

**ANNOTATION OF THE MATERIALS UNDER ART. 65 OF THE
REGULATIONS FOR DEVELOPMENT OF THE ACADEMIC STAFF OF
THE UNIVERSITY OF PLOVDIV “PAISII HILENDARSKI”**

**presented by Ch. Assist. Prof. Olga Tencheva Teneva, PhD
in connection with participation in the announced in SG, no. 96 of 11.11.2025, competition
for the occupation of an academic position “Associate Professor” in the field of higher
education 4. Natural sciences, mathematics and informatics,
professional direction 4.2. Chemical Sciences (Organic Chemical Technology)**

For participation in the competition are presented **17** scientific papers - **16** publications and **1** chapter book. These materials are not the same as the previous used for occupation of academic position “Chief Assistant Professor” and for graduating PhD and is in accordance to the National minimal requirements in the Academic Staff Register. There are **5** publications that meet the requirements under indicator B (B4), and the remaining **12** – under indicator Γ (Γ7 and Γ8).

I. ANNOTATIONS OF THE PUBLICATIONS UNDER INDICATOR B4.

B4.1

Teneva, O.; Petkova, Z.; Toshev, N.; Solakov, N.; Loginovska, K.; Platov, Y. Effect of roasting on the chemical and lipid composition of pine nuts in two regions in Russia. *Heliyon* **2024**, 10(14). <https://doi.org/10.1016/j.heliyon.2024.e34576>

2024			
WOS	IF	Scopus	SJR
Q1	3.6	Q1	0.644

Abstract: The impact of thermal treatment for roasting on pine nuts from two geographical regions in Russia (Vladivostok and Baikal) was studied. They were roasted at 180 °C for 20 min in an oven. The aim was to establish the changes that occurred in the chemical (proteins, lipids, carbohydrates, ash, fibers), lipid composition (fatty acids, tocopherols, sterols, phospholipids), and physicochemical characteristics (peroxide value, acid value, iodine value, conjugated dienes and

trienes) after roasting of the pine nuts. The results showed that the composition of the raw and roasted nuts differed ($p < 0.05$). Significant differences ($p < 0.05$) were observed in the oxidative stability of raw and roasted nuts from Baikal and, the content of unsaponifiable matter and sterols in the nut oil from Vladivostok. The roasting process influences the isolated oils from pine nuts as the chemical and lipid composition changes of oils from Baikal are significant ($p < 0.05$). Both raw and roasted pine nuts have high energy value, protein content, and good health benefits and can be consumed either way. Overall, it was established that the roasting of pine nuts had little impact on their lipid composition; the nuts could also be a source of lipid-soluble bioactive components and might have health-promoting effects.

B4.2

Teneva, O.; Petkova, Z.; Antova, G.; Angelova-Romova, M.; Stoyanov, P.; Todorov, K.; Mladenova, T.; Radoukova, T.; Mladenov, R.; Petkov, V.; Bivolarska, A.; Gyuzeleva, D. Chemical Composition and Lipid Bioactive Components of *Centaurea thracica* Dwelling in Bulgaria. *Molecules* **2024**, 29(14), 3282. <https://doi.org/10.3390/molecules29143282>

2024			
WOS	IF	Scopus	SJR
Q2	4.6	Q1	0.865

Abstract: *Centaurea thracica* (Janka) Hayek is a plant common in southern Bulgaria. The inflorescences were collected during June and September 2021, while their seeds were obtained in September 2021. The chemical and lipid composition of the inflorescences during the vegetation process of the plant were established. A significant decrease in total proteins (from 8.7 to 7.4%), glyceride oils (2.0-1.7%), and ash (4.5-4.2%) content was observed, while the amount of carbohydrates (72.3-77.2%) and fibers (28.7-35.8%) increased. During the vegetation of the plant, the content of oleic and linoleic acids increased up to 2-3 times, while the level of palmitic acid decreased. The lipids from the seeds were rich in oleic (53.0%) and palmitic (36.2%) acids. The tocopherol content in the oils of the inflorescences during vegetation increased from 58 to 110 mg/kg, and the content in the oil from the seeds was 260 mg/kg. The phospholipid content decreased during vegetation, and differences were observed in the composition between the

inflorescences and the seeds. The high content of oleic acid, linoleic acid, tocopherols, and phospholipids determine the nutritional and biological value of the oils isolated from *C. thracica*, and contribute to their potential use in various directions.

B4.3

Teneva, O.; Petkova, Z.; Dobрева, A.; Dzhurmanski, A.; Stoyanova, L.; Angelova-Romova, M. *Centaurea benedicta* - A Potential Source of Nutrients and Bioactive Components. *Plants* **2024**, 13(24), 3579. <https://doi.org/10.3390/plants13243579>

2024			
WOS	IF	Scopus	SJR
Q1	4.1	Q1	0.888

Abstract: The Asteraceae family is a large plant family, with over 1600 genera and 25,000 species, most of which are generally herbaceous plants. This family's members are widely used in the human diet and medicine. One of the most popular representatives is *Centaurea benedicta* L., known as 'Blessed Thistle'. It is a famous plant in the herbal world with some medical benefits, such as strong antioxidant and antidepressant effects, with antibacterial and antiseptic properties, a stimulant of appetite, with a good effect on the liver and the secretion of bile juices, etc. Therefore, this work aimed to fully characterize the chemical composition of the seeds of *C. benedicta* introduced in Bulgaria, some of the physicochemical characteristics, as well as the biologically active compounds. The main nutrient in the chemical composition was carbohydrates (68.5%), and half of their quantity was occupied by fibers (32.2%). Total proteins accounted for 16.4%, and the glyceride oil content was rather low - about 11.0%. The main fatty acids identified in the seed oil were linoleic (72.1%) and oleic acids (18.1%), and the amount of the polyunsaturated ones predominated (73.0%). The main lipidsoluble bioactive components were sterols (0.9%), phospholipids (1.9%), and tocopherols (492 mg/kg). β -Sitosterol (59.5%) and stigmasterol (19.4%) were the main sterols, and α -tocopherol (472 mg/kg) predominated in the tocopherol fraction. The major phospholipids were phosphatidylethanolamine (45.4%), followed by phosphatidylinositol (37.1%) and phosphatidylcholine (6.1%).

B4.4

Teneva, O.; Petkova, Z.; Dobрева, A.; Dzhurmanski, A.; Antova, G. Evaluation of the Proximate Composition of *Amsonia tabernaemontana* Walt. Seeds and Glyceride Oil. *Molecules* **2025**, 30(2), 408. <https://doi.org/10.3390/molecules30020408>

2024			
WOS	IF	Scopus	SJR
Q2	4.6	Q1	0.865

Abstract: The genus *Amsonia*, a member of the Apocynaceae family, comprises plants with notable medicinal benefits. In 2022 and 2023, *Amsonia tabernaemontana* Walt. Seeds introduced to Bulgaria were collected and analyzed. Given the limited information available on the chemical composition of *A. tabernaemontana*, this study aimed to evaluate the phytochemical profile of the plant seeds collected over two consecutive years. Although members of the genus *Amsonia* are not conventional oilseed crops, the glyceride oil content was 7.8% and 11.1% in the respective samples. The chemical composition was meticulously analyzed, revealing carbohydrates in the largest amounts (60.4% and 61.3%), with crude fibers at 18.3% and 24.8%, and protein content at 19.5% and 13.0%. The amounts of ash and moisture content were also quantified. Additionally, the fatty acids, sterols, tocopherols, and phospholipids of the seed oil were examined. β -Sitosterol emerged as the main component in both harvests. The total tocopherol content was relatively low (52.7 mg/kg vs. 20.0 mg/kg), with α -tocopherol being predominant. Phosphatidylcholine, phosphatidylinositol, and phosphatidylethanolamine were identified as the principal components of the phospholipid fraction. The fatty acid composition primarily included linoleic (61.0 and 61.2%) and oleic acids (28.7 and 28.6%).

B4.5

Teneva, O.; Petkova, Z.; Angelova-Romova, M.; Antova, G. Bioactive Lipid Compounds and Nutritional Potential of Glyceride Oils from Flower Buds and Fruits of *Lagerstroemia indica* L. Cultivar ‘Hopi’ Grown in Bulgaria. *Foods* **2025**, 14, 1449. <https://doi.org/10.3390/foods14091449>

2024			
WOS	IF	Scopus	SJR
Q1	5.1	Q1	1.021

Abstract: This study explored the bioactive lipid compounds and assessed the nutritional potential of glyceride oils extracted from flower buds and fruits of *Lagerstroemia indica* L. cultivar ‘Hopi’ grown in Bulgaria. The study focused on chemical composition, fatty acid composition, and the content of biologically active compounds of the oils. The results indicated relatively higher levels of glyceride oil in fruits (F), 14.8%, compared to flower buds (FB), 3.3%. A similar trend was observed for protein content - 15.7% (F) vs. 8.7% (FB). Total sterol and phospholipid content was higher in the FB than in the F. The primary components of sterol composition were β -sitosterol and campesterol. The main individual phospholipid classes were phosphatidylinositol and phosphatidylcholine in both oils. Linoleic acid was the predominant component (77.3% in the oil from the FB vs. 86.0% in the oil from the F), followed by comparable quantities of oleic acid. Palmitic acid was the main saturated fatty acid. To evaluate the therapeutic effect of isolated glyceride oils, the following indices were measured: index of atherogenicity, thrombogenicity, and hypocholesterolemic/hypercholesterolemic ratio. The study sought to compare the levels of glyceride oil, protein content, total sterol and phospholipid content, and to identify the main components of fatty acids, sterols, and phospholipids in the flower buds and fruits and their oils of *L. indica* cultivar ‘Hopi’.

II. ANNOTATIONS OF THE PUBLICATIONS UNDER INDICATOR I.

I7.1

Ivanova, P.; Petrov, P.B.; Gerzilov, V.; Keranova, N.; Petkova, Z.; **Teneva, O.**; Antova, G.; Hristakieva, P.; Penchev, I.G. Effect of flaxseed oil supplemented diets on growth performance and meat quality traits in broilers. *Bulgar. J. Agric. Sci.* **2022**, 28(Suppl. 1), 101–110.

2022			
WOS	IF	Scopus	SJR
-	0.4	Q3	0.216

Abstract: The aim of the present study was to determine the effect of two flaxseed oil levels in the diet of male Ross 308 broilers on the growth performance, feed consumption, slaughter analysis, meat quality, chemical and fatty acid composition of breast and thigh muscles. A total of 180 one-day-old broiler chicks were weighed individually, randomly distributed in 3 groups (n=60 birds in each group; 4 replicates × 15 birds per replicate) and fed to 42 days of age with following diets containing: first group (G1) – 0%; second group (G2) – 1.5% and third group (G3) – 3.0% flaxseed oil. At the end of the experiment, chickens attained average body weight of 2485 ± 49 g (G1), 2500 ± 49 g (G2) and 2551 ± 47 g (G3) without statistically significant differences – P > 0.05. Feed conversion ratio (FCR) for all periods was 1.74 kg/kg (G1), 1.58 kg/kg (G2) and 1.57 kg/kg (G3). Higher water-holding capacity (WHC) was found for breast fillet in G1 and G2 compared to G3 – P < 0.05, and for thigh muscle in G1 and G3 compared to G2 – P < 0.05. No differences between the groups were found with regard to the tenderness of the meat – P > 0.05. With regard to fatty acids, with increasing the amount of flaxseed oil in the diet, the content of oleic, palmitic and palmitoleic acids in the breast fillet decreased while the quantity of linoleic and linolenic acids increased drastically – from 4.60 ± 0.81 (G1) to 5.80 ± 0.87 (G2) and to 13.27 ± 0.15 (G3), and from 0.07 ± 0.03 (G1) to 0.80 ± 0.23 (G2) and to 6.77 ± 0.55 (G3). The tendency of changes in fatty acids in thigh meat was similar – palmitic and palmitoleic acids decreased, and linoleic and linolenic acids increased dramatically – from 6.47 ± 0.03 (G1) to 10.20 ± 0.12 (G2) and to 11.23 ± 1.59 (G3), from 0.10 ± 0.06 (G1) to 2.60 ± 0.23 (G2) and to 5.67 ± 1.13 (G3). The addition of flaxseed oil in the diet decreased the amount of SFA, increased UFA, and PUFA in particular, which once again was due to the increased content of linoleic and linolenic acid in the lipids. The diet supplemented with 3.0% flaxseed oil showed the highest influence on the lipid composition of the broiler’s meat.

Γ7.2

Petkova, Z.; Teneva, O.; Antova, G.; Angelova-Romova, M.; Gecheva, G.; Dimitrova-Dyulgerova, I. Chemical Composition, Lipid-Soluble Bioactive Compounds and Potential Health Benefits of the Moss *Hypnum cupressiforme* Hedw. *Plants* **2023**, 12(24), 4190. <https://doi.org/10.3390/plants12244190>

2023			
WOS	IF	Scopus	SJR
Q1	4.0	Q1	0.795

Abstract: *Hypnum cupressiforme Hedw.* is the main species for Moss surveys (ICP Vegetation programme) in Southeastern Europe and is widely distributed in the region. In addition to their biomonitoring role, mosses are applied in some countries as a traditional medicine for the treatment of eczema, cuts, burns, eye diseases, etc. Therefore, the chemical and lipid composition of the moss *H. cupressiforme* is of interest to establish their possible application in different fields. The chemical composition of the moss was examined regarding total lipids, proteins, carbohydrates (i.e., fibres), ash, and moisture content. The main lipid-soluble bioactive components were determined as sterols, tocopherols, phospholipids and fatty acids. The major fatty acids were linoleic (14.9%), oleic (13.8%), palmitic (12.5%) and α -linolenic (11.3%) acids. Unsaturated fatty acids (56.4%) prevailed in the glyceride oil, in which the polyunsaturated ones constituted 32.5%. The lipid indices (atherogenicity, thrombogenicity, hypocholesterolemic/hypercholesterolemic ratio, peroxidability, and oxidation stability index) were also theoretically calculated based on the fatty acid composition of the moss lipids to establish their health benefits and the rate of oxidation. The primary results of this study revealed *H. cupressiforme* to be a promising alternative source of bioactive compounds that could be implemented in supplements with health-promoting effects.

Γ7.3

Andonova, T.; Muhovski, Y.; Apostolova, E.; Naimov, S.; Petkova, Z.; **Teneva, O.**; Antova, G.; Slavov, I.; Dimitrova-Dyulgerova, I. *Koelreuteria paniculata* Seed Oil - A Rich Natural Source of Unsaturated Fatty Acids and Phytocompounds with DNA Protective Potential. *Foods* **2023**, 12(11), 2230. <https://doi.org/10.3390/foods12112230>

2023			
WOS	IF	Scopus	SJR
Q1	4.7	Q1	0.87

Abstract: The present work is focused on the physicochemical characteristics, chemical composition, and some biological activities of *Koelreuteria paniculata* seed oil. The glyceride oil, obtained with a Soxhlet apparatus by extraction with hexane, was characterized by a relatively high oil content (over 20%), and it is defined as a non-drying oil (iodine value - 44 gI₂/100 g) with good oxidative stability (over 50 h). There were identified 11 fatty acids, 6 sterols, 3 tocopherols, and 6 phospholipids, as the last group was reported for the first time. The major components among them were - monounsaturated eicosenoic and oleic acids, β -sitosterol, β -tocopherol, and phosphatidylcholine.

The *in vitro* tests demonstrated DNA protective activity and a lack of cytotoxicity of the oil, data that has been reported for the first time. The *in vitro* MTT test of the oil on HT-29 and PC3 cell lines did not indicate antitumor activity. The seed oil studied contains valuable bio-components, which have proven benefits for human health, and that is why it could be used in food, cosmetic, and pharmaceutical products.

Γ7.4

Gandova, V.; Teneva, O.; Petkova, Z.; Iliev, I.; Stoyanova, A. Lipid Composition and Physicochemical Parameters of Flaxseed Oil (*Linum usitatissimum* L.) from Bulgaria. *Appl. Sci.* **2023**, 13(18), 10141. <https://doi.org/10.3390/app13181014>

2023			
WOS	IF	Scopus	SJR
Q2	2.5	Q2	0.508

Abstract: Flaxseed oil is a prevalent food supplement. On one hand, vegetable oil is used in the food industry and pharmacy due to its health benefits; on the other hand, it has an application as a lubricant oil. The fatty acid composition of the investigated oil was determined as follows: the main fatty acids were α -linolenic (57.5%), oleic (17.5%), linoleic (12.5%), palmitic (6.0%), and stearic acid (4.3%). The content of unsaponifiable matter was 1.4%. The total sterol content was determined (0.5%), with identified β -sitosterol (79.7%) as a main component, followed by stigmasterol. The content of tocopherols was found to be 243 mg/kg. The compound γ -tocopherol predominated (68%) in the tocopherol fraction, followed by γ -tocotrienol (32%). Some

physicochemical indicators were also determined - density, surface tension, and dynamic and kinematic viscosity - at the following temperatures: 20, 30, 40, 50, 60, 70, and 80 °C. The increase in temperature led to a decrease in all indexes and good linear dependence was observed. The determined physicochemical indicators provided information about the stability of flaxseed oil, which is very important considering its use in food and technical products.

Γ7.5

Dushkova, M.; Ivanova, M.; Trublet, L.; Petkova, Z.; **Teneva, O.**; Miteva-Petrova, M.; Desseva, I.; Mihaylova, D. Flux Behaviour, Rejection and Concentration Factors, and Energy Demand during Ultrafiltration of Sweet Buttermilk. *Appl. Sci.* **2023**, 13(6), 3804. <https://doi.org/10.3390/app13063804>

2023			
WOS	IF	Scopus	SJR
Q2	2.5	Q2	0.508

Abstract: This work aimed to study the flux behavior, rejection and concentration factors, and energy demand to establish the optimal conditions during ultrafiltration of sweet buttermilk to produce ice cream. The experiments were conducted with a UF25-PAN membrane at a transmembrane pressure of 0.2, 0.35 and 0.5 MPa, and a volume reduction ratio (VRR) of 2, 3, 4, and 5. Total protein, fat, ash, and dry matter contents, phospholipid composition, and acidity of retentates and permeate were determined. The increase in the VRR led to a decrease in the permeate flux and an increase in the energy demand, rejection, and concentration factors of the main components of sweet buttermilk. The highest values of rejection and concentration factors established for fat were 98.65% and 4.93, respectively. The permeate flux and energy demand increased with the rise in the transmembrane pressure. The total phospholipids increased 2.8 times at VRR 5 compared to the initial buttermilk. The use of VRR 3 gave the best ratio between the permeate flux, the energy demand, and relatively high values of concentration and rejection factors. The use of VRR 5 will enrich the ice cream to the greatest extent to obtain a product with the highest level of biologically active substances (proteins, phospholipids, minerals).

F7.6

Petkova, Z.; Antova, G.; Petrova, M.; Petkova, N.; Petrova, A.; Stoyanova, M.; Angelova-Romova, M.; **Teneva, O.**; Stoilova, T.; Stoyanova, A. Bio-morphological traits, chemical composition, and antioxidant activity of two accessions from sainfoin seeds. *Ind. Crops Prod.* **2024**, *222*, 119784. <https://doi.org/10.1016/j.indcrop.2024.119784>

2024			
WOS	IF	Scopus	SJR
Q1	6.2	Q1	0.974

Abstract: The importance of some underutilized legume crops in creating sustainable bioeconomy is increasing constantly in the 21st century. Apart from the commonly used beans, the most of them are mainly utilized as animal forages. Such crop is sainfoin which has the ability to resist droughts and adapt to a wide range of climatic conditions. Hence, it is substantial to be performed detailed studies on the genetic diversity of the plant as well as to be established the main components derived from the sainfoin seeds. Therefore, the aim of the present study was the examination of the variability of some important bio-morphological traits of two sainfoin accessions – *Onobrychis transcaucasica* Grossh. and *Onobrychis viciifolia* Scop., as well as revealing the chemical composition and antioxidant activity of the seeds. The highest variability for both species was the trait top leaflet width. The amount of glyceride oil, total proteins, carbohydrates (water-soluble sugars, starch and fibers), ash and moisture of the seeds were determined. Total phenolics and flavonoids, as well as their individual content in the sainfoin seeds revealed them as a potent source of bioactive components. The antioxidant activity was examined using four methods based on different mechanisms (2,2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) (ABTS), 2,2- diphenyl-1-picrylhydrazyl (DPPH), ferric reducing antioxidant ability (FRAP) and cupric reducing antioxidant capacity (CUPRAC)).

The results of this study have possibilities for enrichment the information on *ex situ* collection of *O. transcaucasica* and *O. viciifolia* accessions. They could be successfully used in the improvement of breeding programs and the seeds might have possible application for different industrial purposes because of their chemical composition.

Γ7.7

Ivanova, M.; Alinovi, M.; Dushkova, M.; Trublet, L.; Rinaldi, M.; Barbanti, D.; Chiavaro, E.; Petkova, Z.; **Teneva, O.**; Menkov, N. Ultrafiltered Sweet Buttermilk as Additive Replacer in Ice Cream Production. *Foods* **2024**, 13(19), 3134. <https://doi.org/10.3390/foods13193134>

2024			
WOS	IF	Scopus	SJR
Q1	5.1	Q1	1.021

Abstract: Sweet buttermilk, a by-product of butter production, remains highly underutilized despite containing some relevant components (i.e., phospholipids) that may have a high biological value and may exert some positive technological functions. The aim of this study was to investigate the possibility of using ultrafiltered (UF) sweet buttermilk at different volume reduction ratios (3 and 5) to replace emulsifiers and/or stabilizers in the production of a novel clean-label ice cream formulation made with sweet buttermilk-based mixtures. The functional, thermo-rheological, and sensory profile of four types of ice creams was investigated. Increasing the degree of sweet buttermilk concentration positively influenced the overrun values and at the same time improved the ice cream’s resistance to melting. Also, the thermo-rheological profile during melting was influenced by the presence of UF buttermilk. These differences in technological properties were probably partly caused by the different total phospholipids content caused by UF buttermilk. Some sensory properties (i.e., structure, consistency) were positively related to the utilization of UF buttermilk, while aroma and taste were negatively influenced. This study demonstrated that UF buttermilk can be used as an additive replacer in ice cream production because it enhances the structural and rheological properties of the final product.

Γ7.8

Andonova, T.; Petkova, Z.; **Teneva, O.**; Antova, G.; Apostolova, E.; Naimov, S.; Mladenova, T.; Slavov, I.; Dimitrova-Dyulgerova, I. *Ailanthus altissima Seed Oil* - A Valuable Source of Lipid-Soluble Components with DNA Protective and Antiproliferative Activities. *Foods* **2024**, 13(8), 1268. <https://doi.org/10.3390/foods13081268>

2024			
WOS	IF	Scopus	SJR
Q1	5.1	Q1	1.021

Abstract: The present study is focused on the chemical and lipid composition of seed oil of the European ornamental and invasive wood plant *Ailanthus altissima* (Simaroubaceae). Total lipids, proteins, carbohydrates, ash, and moisture in the seeds were determined. A high yield of glyceride oil (30.7%) was found, as well as a high content of fibers (29.6%) and proteins (18.7%). Physicochemical properties of the oil define it as semi-dry (129.4 g I₂/100 g Iodine value) with oxidative stability, refractive index, saponification value, and relative density similar to widely used oils with nutritional value and health benefits. The composition of the seed oil was determined chromatographically. Unsaturated fatty acids (95.3%) predominated in the seed oil, of which linoleic acid (48.6%) and oleic acid (44.8%) were the major ones. The main lipid-soluble bioactive components were β -sitosterol (72.6%), γ -tocopherol (74.6%), phosphatidylinositol (29.5%), and phosphatidic acids (25.7%). The proven *in vitro* DNA-protective ability of seed oil is reported for the first time. The seed oil exhibited a weak antiproliferative effect on HT-29 and PC3 tumor cell lines and showed no cytotoxicity on the BALB/c 3T3 cell line. In brief, the present study reveals that *A. altissima* seed oil can be used as a healthy food.

Γ7.9

Petkova, Z.; **Teneva, O.**; Iliev, I.; Vasilev, T.; Dobрева, K.; Koleva, Y.; Stoyanova, A. Chemical Composition of Commercial Walnut Oil Samples. *J. Environ. Prot. Ecol.* **2024**, 25(5), 1499–1507.

2024			
WOS	IF	Scopus	SJR
-	-	Q4	0.147

Abstract: Walnut oil contains various biologically active substances – fatty acids, tocopherols, sterols and other phytonutrients, which is why it is used in the food industry, being included in the composition of various products, in order to improve their nutritional properties. The subject of the present research is a comparative characterisation of two commercial walnut oil

samples obtained by cold pressing. The content of fatty acids, tocopherols and sterols was determined in the lipid fractions of both oils. The oil of Bulgarian origin primarily contains linoleic (60.8%), linolenic (15.7%), oleic (14.0%), palmitic (6.3%), and stearic acid (2.1%); γ -tocopherol (100%); β -sitosterol (65.9%) and Δ^5 -avenasterol (32.6%). In the oil of Turkish origin, the main fatty acids are linoleic (57.6%), linolenic (15.7%), oleic (8.6%), palmitic (6.6%), and stearic (2.1%), it contains also γ -tocopherol (100%), β -sitosterol (69.9%), Δ^5 -avenasterol (12.0%) and campesterol (9.9%).

Γ7.10

Teneva, O.T.; Petkova, Zh.Y.; Angelova-Romova, M.J.; Antova, G.A. Comparative Study on Chemical and Lipid Composition of Two Varieties of Quinoa Seeds (*Chenopodium quinoa* L.). *Bulg. Chem. Commun.* **2024**, 56(D2), 55–59. <https://doi.org/10.34049/bcc.56.D.S2P35>

2024			
WOS	IF	Scopus	SJR
-	-	Q4	0.148

Abstract: The seeds of two varieties of quinoa (*Chenopodium quinoa* L.), white and black, were analysed for their chemical composition and a detailed study of their lipids was carried out as well. The chemical composition of the seeds was as follows: protein content - 15.7% and 14.5%, lipids - 5.9% and 6.6%, carbohydrates - 65.6% and 64.6%, starch - 40.2% for both varieties, water soluble sugars - 7.2% and 5.5%, and minerals - 2.4% and 2.3%, respectively. The oil content was about 6.0%, but high amounts of biologically active compounds in the seed oils of black quinoa were noted (tocopherols -1102 mg/kg, phospholipids - 7.6% and sterols - 3.4%), while in the seed oils of white quinoa tocopherols were 365mg/kg, phospholipids - 11.9% and sterols - 2.1%. Linoleic and oleic acids dominated in both oils, followed by palmitic and linolenic acid. Unsaturated fatty acids predominated in the lipid fraction where the content of polyunsaturated fatty acids was 53.1% (white quinoa) and 49.4% (black quinoa), followed by monounsaturated fatty acids - 30.7% and 33.5%, respectively. In the tocopherol fraction of the oils the main component was γ -tocopherol, followed by α -tocopherol. The main component of the sterol fraction was β -sitosterol (80.1% and 75.7%). Phospholipids in the seeds of the two varieties of quinoa had

similar composition. Despite some differences in the chemical and lipid composition, these quinoa seeds were established to be a valuable source of proteins, carbohydrates and healthy lipid-soluble bioactive components for human nutrition.

Γ7.11

Marudova, M.; Viraneva, A.; Antova, G.; Nikolova, K.; Petkova, Z.; **Teneva, O.** Physico-Chemical Characterization of Sesame/Rapeseed Oil Mixtures. *Appl. Sci.* **2025**, *15*, 704. <https://doi.org/10.3390/app15020704>

2024			
WOS	IF	Scopus	SJR
Q2	2.5	Q2	0.521

Abstract: The production of edible plant seed oil used in the food industry is increasing globally. More than 75% of lipids in the human diet come from edible vegetable oils. Among them, sesame oil has the highest resistance to oxidation, valuable physiological properties, and a unique flavor and aroma. However, sesame oil is more expensive than rapeseed oil, and often both oils are mixed to reduce costs. In this study, we performed a physical and physico-chemical analysis of sesame oil and sesame/rapeseed oil mixtures (5/95, 10/90, 30/70, 50/50, 70/30 and 90/10 w/w). The investigated oils were characterized based on their fatty acid composition, peroxide value, iodine value, phase transitions, refractive indices, color and UV–Vis adsorption. The fatty acid composition of mixtures made from sesame and rapeseed oils depended on the ratio of the two oils. Increasing the content of sesame oil in the mixtures resulted in a decrease in the levels of oleic and linolenic acids, while the levels of linoleic acid increased. A very good linear correlation was observed between the temperatures and enthalpies of crystallization of the mixtures, which could be used to establish the composition of a mixture between sesame and rapeseed oil. Information about these parameters could increase the possibilities for the commercial use of the investigated oils.

Γ8.1

Merdzhanov, P.; Delchev, N.; **Teneva, O.**; Gochev, V.; Stoyanova, A. Phytochemistry of *Schizandra chinensis* (Turcz.) Baill Cultivated in Bulgaria. In ACS Symposium Series; American Chemical Society: Washington, DC, USA, **2016**; Vol. 1218, pp. 235–245 (**book chapter**)

Abstract: The chemical composition of the oil fruits from of *Schizandra chinensis* (Turcz.) Baill, cultivated in Bulgaria were analyzed using GC and GC/MS. The major constituents (over 3%) of the essential oil (1.65%) were found to be α -himachalene (10.83%), α -ylangene (10.50%), β -himachalene (9.02%), schisandrin (8.23%), β -chamigrene (6.44%) and γ -muurolene (5.52%). The essential oil studied demonstrated antimicrobial activity against Gram-positive and Gram-negative bacteria and yeasts. Oleic acid (80.8%), stearic acid (14.5%) and palmitic acid (4.7%) were the main components in the triacylglycerol fraction (24.6%). In the tocopherol fraction α -tocopherol (96.7 %) predominated, and in sterol fraction: β -sitosterol (91.0%) and campesterol (5.1%).

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Signature:

/Ch. Assist. Prof. Olga Teneva/