REPORT

by Prof. Dr. Albena Kirilova Detcheva-Tchakarova

Institute of General and Inorganic Chemistry at the Bulgarian Academy of Sciences, Member of the Scientific Jury

on the PhD-thesis for the acquisition of educational and scientific degree " **doctor** "
in professional direction **4. Natural Sciences, Mathematics and Informatics,**
Professional field: **4.2 Chemical Sciences**
Doctoral program: **Analytical Chemistry**
Author: Asya Dimitrova Hristozova
Title: Enhancement of the capabilities of gas chromatography-mass spectrometry by combination with "green" approaches for extraction and modeling
Scientific supervisor: Assoc. Prof. Dr. Kiril Kostov Simitchiev, University of Plvdiv "Paisii Hilendarski"

1. General description of the procedure and the PhD-student

By order № РД-22-486 of 21.02.2025 of the Rector of the Plovdiv University "Paisii Hilendarski" (PU) I was appointed as a member of the Scientific Jury for the acquisition of educational and scientific degree **"doctor"**, on the PhD-Thesis with **title Enhancement of the capabilities of gas chromatography-mass spectrometry by combination with "green" approaches for extraction and modeling** in professional direction **4. Natural Sciences, Mathematics and Informatics**, professional field **4.2. Chemical Sciences,** Doctoral program **Analytical Chemistry**. Author of the PhD-Thesis is **Asya Dimitrova Hristozova -** a full-time doctoral student at the Department of Analytical Chemistry and Computational Chemistry, Faculty of Chemistry, with scientific supervisor **Assoc. Prof. Dr. Kiril Kostov Simitchiev,** Plovdiv University "Paisii Hilendarski".

The materials submitted by **Asya Dimitrova Hristozova** are in accordance with the Regulations for the Development of the Academic Staff of the Plovdiv University, as follows:

- Request to the Rector of the Plovdiv University "Paisii Hilendarski" for starting the procedure for defence of the PhD-Thesis;
- CV in European template;

– Protocol of the meeting of the department council;
– PhD-Thesis;
– Dissertation summary;
– List of the scientific publications on the PhD-Thesis;
– Copies of the scientific publications;
– Declaration of originality and credibility of the submitted materials;
- Reference for compliance of the specific requirements of the Faculty of Chemistry of the Plovdiv University "Paisii Hilendarski".

The dissertation is **165** pages long and includes **25** figures, **38** tables, and **4** appendices (1 table and 8 figures). It cites **306** literature sources.

2. Relevance of the subject

The dissertation aims to study the capabilities of GC-MS/MS for combining with "green" approaches for qualitative analysis of volatile components in essential oils and quantitative analysis of pesticides. The topic is significant, which undoubtedly demonstrates the relevance of the dissertation. The broad-scale research conducted is exceptionally up-to-date.

3. Acquaintance with the problem

The Literature review is extensive (it contains altogether **306** literature sources) and demonstrates that the PhD-student knows in detail the achievements of other authors on the dissertation topic, knows the specific scientific issues well and is fluent in the literature on the subject.

4. Methodology of the investigation

In the present PhD-Thesis the following methods of investigation are used:

- Microwave-assisted cloud point extraction in combination with re-extraction in an organic solvent for the pesticide analysis in fruit juices;
- Dispersive liquid-liquid microextraction based on a hydrophobic natural deep- eutectic solvent for the pesticide analysis in bottled spring waters;
- Instrumental analytical method used - gas chromatography with mass spectrometry detection (GC/MS). Optimization of the experimental conditions of a GC-MS/MS system is performed;

- Application and creation of models for predicting linear retention indices.

5. Characteristics and estimation of the PhD-Thesis and contributions

The results obtained are neatly arranged, and a suitable graphical visualization is used for their presentation. The described investigations in the present PhD-thesis are carried out on a high scientific level, comprehensive and in detail, which demonstrates the research abilities of the doctoral student.

I agree with the author's assessment of the contributions (scientific and applied-scientific) in the dissertation work. The main contributions of the candidate may be specified as **"*Novelty in science*"** and **"*Development of existing knowledge*".**

6. Assessment of the publications and the personal contribution of the PhD-student

On the PhD-thesis two scientific papers are published. The first of them is published in the highly renowned international journal ***Talanta***, quartile **Q1 – 25 points;** the other – in ***Acta Chromatographica***, quartile **Q2 – 20 points; altogether 45 points, required 30 points.** On both publications, altogether **6** citations in SCOPUS are noticed, **5** for the publication in ***Talanta***, and one for ***Acta Chromatographica***, respectively. In both publications, the PhD-student **Asya Hristozova** is the **first co-author,** which is proof of her substantial contribution to the studies.

Parts of the PhD-thesis are presented at scientific meetings in Bulgaria and abroad – altogether **12** participations.

7. Dissertation summary

The scientific publications and the dissertation summary correspond to the content of the PhD-thesis, the goals and tasks, the main results and the achievements. I have no critical remarks concerning the scientific and professional level of the doctoral student **Asya Hristozova,** as well as her PhD-thesis.

8. Recommendations for future use of the dissertation contributions and results

I would like to recommend the PhD-student **Asya Hristozova** to continue in the future with these interesting and perspective investigations and to publish them in highly renowned international journals.

CONCLUSION

The PhD-Thesis of the doctoral student **Asya Dimitrova Hristozova** contains ***scientific and applied results which are original contribution in science*** and **meet all the requirements** of the Law for Development of Academic Staff in the Republic of Bulgaria, the Regulations for implementation of the Law for the development of the academic staff in the Republic of Bulgaria and the respective Regulations of the University of Plovdiv "Paisii Hilendarski". The presented materials and the results obtained fully correspond to the specific requirements of the Faculty of Chemistry, accepted according to the Regulations of the University of Plovdiv "Paisii Hilendarski".

The PhD-Thesis **demonstrates** that **Asya Dimitrova Hristozova** has theoretical knowledge and professional skills in Analytical chemistry, and there is no doubt that she will be able to perform scientific investigations in the future.

Due to the above, I am convinced to give my **positive assessment** to the research presented by the above reviewed PhD-Thesis, abstract, results and contributions, and ***I propose the esteemed scientific jury to award the educational and scientific degree "Doctor"*** to **Asya Dimitrova Hristozova** in the field of higher education: **4. Natural sciences, mathematics and informatics;** professional field **4.2. Chemical sciences**; doctoral program in **Analytical Chemistry**.

29.04.2025 Signature:

Prof. Dr. Albena Detcheva-Tchakarova