

OPINION

by **Assoc. Prof. Milena Natkova Koleva**
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regarding the materials submitted so as to participate in a competition for holding the academic position of **Associated Professor** in the area of higher education: **Technical Sciences**, professional trend: **5.13 General Engineering**, scientific subject: **Engineering Ecology**

Senior assist. prof. Dragomir Stoyanov Vasilev, Department of Mathematics, Informatics and Natural Sciences, TU-Gabrovo, is participating in the competition for associated professor, published in the Official Gazette, issue 68/31.07.2020 and on the website of TU-Gabrovo, for the needs of the Department of Mathematics, Informatics and Natural Sciences at the Faculty of Economics.

1. Overview of content and results in the works presented

To participate in the competition, the Candidate has submitted a monography and 31 publications, of which 23 papers delivered at scientific conferences and published in full and 8 articles in peer-reviewed journals. Considering their topics, they could provisionally be referred to 3 scientific trends which are directly related to the scientific subject of the competition.

The publications in the first trend, Application of Ultrasound and Microwave Energy for Synthesizing and Modifying Organic Compounds, present results from experimental scientific activities linked to the application of nonconventional energy effects when synthesizing and modifying organic chemical compounds – modified polysaccharides, fatty acid esters with mono-, oligo- and polysaccharides. The experiments are not only of scientific nature but of practical one as well – their results could be used as a good basis for seeking engineering solutions related to the intensification of processes in view of cost-effectiveness of materials and energy when producing those compounds, as well as their application as human- and eco-friendly biodegradable components of polymer compositions in return for the toxic ones being used. The most significant results of the above experiments are summarized in a monography.

The publications in the second trend, Engineering Ecology and Environmental Preservation, are in the area of investigating the environmental pollutants, the ways of their reduction or prevention of pollution involving those pollutants, limitation of their impact, as well as their disposal. The results from the investigation of metallic oxides, which have the potential to be used as catalysts in catalytic systems for disposing pollutants by means of catalytic oxidation, are presented. The effect of both the composition and properties of the oxide systems and particular environmental factors on the catalyst quality is studied. Their activity upon oxidation of organic compounds in solutions is determined.

The publications in the third trend, Ensuring Safety in Case of Risks of Chemical Effects, are related to risk assessment and management when working with chemical substances and preparations in view of ensuring occupational safety and protecting human health.

The publications in the three scientific trends are united by their common ecological focus and by the fact that they address, directly or indirectly, today's extremely important problems of environmental preservation and sustainable development. They have scientific and applied nature and prove the active research work of the Candidate.

Eight of the works submitted are related to teaching methodology and the application of advanced educational techniques at academic level. They prove the aspiration of the Candidate to develop and improve his teaching competence, which is actually required by the academic position of associated professor.

The Candidate is an author and co-author of 5 training and methodological materials designed for students taking *Chemistry* and *Environmental Chemistry* courses.

2. General characteristic of the Candidate's performance

2.1. Teaching practice

The teaching practice of senior assist. prof. Dragomir Vasilev is active – he does not only teach but he also does methodological work and collaborates with students as a students' group leader.

His teaching practice involves delivery of lectures and laboratory practice in 16 courses for the bachelor and master degree courses at the Technical University of Gabrovo. He has participated in the elaboration of teaching documentation as a co-author of 3 study programmes in *Engineering Ecology*, *Environmental Chemistry* and *Chemistry* and of a curriculum for the master degree course of *Environmental Preservation and Sustainable Development*.

He has supervised 5 graduates whose projects are in the area of Engineering Ecology. He has reviewed 21 master theses referring to environmental preservation and sustainable development. He has taken part in two state university examining boards to examine the graduation theses of students following a master degree course in *Environmental Preservation and Sustainable Development*.

He is responsible for the overall organization of training and collaboration with students following a master degree course in *Environmental Preservation and Sustainable Development*. He has also been a group leader of the students following a bachelor degree course in *Social Work* and *Public Administration*.

2.2. Scientific and scientific-applied activities

The scientific and scientific-applied activities of the Candidate include participation in 13 scientific and research projects, one financed by the National Scientific Research Fund and the rest - by the Scientific Research Fund of the Technical University of Gabrovo. He has managed 2 projects funded by the Scientific Research Fund of the Technical University of Gabrovo. He has also participated in 5 educational projects, one of which has been international.

The results of his research work are presented at 29 scientific forums in Bulgaria and abroad, 24 of which are international.

The quality of his scientific work and his scientific recognition could be judged by the citations of his scientific publications – all 10 citations presented are abroad and most of them are in refereed and indexed journals.

Senior assist. prof. Vasilev is a member of international scientific networks such as ResearchGate and Academia.edu, and he is registered with a personal scientific code in the world databases for scientific information Web of Science and Scopus.

2.3. Implementation activities

As a result of the Candidate's work on project BG051PO001 - 2.3.01 - Prevention for Safety and Health at Work, his own development titled *Practical Tool for Risk Assessment at Work* has been implemented in economic activity *Human Health*.

3. Contributions (scientific, scientific-applied, applied). Significance of contributions for science and practice

The Candidate's scientific, scientific-applied, and applied contributions are due to his work in the three main trends of his research activities, namely:

- catalytic systems for full oxidation on the basis of nickel and cobalt oxides have been obtained and their applicability to purifying waste water polluted with organic substances has been studied;
- ultrasound and microwave energy has been applied to synthesize and modify organic compounds – aliphatic and sugar esters of higher fatty acids, new organic substances with potential biological activity; the parameters of the processes have been optimized;

- the synthesized esters have been applied and studied as biodegradable non-toxic additives upon processing of plastics instead of the conventional toxic ones; the anti-microbial and anti-fungal activity of the esters synthesized by ultrasound has been studied and established in view of the potential applicability of the plastics which they have been added to.

The above studies do not only theoretically enrich the scientific data in the respective area but they also are of applied nature and their results can be the basis on which engineering problems could be solved in real industrial environment.

4. Evaluation of the personal contribution of the Candidate

The content of the submitted publications demonstrates the ability of the Candidate to organize and conduct scientific studies both individually and in a team. He also has knowledge and skills of applying advanced experimental methods, summarizing and analyzing scientific data, formulating conclusions and drawing up tendencies on the basis of those conclusion. The fact that 5 of the publications and the monography are independently written and in 11 of them the Candidate is the first author confirms his personal contribution.

5. Comments and recommendations

I do not have any comments and recommendations to the Candidate.

6. Personal impressions

The Candidate has the required theoretical knowledge and teaching competence, which appears an excellent precondition for delivering high-quality teaching at academic level. He is very responsible and a good team player. In addition, he knows and applies advanced techniques in both the teaching process and his scientific work.

7. Conclusions

Taking into account the above mentioned, I propose senior assist. prof. Dragomir Stoyanov Vasilev to be selected as an Associate Professor in the area of higher education 5. Technical Sciences, professional trend 5.13 General Engineering, scientific subject “Engineering Ecology”.

27.10.2020 г.

Member of the jury: /signature/

/Assoc. Prof. M. Koleva/