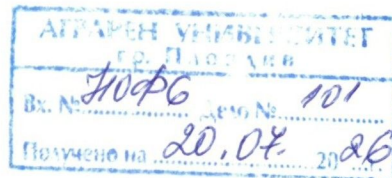


OPINION



on dissertation for obtaining the educational and scientific degree "Doctor" in: field of higher education 6.0 Agricultural Sciences and Veterinary Medicine, professional field 6.1. Crop science, scientific specialty Viticulture

Author of dissertation:

Hristo Shterev Kozarov, full-time doctoral student at the Department of Viticulture and Fruit Growing at the Agricultural University, Plovdiv.

Dissertation Topic:

Application of organic products and their impact on the growth and reproductive performance of Merlot variety grown under non-irrigated conditions.

Reviewer:

Assoc. Prof. Dr. Eng. Emil Sashev Tsvetanov, Institute of Viticulture and Enology - Pleven, field of higher education 6.0 Agricultural Sciences and Veterinary Medicine, professional field 6.1. Crop Science, scientific specialty Viticulture, appointed as a member of the Scientific Jury by Order RD 16-775/23.06.2026 of the Rector of the Agricultural university – Plovdiv.

1. Relevance of the problem.

In modern viticulture, climate changes, drought, and pronounced seasonal variability require the introduction of modern approaches for vineyard management. The Merlot variety is among the most significant red wine varieties in Bulgaria, but growing it under non-irrigated conditions and water deficit leads to compromised quality of the raw material. The lack of a functioning irrigation network necessitates the testing of new ecological products with the role of antitranspirants. The study of the peat extract "Humat Rost" is a timely solution for optimizing the vegetative potential and balance in the vineyard ecosystem.

2. Aim, objectives and research methods.

- **Aim:** To establish the potential of the organic product "Humat Rost" and its impact on the growth and reproductive performance of Merlot variety, grown under non-irrigated conditions to overcome stress.

- **Tasks:** The tasks are structured clearly and track climate factors, soil microbial status, differences in phenology, photosynthetic activity, potential and actual fertility, as well as the physicochemical and sensory profile of the wines.

- **Methods:** The experiment was carried out in a vineyard on alluvial-deluvial soils. The objects of study are 15-year-old vines, grafted on SO4 rootstock, formed on a bilateral cordon with a load of 12 winter buds. The scheme includes 7 variants in 4 replications. Biolog EcoPlate™ ecoplates, LCA-4 photosynthetic system, CCM-300 device, electrophoresis, and SPSS software for mathematical analysis at a significance level below 0.05 were used.

3. Visualization and presentation of the results.

The obtained experimental data are presented exceptionally clearly and systematically in 29 tables and 54 figures. The work demonstrates excellent visualization through maps of the

experimental plot, detailed tables for the distribution of substrates, photographic material from field measurement of leaf gas exchange, and a complete technological scheme for the production of the experimental red wines. The approach for statistical coding of groups with different letters facilitates interpretation.

4. Discussion of results and literature used.

The discussion is conducted in depth and comprehensively, fully adequate to the set goals. The author analyzes the effects of the organic fertilizer in a 3-year dynamic, successfully taking into account the influence of annual variability. The literature used covers a rich list of 276 scientific titles. This confirms the ability of the doctoral student to critically analyze modern scientific information in areas such as grapevine physiology, soil microbiology, and wine biochemistry.

5. Contributions of the thesis

The scientific and scientific-applied contributions proposed by the doctoral student are formulated with exceptional precision, clarity, and complete correctness relative to the obtained experimental data. They possess both fundamental value for viticultural science and direct practical focus for the sector in our country. I consider them fully proven in the course of the 3-year studies and accept them entirely in the following form:

Scientific contributions

- It was established that the application of a lower dose in the soil treatment of variant V5 leads to an increase in the functional diversity and metabolic activity of soil microbial communities, expressed through higher values of functional indices, summarized through MANOVA statistical analysis.
- In the treated variants, the uptake of amino acids by microbial communities was stimulated compared to the control variant V0. The higher metabolic activity in V5, especially after the 96th hour, indicates more efficient use of amino acids and suggests an enhanced functional potential of the microbial community.
- The established significant dependencies between the applied foliar treatments with "Humat Rost", the specifics of the vintage, and the organoleptic characteristics of the obtained wines are also original. It is proven that the tasting score varies significantly depending both on the vintage year and on the treatment doses used by variants.

Scientific and applied contributions

- Root treatment with a dose of 25 kg/da maintains a higher rate of amine uptake compared to the other variants, which reveals the specific metabolic reaction of the soil microbiota to the applied treatment.
- A trend towards dose dependency in the manifestation of the effect is proven, as well as the significant influence of climatic conditions on changes in linear growth and maturation of shoots.
- Practical guidelines have been developed to increase the viability of winter buds by optimizing the sampling time and applying organic fertilization, leading to increased resistance to late spring frosts and preservation of the reproductive potential of the grapevine.
- Regression analysis reveals significant dependencies between nutrient regimes, feeding periods, and the formation of reproductive and vegetative organs in grapevines.

6. Critical comments and questions.

Due to the high quality of the experimental work, no critical remarks are made. The following questions are addressed to the doctoral student:

1. Based on the 3-year studies, which specific phenophase of grapevine development emerged as the most critical and, accordingly, the most effective for performing foliar feeding?
2. Were differences observed in the technological indicators of the must and the sugar content of the grapes between the variants with foliar application and those with root application at harvest?

7. Published articles and citations.

In connection with the dissertation, 1 scientific article was published in Journal of Mountain Agriculture on the Balkans in 2025, Volume 28, Issue 5, in which the doctoral student is the sole author. At the time of preparation of the documents, no citations were found. The publication activity corresponds to the requirements of the FRAADB.

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

CONCLUSION:

On the basis of the different research methods learned and applied by the PhD student, the correctly derived experiments, the made generalizations and conclusions, I consider that the presented dissertation meets the requirements of the FRAADB and the Regulations of the Agricultural university – Plovdiv for its application, which gives me the reason to evaluate it as **POSITIVE**.

I take the liberty of suggesting that the Honourable Scientific Jury also vote **POSITIVE** and award **Hristo Shterev Kozarov** the educational and scientific degree "Doctor" in the scientific specialty Viticulture.

Date: 08.07.2026
Plovdiv

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