed in grams per unit area) of *Hippeastrum papilio* as a source of galanthamine, the influence of different concentrations of nutrient solutions on the accumulation of galanthamine and haemanthamine in three developmental stages and in roots, bulbs, and leaves of *H. papilio*, as well as the effect of

elicitors in hydroponic cultures of Amaryllidaceae plants for stimulating the biosynthesis of biologically active substances (BAS).

Of practical importance is also the established correlation that polyploidy in *H. papilio* positively influences the biosynthesis of alkaloids but negatively affects biomass accumulation.

The fundamental significance of the work lies in determining the karyotype formula of *H. papilio* through the study of chromosome morphology in diploid plants and the tissue localization of alkaloids via histological investigations. It was found that galanthamine and haemanthamine are present in all investigated plant organs (root, bulb, and leaves), but they are predominantly accumulated in the bulbs, particularly in their central part, composed of young leaves.

The interpretations and conclusions are well articulated.

On the topic of the doctoral dissertation, 4 scientific publications have been published in impact factor journals, three of which are in Q1 and one in Q3. In all four publications, the doctoral student is the first author. Six citations have been noted across two of the publications.

## CONCLUSION

The dissertation contains scientific and applied-scientific results that represent an original contribution to science and meet the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations of the IBER–BAS for the application of this law, and the Regulations on the conditions and procedures for acquiring scientific degrees and holding academic positions at IBER–BAS.

The dissertation demonstrates that the doctoral candidate Gabriela Ivanova Haist possesses the necessary theoretical knowledge and professional skills and displays personal qualities and good potential for conducting independent scientific research.

For the reasons stated above, I give a **positive assessment** of the research conducted, as presented in the above-reviewed dissertation, abstract, achieved results, and contributions.

I vote “YES” for awarding the educational and scientific degree “Doctor” to Gabriela Ivanova Haist in the higher education area: 4. Natural Sciences, Mathematics and Informatics, Professional field: 4.3. Biological Sciences, Scientific specialty: Botany

01.06.2025

Sofia

Prepared by: Prof. E. Kozhuharova, D.Sc.