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OPINION

on a dissertation work for obtaining the educational and scientific degree "Doctor" in area of higher education: 6. Agricultural sciences and veterinary medicine; professional field: 6.1 Plant breeding, the scientific specialty "Genetics"

Author of the dissertation:

Todorka Angelova Srebcheva

Ph.D. student at the Department of "Plant Physiology, Biochemistry and Genetics" at the Agricultural University, Plovdiv

Dissertation topic:

ANALYSIS OF GENES RESPONSIBLE FOR CAPSAICIN SYNTHESIS
IN PEPPER (GENUS CAPSICUM)

By Assoc. Prof. Elena Dimitrova Apostolova-Kuzova, P.h.D., PU "Paisii Hilendarski"; In Area of Higher Education: 4. Natural sciences, Mathematics, and Informatics; Professional Field 4.3. Biological Sciences, Scientific Specialty: Molecular Biology.

Appointed as a member of the scientific jury by order № ПД-16/948, 27.09.2022, by the Rector of AU.

1. Relevance of the problem.

The dissertation topic is highly relevant since pepper is one of the most cultivated vegetables in the world. The diversity of pepper cultivars and forms with different capsaicin contents represents a unique resource that can be used in future selection and breeding programs. Analyzing the genes responsible for the production of capsaicin by the Ph.D. student could help to increase the diversity and identify forms of pepper with different content or lack of capsaicin.

2. Purpose, tasks, hypotheses, and research methods.

The purpose of the dissertation is formulated precisely and clearly, and the set goal naturally follows the planned tasks. The research includes classical and current approaches and analyses, making the work an essential basis for further studies. The Ph.D. student uses terminology precisely, which shows her excellent methodological and practical training.

3. Visualization and presentation of the obtained results.

The published dissertation work represents severe scientific work in the field of classical and modern genetic plant breeding. The presentation of the results is accurate and logical, being shown in a synthesized form with the help of 47 figures and 11 tables. They are suitable for a more complete and comprehensive presentation of a large volume of information. The approach to visualization is also balanced.

4. Discussion of the results and used literature.

The dissertation covers 131 pages, of which 36 are part of the Results and Discussion chapter, citing 267 literary sources (all in Latin). The main burden of the dissertation work is the chapter "Results and Discussion." It presents the results of the established alleles of the Pun1 gene in the parental forms of pepper. Directed crosses were made between the selected parental forms. The inheritance of the hot trait in F1 and F2 was studied. The next step was to screen for additional loci affecting capsaicin and follow the relationship between genetic affiliation and capsaicin biosynthesis in the individual parental forms, F1, and F2. The work ends with conclusions (8 in number), where the established trends of the search are summarized, which fully correspond to the added goal and task. The essence and credibility of the results on which the conclusions are based are unquestionable. The doctoral student was sufficiently precise in the laboratory work and analyzing and processing the results.

5. Contributions from the dissertation work.

The contributions presented in the dissertation are original and derive directly from the fulfillment of the purpose and tasks of the research. The doctoral student has formulated a total of 9 contributions, of which 5 have a purely scientific-theoretical nature, and 4 have a scientific-applied aspect. The current dissertation work is based on elucidating the functioning mechanisms of regulation of capsaicin levels by revealing the level and mode of functioning of the alleles of the AT3 gene present in the Bulgarian selection, as well as the presence in at least part of the samples of functional alleles of the second, epistatic gene. The results provide a basis for developing future selection programs by applying marker-assisted selection.

6. Critical Notes and Questions.

I have no critical remarks or recommendations for the Ph.D. student! In the preliminary discussion of the dissertation work, I made some notes and opinions about the thesis. They have been taken into account in the final shaping of the dissertation, and corrections have been made.

7. Published articles and citations.

A total of 4 co-authored articles have been published in the dissertation. In authors' collectives, the Ph.D. student is always first. The necessary steps have been taken to popularize the scientific-applied and applied contributions of the dissertation work. The presented abstract objectively reflects the structure and content of the dissertation work.

CONCLUSION:

Based on the various research methods learned and applied by the Ph.D. student, the correctly performed experiments, and the conclusions made, I believe that the presented dissertation meets the requirements of the ZRASRB and the Regulations of the Agrarian University for its application, which gives me a reason to evaluate it **POSITIVE**.

All this gives me a reason to confidently recommend to the respected Scientific Jury appointed by the Rector of AU to vote **positively** and award **Todorka Angelova Srebcheva** the educational and scientific degree "Doctor" in the scientific specialty "Genetics".

Date: 06/11/2022
Plovdiv

Prepared the opinion:.....
(Assoc. Prof. Elena Apostolova-Kuzova, PhD)