

## REPORT

by Prof. Dragomir Yankov, PhD  
 concerning

the materials submitted for a competition for the academic position of Reader in the scientific specialty 4.2. Chemical Sciences (Unit operations in the Chemical and Biochemical Technology) for the needs of the laboratory "Transfer processes in multiphase media" - Institute of Chemical Engineering - BAS, published in the State Gazette No 37 / 07.05.2021

The only candidate who submitted documents for the announced competition, is Chief Assistant Rayka Kirilova Vladova PhD.

Chief Assistant Vladova graduated from the University of Chemical Technology and Metallurgy, Sofia in 2010. with a Bachelor's degree, and in 2013 earned a Master's degree there. In the period 2014-2017 Rayka Vladova is a full-time doctoral student at the Institute of Chemical Engineering - BAS, where she successfully defended her dissertation on the topic "Increasing the sustainability and energy efficiency of production systems with periodic processes using the example of a system for autothermal thermophilic aerobic treatment (ATAD) of wastewater" in scientific field Unit operations in chemical and biochemical technology. After acquiring the ONS "Doctor", Dr. Vladova was appointed as an Assistant at IChE, and in 2019 as Chief Assistant.

Ch. assistant Dr. Rayka Vladova appeared in the competition for associate professor with a total of 37 publications. Four of the publications are included in the PhD dissertation and will not be considered. Of the rest, 25 are publications in international scientific journals, two book chapters and six full-text publications in materials from scientific congresses and conferences.

The papers are distributed as follows:

**In journals with IF – 18.**

By quartiles:

Q1 – 3; *Energy* – 1; *Computers & Chemical Engineering* - 1; *Clean Technologies and Environmental Policy* – 1;

Q2 – 1; *Journal of Ecological Engineering*

Q3 – 11; *Chemical Engineering Transactions* – 11

Q4 – 3; *Bulgarian Chemical Communications* – 2, *U. Porto Journal of Engineering* – 1.

**In journals without an impact factor – 7.**

Ch. assistant Rayka Vladova is first author in ten publications, and corresponding author in 7. The author's *h*-index is 4 (Scopus).

The listed publications have been cited a total of 33 times.

R. Vladova has managed 2 projects and participated in five projects funded by the Scientific Research Fund of Bulgaria.

Below is a table of the minimum required points by groups of indicators and those of the applicant:

Group of indicators	Content	Minimum for Associate Professor	Of the candidate
A	Indicator 1	50	50
B	Indicator 2	-	-
C	Indicators 3 or 4	100	102
D	Sum of indicators from 5 to 10	220	244
E	Sum of points in indicators 11	60	66
F	sum of the indicators from 12 to the end	-	-

The total number of points is 462 with a required minimum of 430.

The candidate also meets the additional requirements for holding the academic position of "Reader" at IChE-BAS.

The main scientific and applied-scientific interests of R. Vladova are in the field of design, management and optimization of supply chains (SC), as well as increasing the sustainability and energy efficiency of periodic production systems.

The main contributions in the submitted materials for the competition can be systematized as follows:

- An approach has been created for the short-term design of a product portfolio of a three-echelon "green" SC of a production complex from the dairy industry. (publ. Nos. 4, 11, 12, 16 and 22);
- A stochastic optimization approach has been developed to deal with uncertainty regarding product requirements in SC for producing different dairy products using different technologies, different number of suppliers and different number of markets, while satisfying environmental, economic and social criteria. (publ. Nos. 23, 29, 31 and 32).
- A mixed integer linear programming (MILP) approach was established for the design and management of SC for biodiesel production using different feedstocks. (publ. Nos. 15, 20, 21 and 28);
- An assessment was made of the energy costs of each of the stages of wastewater treatment in a municipal wastewater treatment plant. (publ. Nos. 7 and 26).
- Methods are proposed to increase the sustainability and energy efficiency of domestic wastewater treatment facilities using the process of autothermal thermophilic aerobic digestion of sediments (Autothermal Thermophilic Aerobic Digestion - ATAD). (pub. no. 1, 2, 3, 5, 6, 8, 9, 10, 13, 14, 17 and 18).

#### **CONCLUSION:**

The presented materials in volume and quality meet the requirements of the Internal Regulations of IChE, the Regulations on the terms and conditions for obtaining scientific degrees and holding academic positions in the Bulgarian Academy of Sciences, the Development of Academic Staff in the Republic of Bulgaria Act and the Regulations for DASRBA. I fully support the candidate in the competition for the academic position of Reader in the scientific specialty "Unit Operations in the Chemical and Biochemical technology" and I will vote "Yes", the esteemed jury to propose to the Scientific Council of IChE to appoint Chief Assistant Rayka Vladova as Reader.

Sofia

06.12.2024

  
(Prof. Dragomir Yankov, PhD)