

OPINION

by Assoc. Prof. Dr. Tsvetelina Emilova Doncheva,

Institute of Organic Chemistry with a Center for Phytochemistry, Bulgarian Academy of Sciences, member of the scientific jury, according to order No. 31 / 28.05.2026 of the Director of IBER-BAS

Subject: Dissertation for the acquisition of the educational and scientific degree “Doctor (PhD)” in higher education area 4. Natural Sciences, Mathematics and Informatics, within the research group “Chemoecology and Natural Products”, professional field 4.3. Biological Sciences, scientific specialty “Botany”

Dissertation title: GC-MS Analysis of Silylated Amaryllidaceae Alkaloids

PhD Candidate: Rumen Velinov Denev

Scientific supervisor: Prof. Dr. Strahil Berkov

The set of materials presented by Rumen Denev complies with the Law on the Development of Academic Staff in the Republic of Bulgaria and the Regulations for its application, as well as with the Regulations on the conditions and procedures for acquiring scientific degrees and occupying academic positions at the Institute of Biodiversity and Ecosystem Research (IBER) at the Bulgarian Academy of Sciences (BAS). According to the statement certified by the Scientific Secretary of IBER-BAS, the doctoral candidate has fulfilled all requirements related to his training and the implementation of the individual study plan. During the doctoral programme, he accumulated a total of 286 points, significantly exceeding the required minimum of 250 points.

The dissertation is presented in the form of three bound scientific publications. The papers have been published in reputable international peer-reviewed journals indexed in Web of Science and Scopus, as follows: *Rapid Communications in Mass Spectrometry*, 2021 (IF 2.586; Q2), *Rapid Communications in Mass Spectrometry*, 2026 (IF 1.7; Q3) и *Journal of Chromatography A*, 2026 (IF 4.0; Q1). One of the publications has already received five independent citations, demonstrating the scientific significance and relevance of the reported results.

The conducted research is aimed at overcoming the limitations of direct GC-MS analysis of thermolabile, polar, and poorly volatile alkaloids through the application of silylation as an effective approach for enhancing their volatility, stability, and detectability. The obtained results convincingly demonstrate that this approach considerably broadens the applicability of the GC-MS method for the analysis of structurally diverse Amaryllidaceae alkaloids and contributes to their more reliable qualitative and quantitative determination. Particularly noteworthy are the results related to the identification of new Amaryllidaceae alkaloids and the development of a library of EIMS spectra of both silylated and non-silylated compounds. This library represents a valuable tool for future chemotaxonomic, phytochemical, and pharmacological studies.

The conclusions drawn are well substantiated, logically presented, and fully consistent with the objectives and tasks of the dissertation. They demonstrate in-depth knowledge of the research topic, as well as strong skills in the critical analysis, synthesis, and interpretation of scientific results.

In conclusion, the submitted dissertation contains up-to-date, original, and scientifically sound results of both scientific and applied scientific significance. These results constitute a substantial contribution to the study of Amaryllidaceae alkaloids and to the development of methodologies for their GC-MS analysis. In terms of scope, quality, and significance, the achieved results fully comply with the Law on the Development of Academic Staff in the Republic of Bulgaria, its Implementing Regulations, and the specific requirements of IBER-BAS.

For all these reasons, I give my positive evaluation of the dissertation and confidently recommend that the esteemed Scientific Jury award Rumen Velinov Denev the educational and scientific degree “Doctor (PhD)” in higher education area 4. Natural Sciences, Mathematics and Informatics, professional field 4.3. Biological Sciences, Scientific Specialty “Botany.”

Sofia, 07 July 2026

Assoc. Prof. Tsvetelina Doncheva, PhD