

## STATEMENT

by **Assoc. Prof. Diana Petrova Karcheva-Bahchevanska, PhD**

Department of Pharmacognosy and Pharmaceutical Chemistry,  
Faculty of Pharmacy, Medical University - Plovdiv

regarding a **procedure for acquiring the educational and science degree "Doctor"**,  
professional field 7.3. Pharmacy,  
Doctoral Program "Pharmacognosy and Phytochemistry"

**Author:** MPharm Vanya Ivanova Nalbantova

**Form of the doctoral program:** Full-time

**Department of** Pharmacognosy and Pharmaceutical Chemistry

**Topic:** "Phytochemical study and potential applications of *Trigonella foenum-graecum*  
L. seeds"

**Scientific supervisors:**

- Assoc. Prof. Niko Joseph Benbassat, PhD, Department of Pharmacognosy and Pharmaceutical Chemistry, Faculty of Pharmacy, Medical University of Plovdiv;
- Professor Cédric Delattre, PhD, Clermont Auvergne INP, CNRS, Institut Pascal, Université Clermont Auvergne, F-63000 Clermont-Ferrand, France.

### 1. General presentation of the procedure and the PhD student

The submitted set of paper/electronic materials is in accordance with Article 70 (1) of Section I. Acquisition of Doctoral Degree at MU-Plovdiv; Regulations of MU-Plovdiv of 28.01.2021 and includes all required documents.

Vanya Ivanova Nalbantova completed her higher education in Pharmacy, with a Master's degree in Pharmacy in 2016 at the Faculty of Pharmacy at MU-Plovdiv. She worked in the specialty in an open-type pharmacy in the period 2017 - 2019. Since 2019, she has held the position of "Assistant" at the Department of Pharmacognosy and Pharmaceutical Chemistry at MU-Plovdiv, where she works today. She is in the process of obtaining a specialty in Medicinal Plants and Phytopharmaceuticals since 2021.

In connection with the development of her dissertation, the PhD student has carried out an international mobility at Clermont Auvergne INP, CNRS, Institut Pascal, Université Clermont Auvergne, F-63000 Clermont-Ferrand, France. She is the principal investigator of 1 intra-university research project (DPDP-05/2021) and has participated in 3 international and 2 national scientific forums. She has submitted 4 (four) publications, 3 of them in journals with impact factor. She is the first author of the publications submitted, with one of them falling in the first quartile (Q1).

## 2. Relevance of the topic

The topic of the presented dissertation is scientifically significant. It draws attention to the well-known in folk medicine *Trigonella foenum-graecum* L. (Greek fenugreek), but also further develops the knowledge about it with an emphasis on the characterization of the essential oil and polysaccharide composition, as well as the study of the possibilities of epithelizing application of its isolated galactomannan. Enrichment of the information on the phytochemical composition of the plant species studied will contribute to further elucidation of its pharmacological activity, which is a prerequisite for the development of a phytopharmaceutical product. The dissertation work integrates research in the field of pharmacognosy and phytochemistry, pharmaceutical analysis and pharmacology, which makes the presented results theoretically and practically significant for pharmacy and medicine in general.

## 3. Knowledge of the problem

The literature review covers in detail all aspects of the problem at hand. The aim of the study is clearly formulated, which is achieved by solving six well-founded tasks. Regarding the elucidation of the phytochemical composition of *T. foenum-graecum* L. - primary (lipids and polysaccharides) and secondary (terpenes) metabolites were isolated and identified. Regarding the biological activity studied - the epithelizing ability of polysaccharide films based on the isolated galactomannan in combination with *Cotinus coggygria* Scop. extract was verified. In shaping the literature review, describing and interpreting the results, 190 literature sources were cited.

## 4. Research methodology

In this dissertation, the **Materials and Methods** section describes in detail the methods used to perform the previously set tasks. Some of them are as follows: high performance anion exchange chromatography (HPAEC), gas chromatography with mass spectrometric detection (GC-MS), Fourier transform infrared spectroscopy (FTIR), NMR structural analysis of galactomannan. A method for the identification and quantification of monosaccharide components in hydrolyzed galactomannan by high-performance thin-layer chromatography (HPTLC) was developed and validated. The use of multiple methods, both classical and modern, is impressive, which is a prerequisite for acquiring the necessary theoretical knowledge and practical skills in conducting scientific experiments. This gives reason to consider that the dissertation has the necessary scientific value, and the doctoral student, in the process of her studies, has acquired the ability for independent future research.

## 5. Characteristics and evaluation of the thesis and contributions

Thus, the submitted dissertation by Vanya Nalbantova fully meets the requirements of MU-Plovdiv for the award of PhD. The dissertation is organized in 134 pages and contains the necessary main sections. The data are presented in 22 tables and illustrated with 34 figures. The bibliography includes 190 references, of which only 1 is in Cyrillic. A significant part of them are from recent years, which confirms the topicality of the subject.

The following contributions are reported:

- ✓ For the first time the chemical composition of essential oil from seeds of *Trigonella foenum-graecum* L., common in Bulgaria, was characterized.

- ✓ For the first time, an essential oil has been isolated using a newly developed method for obtaining essential oils in minimal quantities.
- ✓ A comparative analysis of the terpene composition of essential oils obtained from seeds of the studied plant species cultivated in Bulgaria and India was performed.
- ✓ Galactomannan was isolated and structurally identified from the polysaccharide fraction in pure form.
- ✓ For the first time, an HPTLC method was developed and validated for the identification and quantification of hydrolyzed galactomannan from seeds of the plant species under study.
- ✓ For the first time, a test of the epithelizing effect of a film coating of isolated galactomannan from *T. foenum-graecum* L. and *Cotinus coggygia* Scop. extract on rat buccal mucosa is conducted.

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

The presented list of publications related to the dissertation contains 4 scientific publications, three of them in journals with impact factor. The doctoral candidate is the first author of each of them. Results of this dissertation have also been promoted through participation in scientific forums (3 international and 2 national). The PhD student is the lead researcher in one intra-university research project.

In connection with the development of this dissertation Vanya Nalbantova has carried out an international mobility in Clermont Auvergne INP, CNRS, Institut Pascal, Université Clermont Auvergne, F-63000 Clermont-Ferrand, France in the period 08.05.2023 - 07.07.2023.

I believe that the research carried out has the **necessary personal contribution** of the PhD student for this kind of work.

## 7. Abstract

The presented abstract contains 49 pages and is structured correctly as it fully reflects the studies conducted, results obtained and contributions made in the thesis. The data are presented in 12 tables and illustrated with 17 figures. The abstract thus formatted fully meets the requirements under the Regulations of MU-Plovdiv for the acquisition of educational and scientific degree "Doctor".

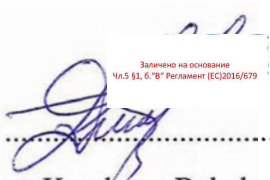
## CONCLUSION

The PhD student Vanya Nalbantova meets the requirements for obtaining the PhD degree at the Medical University - Plovdiv. Her dissertation thesis entitled "Phytochemical study and application possibilities of seeds of *Trigonella foenum-graecum* L." **contains significant scientific, scientific-applied and applied results, which represent an original contribution to the field of pharmacognosy and phytochemistry.** The submitted work fully complies with all the requirements of the Academic Staff Development Act in the Republic of Bulgaria and complies with the specific requirements specified in the regulations for academic development at the Medical University - Plovdiv.

The PhD student Vanya Ivanova Nabantova **possesses** an in-depth theoretical knowledge of the scientific specialty "Pharmacognosy and Phytochemistry", **demonstrating** skills for independent scientific research.

Due to the above, I confidently give my **positive assessment** for the conducted research, achieved results and contributions, and **I propose to the honorable scientific jury to award the educational and scientific degree "Doctor"** to Vanya Ivanova Nabantova in the PhD program "Pharmacognosy and Phytochemistry", in the field of higher education 7. Health and Sport, professional field 7.3. Pharmacy.

22.10. 2024 г.

Prepared by:  .....  
(Assoc. Prof. Diana Karcheva-Bahchevanska, PhD)