

## OPINION

by **Prof. Magdalen Dimitrov Zlatanov, Ph.D.**

of a dissertation for the award of the educational and scientific degree "**Doctor**"  
Higher education field 4. Natural sciences, mathematics and informatics;  
Professional field 4.2. Chemical sciences;  
Doctoral program: Technology of animal and vegetable fats, soaps, essential oils and perfumery and cosmetics

**Author:** Liliya Stoyanova Stoyanova

**Topic:** Impact of organic production on the composition of tobacco seeds and the potential applications of glyceride oil

**Scientific supervisor:** Assoc. Prof. Maria Angelova-Romova, PhD, University of Plovdiv "Paisiy Hilendarski" (PU)

### 1. General presentation of the procedure

By order №. RD-21-2253/05.12.2024 of the Rector of the University of Plovdiv "Paisii Hilendarski" (PU), I have been appointed as a member of the scientific jury for ensuring a procedure for the defense of a dissertation on the topic " Impact of organic production on the composition of tobacco seeds and the potential applications of glyceride oil" for the acquisition of the educational and scientific degree "Doctor" in the field of higher education 4. Natural sciences, mathematics and informatics, professional direction 4.2. Chemical sciences, doctoral program "Technology of animal and vegetable fats, soaps, essential oils and perfumery and cosmetic preparations". The author of the dissertation is Liliya Stoyanova Stoyanova – a full-time doctoral student at the Department of Chemical Technology with scientific supervisor Assoc. Prof. Maria Angelova-Romova, PhD, University of Plovdiv "Paisii Hilendarski".

The set of materials submitted by the doctoral student on paper is in accordance with Art. 36 (1) of the Regulations for the Development of the Academic Staff of the University of Plovdiv, and includes all the necessary documents.

Liliya Stoyanova obtained in 2008 a Bachelor's degree in Biological Faculty – University of Plovdiv, in 2011 – a Master's degree at the University of Food Chemistry, in 2014 - Master's degree as chemist. From 2008 she works as teacher of biology, from 2011 to 2018 was dental assistant. In 2019 works in Accreditive laboratory for examination to Institute of tobacco.

The presented doctoral thesis for obtaining scientific degree PhD is in volume 171 p. and include: Literature survey – 30 p., Materials and methods – 30 p., Results and Discussion – 66 p.,

Conclusion, Scientific and applied activity. The bibliography contains 172 references, 161 in latinic.

The dissertation work contains 35 tables, 42 figures and 2 schemas.

## **2. Actuality of the investigation in the doctoral thesis problem in scientific and scientific-applied attitude**

In the doctoral thesis was considered the topical in scientific and applied character for Bulgaria problem of investigation the composition of bulgarian tobacco and tobacco materials, mainly tobacco seeds, which are rich in glyceride oil. The seeds can be used for recovery of the oil for technical and cosmetic purposes.

## **3. Degree of cognoscibility of the problem and literature material**

In the literature, the story of use of the tobacco seeds from Bulgarian and foreign sorts detailed were described. Data about botanic characteristic of the tobacco plants, qualitative and quantitative composition of the seed glyceride oils were reported, the properties of the main individual components, the application were also considered.

In the conclusion was noted that are not data about properties and application of the investigated seeds, produced by organic methods, availability of data about physicochemical characteristics and consumer properties, changes during storage.

The final conclusion is that the oils are perspective material for produce of valuable products for cosmetics.

On the base of the conclusion were formulated the main goals, as well as: influence of organic production on about physicochemical characteristics of the vegetal oil and possibilities for use in practice. For decide of them, comparative investigations of the chemical composition of the seeds and oils, optimization of the techniques for recovery of the oils, possibilities for application have to make.

## **4. Correspondence between methods of investigations and the aims of the doctoral thesis**

Detailed information for origin of the investigated plants and seeds was presented. The seeds from two follower ages produced in Institute of tobacco were used for examination. Modern analytical spectrophotometric methods, gas and liquid chromatography methods, as well as respective units were used. The investigations were provided in laboratories in departments “Chemical Technology” of University of Plovdiv; Laboratories in Institute of tobacco. The analytical methods and technological investigations were described.

**5. In section n Results and Discussion** were comment the experimental results and conclusions

Mineral composition, content of phenolic compounds and antioxidant activity of seed extracts, lipid composition of the oils, recovered from the seeds, from organically and conventionally produced Bulgarian tobacco varieties were investigated. The content and composition of the biologically active substances – fatty acids, phospholipids, sterols, tocopherols, antioxidant activity, cholesterolemic, atherogenic and thrombogenic indexes were established.

Technique for recovery of the oil by maceration and ultrasound with an extractant n-hexane: acetone was optimized.

It has been found that organically produced tobacco seeds and the glyceride oil obtained from them have a higher content of biologically active substances – phospholipids, tocopherols, and polyphenolic compounds.

Waste, unsuitable for sowing, tobacco seeds have been found to be a valuable source of glyceride oil and energy. They have an identical chemical and lipid composition to usable tobacco seeds and can also be successfully used as raw material for obtaining of oil.

Tobacco oil has been found to be a suitable ingredient for the preparation of moisturizing cosmetic products. A recipe has been developed for the preparation of emulsion cream based on tobacco oil. On the base of the results from investigations were formulate the correspondence conclusions.

## **6. Contributions of the doctoral thesis**

### **Scientific-applied contributions**

- For the first time, the chemical composition of seeds from a Bulgarian variety of tobacco, grown in organic production conditions, was investigated.

- For the first time, a study has been conducted on the total content of phenolic compounds and antioxidant activity of seed extracts, meal and oil from organically and conventionally produced Bulgarian tobacco varieties.

- For the first time, the chemical and lipid composition of waste tobacco seeds unfit for sowing has been studied in detail. The possibility of fully utilizing waste tobacco seeds for the production of glyceride oil, fiber and natural antioxidants has been proven.

### **Applied contributions**

- Various techniques have been used for the extraction of glyceride oil from tobacco seeds. It has been found that oil extraction by maceration and ultrasound with an extractant n-hexane: acetone are fast and affordable methods for oil extraction.

- A method for extracting glyceride tobacco oil with a high content of tocopherols has been proposed – maceration and ultrasound extraction with an extractant ethyl acetate.

- A recipe has been developed for the preparation of an emulsion cream based on natural ingredients, containing tobacco oil and lemongrass essential oil as a natural preservative.

## 7. The valuation of the referate

The referate is in volume 38 pages and include all of main parts of the doctoral thesis, as well as list with publication and cites. The results from investigations are presented by 30 tables and 20 figures. The conclusion from literature survey, the aims and the methods for investigations are presented also. The scientific and the scientific-applied contributions on the base of the results and the possibilities for their application are described.

## CONCLUSION

The documents and materials submitted by Liliya Stoyanova Stoyanova meet all the requirements of the Law for Development of the Academic Staff in Republic of Bulgaria (ZRASRB), the Regulation for implementation of ZRASRB and the respective Regulation of Chemical Faculty to Plovdiv University.

The scientific value of the doctoral thesis, which include investigation of the different factors on the conventional and organic methods for growing of the plants, on the lipid composition of the tobacco seeds and glyceride oils, possibilities of application of the glyceride oil are corresponded to the requirements for ONS “Doctor”. The candidate has a submitted a sufficient number of scientific papers, published the materials used in the defence of ONS “Doctor”. In the works of the candidate there are original scientific and scientifically applied contributions, which have received recognition as a representative part of them were published in scientific journals by national academic publishers and presented at international scientific conferences

In this regard, I confidently give a positive assessment to the doctoral thesis and recommend to the Honorable Scientific Jury to prepare a report-proposal to the Faculty Council at of the University of Plovdiv, **for the election of Liliya Stoyanova Stoyanova, to the academic degree PhD**, Higher education field - 4. Natural science, mathematics, and informatics; Professional field - 4.2. Chemical sciences; Doctoral Program - Technology of animal and vegetable fats, soaps, essential oils and perfumery - cosmetic preparaties.

10.01.2025

Reviewer:

(Prof. M. Zlatanov PhD)