OPINION

by

Prof. Christomir Christov, DSci.

Department of Chemistry, Faculty of Natural Sciences, Konstantin Preslavsky University of Shumen

Regarding

the defense of dissertation for academic and scientific PhD degree, Area of Higher Education 4. Natural Sciences, Mathematics and Informatics, Professional Field 4.2 Chemical Sciences, Doctoral Program: Ecology and Environmental Protection, for the needs of the Faculty of Natural Sciences, "Asen Zlatarov" University of Burgas.

By order № УД-216/15.08.2022 signed by the Rector of Asen Zlatarov University of Burgas I'm appointed as a member of the scientific jury. At its first meeting on 24.08.2022 I was chosen to write an opinion , which is in accordance with The Regulation on the Terms and Procedure for Acquisition of Academic Degrees and the Occupation of Academic Jobs at University of Burgas.

Eng. Dimitrinka Slavova Ivanova is the sole applicant for the PhD degree at Department of Ecology and Environmental Protection, Faculty of Natural Sciences, "Asen Zlatarov" University of Burgas.. I have received electronically all materials for the competition.

Brief Biographical Data

In 1999 Eng. Dimitrinka Ivanova was awarded a Master Degree in Industrial Ecology at Asen Zlatarov University of Burgas. In the period from 1998 to 1999 she also studied at Asen Zlatarov University pedagogy and received Teacher *Qualification.*

Since 2003 Eng. Dimitrinka Ivanova is an assistant at Prof. Assen Zlatarov University of Burgas.

SCIENTIFIC AND APPLIED CONTRIBUTIONS

The title of presented dissertation is "Studies of pollution with road drift on major and secondary transport arteries in the city of Burgas".

The major CONCLUSIONS in the dissertation are as follow:

For the first time is studied the pollution with silt loading and heavy metals in it, on major and minor transport arteries in the city of Burgas in relation to the traffic of vehicles. Based on the data obtained and the results analyzed, the following conclusions are drawn:

I. In terms of the traffic of vehicles in the city of Burgas

1. For the first time, an electronic map of the transport scheme of the city of Burgas has been created, taking into account the main and secondary transport streets and boulevards and all entry-exit highways.

2. An analysis of the maximum intensity of motor vehicles by category was made, based on direct measurements for two periods. In the first period - on 85 traffic arteries and in the second period - on 22 traffic arteries. The results show that the traffic volume increases from 15 to 217% in the second period, with the maximum intensity being maintained in the time interval between 16 and 18 o'clock.

3. For the first time, the relative traffic intensity by seasons, by days of the week, by hours of the day, in the city of Burgas was studied and analyzed.

4. A correlation was found between the relative change in traffic volume on two busy urban boulevards and the concentration of nitrogen oxides measured by nearby (traffic-oriented) monitoring stations.

II. In terms of silt loading

1. For the first time, based on an assessment of the condition of the road surface, pavements, drainage structures, green areas and the presence of visible embankment material on 42 traffic arteries, a classification of the silt loading measurement points into four groups has been drawn up.

2. For the first time in Bulgaria, sampling of silt loading was carried out on 12 transport segments of the city of Burgas, selected on the basis of the classification.

3. It has been proven that when the road condition is unsatisfactory - pavement disturbance of 31 to 50%, combined with low vehicle traffic, higher values of silt loading are observed.

4. In a study of inter-block streets where vehicle flow was less than 500 vehicles/24 h and there was a lack of pavement cleaning, it was found that the measured average value for silt loading was 37.81 g/m^2 (EPA recommended value of 0.6 g/m^2).

III. In terms of heavy metals

1. For the first time the heavy metal content of silt loading in Bulgaria has been investigated. Data and results were obtained for 12 control sections of the street network of Burgas.

2. It has been proved that in the tested silt loading samples, the heavy metals Ni, Cu, Zn and Pb are in values above the MAC for soils, in the places where the traffic intensity was more than 500 vehicles/24h.

3. The average concentration of heavy metals was found to be higher in the fractions with size below 40 μm.

4. It has been shown that the maximum permissible concentrations for Ni, Cu, Zn and Pb are not exceeded in the inter-block spaces despite the high content of silt loading.

SCIENTIFIC AND APPLIED CONTRIBUTIONS

The present dissertation provides basic data on silt loading and heavy metals on part of the real road infrastructure of the city of Burgas based on representative sampling and analysis. Such results are presented for the first time in Bulgaria.

- A methodology has been developed and applied to calculate the absolute value of traffic for any hour of the year. The hourly, daily and seasonal load factors have been determined.
- A correlation between the relative monthly average concentration of nitrogen oxides and the variation in traffic volume is demonstrated.
- The experimental results for silt loading and heavy metals have applications in methods for estimating ambient air pollution by fine particulate matter.
- The obtained data can be applied to the calculation of emission factors from fine particulate matter, emissions from fine particulate matter and modelling of transport pollution in cities as well as environmental impact assessment.

The established and proven results provide guidance on the real and actual state of silt loading and heavy metal pollution, not only in the city of Burgas, but also in the country.

Meeting the Minimum National Requirement

The set of materials submitted by Mrs. Ivanova is in compliance with The Regulation on the Terms and Procedure for Acquisition of Academic Degrees at "Asen Zlatarov" University of Burgas and includes all administrative and scientific documents required.

Eng. Dimitrinka Ivanova submits for the completion a total list of 4 publications referenced in Web of Science , Scopus, and SJR. It should be noted that in all 4 publications the applicant is a first author.

Ivanova, D., Z. Nikolaeva, S. Naidenova, 2020. *Selection of points of interest for sampling of silt loading in transport arteries in city of Burgas*, Journal of Environmental Protection and Ecology, 21 (1), 1-9. Q4 (12 т.)

Ivanova D., Z. Nikolaeva, 2021. *Pollution with silt loading on major roads in the city of Burgas, Bulgaria*, Journal of Environmental Protection and Ecology, 22(3), 968-975. Q4 (12 т.)

Ivanova D., Z. Nikolaeva, A. Dimitrov, 2022. *Study of the concentration of heavy metals in silt loading from transport arteries in the city of Burgas, Bulgaria*, Oxidation Communication, 45 (2) 390-397. Q3 (15 т.)

Ivanova D., A.Dimitrov, Y.Tasheva, 2022. *Contemporary trends in evaluation and calculation of dust in the world*, Oxidation Communication (In press - №3772). Q3 (15 т.)

According to the regulation's procedures in professional field 4.2 Chemical sciences involve quartiles Q1, Q2, Q3 and Q4 according to the metrics SJR. In this regard D. Ivanova. submitted 2 publications Q3 (30 points); and 2 publ. Q4 (24 p.) – (total **54 p).**

According to the analysis of the results the minimum number of points (30 points) required for the PhD degree in the professional field 4.2 Chemical Sciences, according to the Minimal National Requirements, and Regulations for the development of the academic staff of Asen Zlatarov" University of Burgas are met.

CONSLUSION

Once I have read the materials and scientific publications submitted and have made an analysis of their significance and the scientific contributions contained in them, I think that the candidate: Eng. Dimitrinka Ivanova has accomplished the minimal national requirements set in the Republic of Bulgaria, The Regulation on the Terms and Procedure for Acquisition of Academic Degrees and the Occupation of Academic Jobs at "Asen Zlatarov" University of Burgas, and all other relative normative documents. I find it worthwhile **to give my positive assessment** and to recommend to the Scientific Jury to make a report to the Faculty Council of the Faculty of Natural Sciences to ask them to grant the PhD degree to Dimitrinka Ivanova at "Asen Zlatarov" University of Burgas in the Area of Higher Education 4. Natural Sciences, Mathematics and Informatics, Professional Field 4.2 Chemical Sciences, Doctoral Program: Ecology and Environmental Protection.

Подпис заличен
Чл.2 от ЗЗЛД

08.10. 2022

Scientific Jury Member:

(Prof. Christomir Christov, DSci)