



STATEMENT

on a dissertation work for obtaining the educational and scientific degree "Doctor" in: Field of higher education 6. Agricultural Sciences and Veterinary Medicine, Professional direction 6.1 Crop Production, the Scientific specialty "Crop Production"

Author of the dissertation: Svetlana Yordanova Manhart - part-time doctoral student at the Department of Crop Production at the Agricultural University, Plovdiv

Dissertation topic: "Varietal response of coriander (*Coriandrum sativum* L.) depending on the application of some foliar treatment products"

Reviewer: Prof. Dr. Viliama Marinova Vasileva, Maize Research Institute - Knezha, Field of higher education 6. Agricultural Sciences and Veterinary Medicine, Professional direction 6.1 Crop Production, the Scientific specialty "Crop Production"

appointed as a member of the Scientific jury by order No. RD-16-515/04.05.2023 from the Rector of the AU.

1. Relevance of the problem.

Coriander (*Coriandrum sativum* L.) is one of the most valuable essential oil crops in the world with proven essential oil benefits in many directions. In 2021, our country ranks among the largest exporters of coriander seeds after India, Russia and Italy (<https://oec.world/en/profile/hs/coriander-seeds>). From the group of essential oil crops, the areas with coriander occupied the largest part and it is distributed in almost all regions of the country. Nevertheless, there are a few studies with this crop.

The challenges that climate change poses to agriculture require finding means to overcome their adverse effect in terms of productivity and quality. The crop - the subject of research in the dissertation was no exception. As part of the agrotechnical measures is the use of plant biostimulants for foliar treatment. Thus, the crop and the problems, the solution of which was sought through the fulfillment of the tasks of the dissertation work, make it relevant and necessary. The comprehensive literature review done by the doctoral student with a large number of references proved the positive effect of the application of such products on both quantitative and qualitative characteristics of coriander.

2. Purpose, tasks, hypotheses and research methods.

The aim of the dissertation work was to study the response of coriander varieties depending on the application of foliar treatment products on the productivity, content and composition of essential oil in the seeds. For its

implementation, the following tasks were solved: i) tracking the phenological development of plants and establishing the duration of the interphase periods depending on the variety and applied foliar treatment products; ii) establishing the seed yield and its structural elements, and essential oil yield; iii). determination of the physical qualities of the seeds, the content of essential and common oil; iv) establishing the effect of the products used on the chemical composition of the essential oil.

To achieve the goal and tasks of the study, three years field experiments (2020-2022) were conducted methodically correctly. Two factors were investigated, i.e. variety and foliar treatment products. Five varieties of coriander with different origins were studied, as follows: 'Jantar' (Russian), 'Marokan' (Italian), 'Mesten drebnoploden' (Bulgarian), 'Thuringen' (German) and 'Marino' (Dutch). The products for foliar treatment (correctly noted number of treatments and stage) were as follows: mineral fertilizer - Grow Energy 20-8-60 + 2% MgO + ME + amino acids and algae extract; Fulvin 40-22 – organic fertilizer 4-3-3 liquid; Isabion - biostimulator.

A description of the varieties tested was done. In the chapter the characteristics recorded were described in detail. The agrotechnics of the experiment was shown in details also. A soil-climatic and agro-meteorological characterization of the area where the experiments were carried out was done. The statistical methods for processing the experimental data were indicated.

3. Transparency and presentation of the obtained results.

The results obtained from the study were very well illustrated. The doctoral student prepared perspicuous tables (37) and figures of different designs (36). Photographic material visualized the experiments and the varieties studied.

4. Discussion of the results and used literature.

The experimental data were logically and thoroughly analyzed. The results were compared with those obtained by other authors in the country and mainly abroad. The total number of references was 238, with 43.7% (134 items) from the last 10 years. This is indisputable proof of the candidate's literary awareness of the problem and theoretical training.

Modern statistical-mathematical methods were used, which the doctoral student successfully applied. They fully correspond to the nature and objectives of the studies, and allow the formulation of adequate conclusions (14).

5. Contributions of the dissertation.

Five scientific-theoretical and four scientific-applied contributions were formulated. They reflect the results of the doctoral student's research.

Scientific contributions

1. The vegetation period of coriander varieties of different origins, grown under the soil and climatic conditions of the Plovdiv region, was determined. For the first time, the products for foliar treatment have been shown to extend plant

flowering and increase the length of the growing season.

2. The yield structural elements, viz. number of umbels per plant, number of seeds per umbel, number of seeds per plant and seed weight per plant increased after the treatment with foliar products.

3. Coriander varieties (Morocan and Mesten drebnoploden) and a foliar product (the Isabion biostimulator) have been identified in which the content of linalool in the essential oil increased.

4. In all tested varieties, the presence of 2E-Tridecenen-1-al aldehyde was reported as a result of the treatment with foliar products, most pronounced in the Jantar and Marino varieties when treated with Isabion.

5. The various mathematical and statistical methods provide rich information regarding all aspects of the effect of the products on the varieties studied. Correlational dependences between both qualitative and quantitative characteristics were found. Regression models were done and the effect of the Isabion product on the chemical parameters of the Mesten drebnoploden variety with the highest coefficient of determination was proven.

Scientific-applied contributions

1. The positive effect of the foliar treatment products Energy 20-8-60, Isabion and Fulvin 40-22 on the yield of coriander seeds and essential oil has been proven. Treatment with Isabion resulted in an increase in seed yield (up to 9.9%), and treatment with Energy 20-8-60 and Isabion resulted in an increase in essential oil yield (up to 18.3%), depending on the variety.

2. The products for foliar treatment increased the essential oil content to 11.8%, with the greatest effect being Energy 20-8-60.

3. Treatment with the Isabion product increased the 1000 seeds weight in the Mesten drebnoploden variety to 16.4%.

4. The results of the research conducted allowed the products for foliar treatment Energy 20-8-60, Isabion and Fulvin 40-22 to be applied in the coriander cultivation technology.

6. Critical Notes and Questions.

I have no critical notes. The dissertation contains scientific and scientific-applied results that represent an original contribution to the science and have important theoretical and practical significance. It is proof that the doctoral student has in-depth theoretical knowledge in the scientific specialty "Crop Production" and the ability for independent scientific research.

7. Published articles and citations.

Two articles related to the dissertation have been published in scientific journals, referenced and indexed in world-famous databases with scientific information. In one of the articles, the doctoral student is an independent author, and in one, she is a co-author with one of the scientific supervisors. Both the number and quality of publications fully meet and exceed the minimum national requirements for obtaining the educational and scientific degree "doctor".

The presented abstract reflects objectively both the structure and content of the dissertation work.

CONCLUSIONS:

Based on the scientific and applied, by the doctoral student, various research methods, the correctly conducted experiments, the generalizations and conclusions done, I consider that the presented dissertation meets the requirements of the LDASRB and the Regulations of the Agrarian University for its application, which gives me grounds to evaluate it **POSITIVE**.

I take the liberty of proposing to the honorable Scientific Jury to also vote positively and award Svetlana Yordanova Manhart the educational and scientific degree "**Doctor**" in the Scientific specialty "Crop Production".

Dated: May, 14, 2023
Town of Plovdiv

STATEMENT PREPARED BY:


(Prof. Viliama Vasileva, PhD)