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Research Article

Biological activity and nutritional profile of apricot, plum-apricot, and plum fruits

Dasha Mihaylova[1], Galia Gentscheva[2], Nadezhda Petkova-Ognyanova[3], Aneta Popova[4✉], Anton Slavov[3], Svetla Pandova[5]

[1]*Department of Microbiology and Biotechnology, University of Food Technologies, 4002, Plovdiv, Bulgaria*
[2]*Department of Chemistry and Biochemistry, Medical University Pleven, 5800, Pleven, Bulgaria*
[3]*Department of Organic and Inorganic Chemistry, University of Food Technologies, 4002, Plovdiv, Bulgaria*
[4]*Department of Biochemistry and Nutrition, University of Food Technologies, 4002, Plovdiv, Bulgaria*
[5]*Fruit Growing Institute, Agricultural Academy, Department of Breeding and Genetic Resources, 12 Ostromila Str., 4000, Plovdiv, Bulgaria*

Abstract
Fruits have long been recognized as vital sources of nutrition. The "Stendesto" is the only successful hybrid, registered in Bulgaria. It is a product of the "Modesto" apricot and the "Stanley" plum. Despite the widespread popularity of Prunus spp., information regarding its characteristics remains relatively scarce. This study evaluated the total phenolic content, total flavonoid content, total monomeric anthocyanins, and antioxidant capacity (utilizing four contemporary assays) to uncover the biological activity of the three fruits under examination. Additionally, the levels of protein, lipid, and carbohydrates were analysed. Data pertaining to the micro- and macro-elements present in the three fruits were also included. The findings revealed that the antioxidant potential of the fruit extracts containing free phenolic compounds exhibited higher values across all samples analysed compared to those containing bound compounds. The fruits of the "Stendesto" hybrid exhibited traits that are more similar to those of the "Stanley" plum rather than the "Modesto" apricot. The "Stendesto" hybrid is characterized by possessing the highest concentrations of free phenolic compounds, total flavonoids, and total monomeric anthocyanins. This research is considered one of the first studies on plum-apricot hybrids in Bulgaria and aims to expand the existing scientific knowledge base, thereby facilitating future comparisons.

Keywords
bound and free phenolics, proteins, carbohydrates, dietary fibers, mineral composition

Abbreviations
AACC – American Association for Clinical Chemistry; ABTS – 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid; AOAC – Association of Official Analytical Chemists; CUPRAC – Cupric Reducing Antioxidant Capacity; DPPH – 2,2-diphenyl-1-picrylhydrazyl; FRAP – Ferric Reducing Antioxidant Power; HPLC – high-performance liquid chromatography; LOD – limit of detection; RID – refractive index detector; SSC – soluble solid content; TEAC – Trolox Equivalent Antioxidant Capacity; TFC – total flavonoid content; TMAs – total monomeric anthocyanins; TPC – total phenolic content

✉*Corresponding author: Assoc. Prof. Aneta Popova, PhD, Department of Biochemistry and nutrition, Economics Faculty, University of food technologies, 26 Maritza Blvd, Plovdiv, Bulgaria, E-mail: popova_aneta@yahoo.com*

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Introduction

Health-related quality of life is a concept that includes an individual's well-being, shaped by their health condition, mental and social experiences (Glabska et al. 2020; Devirgiliis et al. 2024). In recent decades, it has become increasingly significant that a vital metric in public health, clinical research, and healthcare policy are focused on individuals maintaining a diverse and nutritious diet. Dietary strategies as adjunctive treatments have been extensively explored in the academic literature. Fruits and vegetables are essential components of any diet. They serve as significant sources of vitamins and minerals for the body. Fruits and vegetables are recognized as valuable dietary sources, providing complex carbohydrates, fiber, vitamins, carotenoids, minerals, and polyphenols (Cosme et al. 2022). The consumption of fresh fruits has been shown to improve both mental and physical health, aiding in the prevention of various non-communicable diseases, including neurological disorders, cardiovascular diseases, diabetes mellitus, obesity, osteoarthritis, and certain types of cancer. The Mediterranean diet, for example, has been extensively studied as a healthy dietary model, characterized by a high intake of fruits and vegetables, among other elements, along with distinctive features such as the use of spices, dietary variety and moderation, a preference for locally sourced foods, the encouragement of social dining, and specific culinary practices (Godos et al. 2025; Petkoska et al. 2025). The qualitative and quantitative composition, nutritional value, and consumer acceptability of fruits, in general, differs based on species, cultivar, genotype, maturity stage, agricultural practices, environmental conditions, plant nutrition, soil conditions, and the conditions under which fruits are stored (Faniadis et al. 2010; Rabiee et al. 2025).

Industrialization, interbreeding, and natural changes have significantly contributed to the evolution and vegetative propagation, as they facilitated morpho-functional variations in leaves, flowers, and fruits; additionally, they have enhanced the quality and increased the quantity of existing cultivars through phenotypic plasticity (Cruz et al. 2024). It is estimated that 75% of the genetic diversity of crops was lost during the twentieth century (Ganji et al. 2019). The adaptation of new species will be shaped by agriculture, owing to the challenges that climate change presents to wild plant forms (Wani & Magray 2024). “Stendesto” is created as a hybrid between the 'Stanley' plum and the 'Modesto' apricot, noted for its superior fruit quality. As the sole registered and successful Bulgarian hybrid of its kind, it serves as a primary subject for research into the bioactive compounds, antioxidant properties, physical attributes, and nutritional features of interspecific hybrids.

Prunus fruits have been researched for their possible health advantages attributed to their chemical makeup, particularly the presence of bioactive compounds such as polyphenols and antioxidants (Eslami et al. 2022; Najib & Eftekhari 2023). Moreover, Prunus species (cherries, plums, apricots, and peaches) are greatly valued in the global daily diet because of their remarkable organoleptic characteristics.

At present, there is a deficiency of accessible information regarding the nutritional value of particular fruit varieties, including hybrid fruits. Furthermore, hybrid fruits are seldom subjected to assessments regarding their nutritional or biological value. Therefore, the objective of this research was to assess three types of fruit – one hybrid and its parental varieties – to provide data concerning their biological value (total phenolic content, total flavonoid content, total monomeric anthocyanins, and antioxidant capacity), as well as the levels of protein, lipids, carbohydrates, and the micro- and macro-elements found in the three fruits.

Materials and Methods

Fruit sample collection. Fruits from the "Modesto" (apricot), "Stanley" (plum), and "Stendesto" (plum-apricot) varieties were collected in 2024 after their ripening periods. The “Modesto” apricot exhibited a soluble solid content (SSC) of 16.75±0.49 ºBrix and a firmness rating of 1.2. The “Stendesto” hybrid demonstrated an SSC of 19.00±0.56 ºBrix and a firmness of 1.75±0.07. The “Stanley” plum recorded a SSC of 19.45±0.48 ºBrix along with a firmness of 2.83±0.35. A total of fifty fruits from each variety were gathered from the experimental fields of the Fruit Growing Institute (Plovdiv, Bulgaria) and transported in an air-conditioned vehicle to the University of Food Technologies, where the fruits (including the peel, because of higher nutritional density and lower collection of by-products) underwent further processing. Each piece of fruit was rinsed with tap water, sliced using a ceramic knife, de-pitted, and then subjected to additional processing in accordance with particular analysis. Additionally, twenty extra fruits from each variety were harvested to account for any decay or damage that might occur during or after the harvest.

Protein and lipid analysis. The total nitrogen content was assessed utilizing the Kjeldahl method in accordance with ISO 1871:2009. The protein content was derived by multiplying the nitrogen content by a conversion factor of 6.25, which represents the ratio of nitrogen to protein. The total lipid content was assessed through continuous extraction utilizing a Soxhlet apparatus. Each sample, weighing approximately 4-5 g, was contained within a pre-weighed, oven-dried thimble. The thimbles were secured with staples and positioned in the Soxhlet apparatus, where they underwent extraction for six hours using n-hexane. The resulting extracts were evaporated with a rotary vacuum evaporator (RV 10, Ika, Staufen, Germany), and the remaining residues were subsequently weighed. The findings are presented as g.100 g^{-1}.

Carbohydrates analysis. The levels of sugars and sorbitol were examined utilizing a Shimadzu HPLC system, which comprised an LC-20 AD pump and a Shimadzu RID-10A refractive index detector (RID), as detailed by Mihaylova et al. (2025). The total dietary fiber content (expressed as percentages) was assessed utilizing a K-TDFR-100A (Megazyme, Ireland), in accordance with the AOAC method 991.43 titled "Total, soluble and insoluble dietary fibers in foods" (First action 1991) and the American Association of Cereal Chemistry (AACC) method 32-07.01, which pertains to the "determination of soluble, insoluble and total dietary fibers in foods and food products".

Mineral composition. Trace elements were analyzed using atomic absorption spectrometry in accordance with EN 14082:2003. The levels of potassium, calcium, and magnesium were assessed through atomic absorption spectrometry as per EVS-EN 1134:1996.

Nutritional data. The method of calculation was employed to ascertain the nutritional information derived from the content and energy equivalents of the macronutrients. The results are presented in g.100 g^{-1} for the amounts of proteins, carbohydrates, and fats, and in kcal.100 g^{-1} for the energy content.

Total phenolic content (TPC), total flavonoid content (TFC), total monomeric anthocyanins (TMAs). The procedure for the detection of the TPC, TFC, and TMAs followed the exact description of Mihaylova et al. (2025) with reference to Kujala et al. (2000), Kivrak et al. (2014), and the pH differential method (Lee et al. 2005).

Antioxidant activity. Extracts from both free and bound phenolic samples were analysed to assess their in vitro antioxidant activity using the (1,1-diphenyl-2-picrylhydrazyl ($DPPH^{\bullet}$) radical scavenging assay (Brand-Willams et al. 1995), the 2,2′-azino-bis-(3-ethylbenzothiazoline-6-sulfonic acid) ($ABTS^{\bullet+}$) radical cation decolorization method (Re et al. 1999), the ferric reducing/antioxidants power (FRAP) test (Benzie & Strain 1999), and the cupric ion reducing capacity in the presence of neocuproine (CUPRAC)) (Apak et al. 2004). The antioxidant capacity was quantified as Trolox equivalent antioxidant capacity (TEAC) per gram of fruit dry weight (dw).

Statistical analysis. The results are expressed as mean value ± SD (triplicated) and were statistically analysed using one-way ANOVA along with a Tukey-Kramer post hoc test ($\alpha = 0.05$) through the online application provided by Texas A&M University, USA, as detailed by Assaad et al. (2014).

Results and Discussion

Table 1 provides a summary of the data regarding the levels of polyphenols, flavonoids, and anthocyanins present in the samples under investigation. To conduct a comprehensive assessment of the examined fruits, both free and bound phenolic compounds were extracted. All established results exhibited statistically significant variations. The extraction of bound phenolic compounds was performed using two commonly employed methods that vary in their conditions, specifically alkaline and acid hydrolysis, to determine which method is more appropriate for the fruits studied. Polyphenols serve as the primary antioxidant compounds capable of neutralizing free radicals within the body. Anthocyanins, which are

Table 1. Total phenolic content (TPC), total flavonoid content (TFC,) and total monomeric anthocyanins (TMAs,) of free and bound (insoluble) phenolics fractions of plum-apricot, plum and apricot fruits.

Samples/Analyses	**TPC, mg GAE.g^{-1} dw**	**TFC, µg QE.g^{-1} dw**	**TMAs, µg cyanidin-3-glucoside (C3GE).g^{-1} dw**
"**Stendesto**" plum-apricot			
Free phenolics	23.52±0.75^{a}	5840.7±108.8^{a}	1502.70±24.10^{a}
Alkaline hydrolysis (bound phenolics)	0.72±0.01^{d}	76.5±0.9^{d}	25.61±1.09^{c}
Acid hydrolysis (bound phenolics)	0.40±0.00^{d}	-	-
"**Stanley**" plum			
Free phenolics	19.08±0.58^{b}	1971.96±13.32^{c}	1219.96±34.29^{b}
Alkaline hydrolysis (bound phenolics)	0.61±0.01^{d}	54.04±3.55^{d}	19.71±1.34^{c}
Acid hydrolysis (bound phenolics)	0.50±0.01^{d}	25.37±5.54^{d}	-
"**Modesto**" apricot			
Free phenolics	4.45±0.09^{c}	3277.71±11.79^{b}	-
Alkaline hydrolysis (bound phenolics)	1.01±0.00^{d}	-	-
Acid hydrolysis (bound phenolics)	0.97±0.01^{d}	-	-

*Different letters in the same column show statistically significant differences ($p < 0.05$), as established by ANOVA and the Tukey test.

Anthocyanins, which are the pigments responsible for the blue, purple, and red hues of fruits and vegetables, exhibit various beneficial properties, including antioxidant (Borowiec et al. 2022), anti-inflammatory (Cory et al. 2018), antidiabetic (Aryaeian et al. 2017), anticancer (Singaravelan & Tollefsbol 2025), and neuro- and cardioprotective effects (Iqbal et al. 2023). The reported values for the total polyphenol content in plums show significant variability across different studies. Within the constraints of the employed methods, the "Modesto" apricot was not found to have total monomeric anthocyanins in any of the prepared extracts. Alkaline hydrolysis was more effective in extracting the bound phenolics present in both plum and plum-apricot when compared to acid hydrolysis. Nevertheless, the free phenolic fractions were found to be higher in all three fruits examined. The "Stendesto" hybrid is noted for having the highest levels of free phenolic compounds, total flavonoids, and total monomeric anthocyanins. The current data represent the first findings related to hybrid fruits, which will enhance the existing scientific knowledge and facilitate future comparisons. The total flavonoid content has been measured to range from 3.12 to 20.63 mg QE.g^{-1} (Ali et al. 2022), further demonstrating that factors such as variety, cultivation conditions, and extraction methods influence the yield of biologically active compounds. Liaudanskas et al. (2020) indicated that flavonols make up 25.8% of the total phenolic content in the "Stanley" plum variety. Vlaic et al. (2018) reported values ranging from 5.56 to 261.93 mg CE.100 g^{-1} (TMAs) for the "Stanley" plum variety. The literature data align with the findings of the current study regarding the TPC, TFC, and TMAs of "Stanley" plum fruits.

In a similar vein, when examining apricot fruits, the reported data on TPC and total flavonoids vary widely; for instance, ultrasonic extraction yields a TPC of approximately 165.49 mg GAE.100 g^{-1} DM (Bousselma et al. 2023). Other researchers discovered TPC values ranging from 4233.70 to 8180.49 mg of GAE per 100 g DM for various apricot varieties cultivated in Turkey, Pakistan, and Chile (Vega-Galvez et al. 2019). A greater degree of similarity is noted between the plum-apricot hybrid and the plum than between the plum-apricot hybrid and other varieties. The antioxidant capacity (Table 2) of fruit extracts containing free phenolic compounds exhibits higher values for all examined samples in comparison to those of bound phenolic extracts. The ABTS method proved to be more effective for the extraction of free phenolics in comparison to the bound one.

Table 2. *In vitro* antioxidant activity of free and bound phenolics (DPPH, ABTS, FRAP, CUPRAC) of free and bound (insoluble) phenolics fractions of plum-apricot, plum and apricot fruits.

Samples/Analyses	**DPPH, µM TE/g dw**	**ABTS, µM TE/g dw**	**FRAP, µM TE/g dw**	**CUPRAC, µM TE/g dw**
"**Stendesto**" plum-apricot				
Free phenolics	58.86±1.46^{a}	340.27±1.54^{a}	173.77±2.60^{a}	260.16±4.49^{a}
Alkaline hydrolysis (bound phenolics)	1.79±0.01^{d}	10.14±1.82^{d}	4.16±0.08^{d}	7.52±0.19^{d}
Acid hydrolysis (bound phenolics)	1.03±0.03^{d}	8.15±0.45^{d}	1.07±0.02^{d}	5.07±0.07^{d}
"**Stanley**" plum				
Free phenolics	52.78±0.58^{b}	239.50±4.90^{b}	136.57±6.73^{b}	191.85±1.65^{b}
Alkaline hydrolysis (bound phenolics)	1.517±0.026^{d}	< LOD	2.77±0.05^{d}	5.65±0.34^{d}
Acid hydrolysis (bound phenolics)	1.146±0.036^{d}	< LOD	2.81±0.04^{d}	5.92±0.25^{d}
"**Modesto**" apricot				
Free phenolics	12.98±0.06^{c}	64.20±0.39^{c}	33.96±0.16^{c}	55.31±0.63^{c}
Alkaline hydrolysis (bound phenolics)	0.54±0.06^{d}	< LOD	2.98±0.06^{d}	6.48±0.03^{d}
Acid hydrolysis (bound phenolics)	0.35±0.02^{d}	< LOD	2.32±0.08^{d}	5.40±0.25^{d}

LOD – limit of detection. Different letters in the same column show statistically significant differences ($p < 0.05$), as established by ANOVA and the Tukey test.

The CUPRAC method yielded the highest values for all three fruits examined across all extraction methods utilized. The "Stendesto" hybrid fruit displayed characteristics that were more akin to the "Stanley" plum than to the "Modesto" apricot. The current findings provide new comprehensive data that will enhance the existing literature. The literature contains information regarding the antioxidant properties of the "Stanley" plum variety, with various authors documenting findings related to juices, peels, and fruits. However, there is a lack of data concerning extracts of free and bound phenolic compounds, as well as evaluations using multiple methods to assess antioxidant potential. Miletić et al. (2012) examined the antioxidant potential of the "Stanley" plum variety and did not observe any significant trends throughout the fruit's development. Additionally, while there is information available on the antioxidant potential of apricots, the variety "Modesto" has not been investigated. Nevertheless, the FRAP method has reported high values for other varieties (Iordanescu et al. 2018).

Mineral elements play a crucial role in the metabolism of plants. They can be categorized into macro-elements and micro-elements based on their functions. In this context, fruits are regarded as the primary source of minerals. Table 3 presents the information regarding the mineral content found in the fruits of the varieties that were studied.

Potassium, calcium, and magnesium were the three elements most abundantly found in the fruits. The "Stendesto" hybrid successfully incorporated all characteristics found in both the plum and apricot, exhibiting values that surpass those of the plum yet remain below those of the apricot. All examined varieties may constitute a minor portion of the daily intake of Fe, while Fe and Zn, as vital microelements, are distributed unevenly across the various types. Iron is the most prevalent element found in apricot fruits. Among the macro-element potassium is clearly the most dominant in all examined varieties. The daily intake of magnesium ranges from 3.5 to 6.0 mg.kg^{-1} depending on the age group, indicating that all studied samples can make a relatively significant contribution to the daily intake of Mg. Minerals play a crucial role in the healthy development of the skeletal system, the prevention of diseases, and overall well-being (Martiniakova et al. 2022). Potassium, iron, magnesium, and copper are minerals that are supplied in the typical diet through the consumption of fruit, which constitutes more than 5% of the overall intake (Rejman et al. 2021).

Table 3. Mineral content of plum-apricot, plum and apricot fruits

Sample/mineral, mg.kg^{-1}	"Stendesto"	"Stanley"	"Modesto"
K	13772±835^{ab}	12274±632^{b}	15251±1003^{a}
Ca	654±28^{b}	478±15^{c}	1058±38^{a}
Mg	523±12^{b}	473±10^{c}	711±28^{a}
Na	35.3±2.6^{b}	33.5±2.1^{b}	46.4±3.2^{a}
Fe	12.2±0.42^{b}	7.11±0.5^{c}	21.5±0.62^{a}
Cu	4.55±0.2^{b}	4.07±0.22^{b}	8.02±0.42^{a}
Zn	2.7±0.2^{b}	3.28±0.23^{b}	15.6±0.9^{a}
Mn	2.78±0.07^{c}	11.0±0.23^{a}	5.84±0.15^{b}
Co	0.91±0.06^{b}	1.15±0.07^{a}	1.04±0.06^{ab}
Ni	1.7±0.06^{b}	1.45±0.05^{b}	3.0±0.25^{a}
Cr	0.60±0.05^{ab}	0.50±0.05^{b}	0.65±0.04^{a}

*Different letters in the same row show statistically significant differences ($p < 0.05$), as established by ANOVA and the Tukey test.

Table 4 displays the information regarding the content of protein, lipids, and carbohydrates. The total carbohydrate content varied between 9.63 ± 0.32 ("Stendesto" hybrid) and 15.11 ± 0.55g.100g^{-1} ("Stanley" plum). Glucose, fructose, sorbitol, and sucrose were the predominant sugars found in the plum, whereas the hybrid fruit displayed the least sugar content, except for sorbitol, in which case the apricot recorded the lowest levels. In general, the total lipid content ranged from 0.08 ± 0.001 ("Modesto" apricot) to 0.28 ± 0.02 g.100 g^{-1} ("Stendesto" hybrid). Additionally, the total protein content showed variations across the different fruits examined.

The overall dietary fiber content of the samples examined was assessed, along with a more detailed analysis of both insoluble and soluble dietary fiber (Table 5). The values acquired for total dietary fiber vary from 19.83 ± 1.78% ("Stendesto") to 22.81 ± 1.12% ("Stanley"). The lowest percentage was recorded for the plum-apricot hybrid.

Table 4. Carbohydrates, total lipids and total proteins content of plum-apricot (“Stendesto”), plum (“Stanley”) and apricot (“Modesto”) fruits

Parameter/Samples, g.100 g^{-1}	“Stendesto”	“Stanley”	“Modesto”
Sucrose	1.11 ± 0.03^{c}	2.12 ± 0.11^{a}	1.91 ± 0.05^{b}
Glucose	1.19 ± 0.05^{c}	3.60 ± 0.14^{a}	1.72 ± 0.13^{b}
Fructose	0.29 ± 0.01^{b}	0.94 ± 0.05^{a}	0.22 ± 0.07^{b}
Sorbitol	0.92 ± 0.01^{b}	2.23 ± 0.12^{a}	0.11 ± 0.01^{c}
Total sugars	2.59 ± 0.04^{c}	6.66 ± 0.09^{a}	3.85 ± 0.12^{b}
Total carbohydrates	8.56 ± 0.25^{c}	15.11 ± 0.55^{a}	9.63 ± 0.32^{b}
Total lipids	0.28 ± 0.02^{a}	0.15 ± 0.07^{b}	0.08 ± 0.001^{b}
Total protein	0.73 ± 0.06^{b}	1.04 ± 0.06^{b}	1.79 ± 0.43^{a}

*Different letters in the same row show statistically significant differences ($p < 0.05$), as established by ANOVA and the Tukey test.

Table 5. Dietary fiber content in the studied plum-apricot (“Stendesto”). plum (“Stanley”) and apricot (“Modesto”) fruits.

Sample/parameter	Total dietary fibers, %	Insoluble dietary fibers, %	Soluble dietary fibers, %
“**Stendesto**”	19.83 ± 1.78^{a}	14.78 ± 1.84^{a}	5.05 ± 1.12^{a}
“**Stanley**”	22.81 ± 1.12^{a}	16.74 ± 1.35^{a}	6.07 ± 1.17^{a}
“**Modesto**”	20.98 ± 1.62^{a}	15.00 ± 1.06^{a}	5.98 ± 1.23^{a}

*Different letters in the same column show statistically significant differences ($p < 0.05$), as established by ANOVA and the Tukey test.

A thorough examination of soluble and insoluble dietary fiber revealed that insoluble fibers are predominant in the fruits. Dietary fiber is a type of carbohydrate that remains undigested and unabsorbed in the small intestine. Its levels diminish during the ripening of fruits as a result of the hydrolysis of the cell wall by cellulolytic enzymes (Edema et al. 2024). Authors have documented a broad spectrum of TDF values for plums, ranging from 58% to 82% (Kosmala et al. 2013). The total dietary fiber content in apricots is reported to be 1.5 g.100 g^{-1} (Fratianni et al. 2018). Incorporating plant materials into various food products enables their functionalization, as it is established that, according to European Union regulations, food systems containing over 3% by weight can be classified as a "source of dietary fiber" (Khorasaniha et al. 2023). The fiber content found in fruits generally ranges from 1% to 3%, with the exception of dried fruits, which contain significantly higher levels (Vincente et al. 2014).

The energy content of the analyzed fruits was also assessed by utilizing the energy equivalents of the macronutrients, and their nutritional value (kcal) was established (Table 6).

The hybrid fruit is characterized by having the lowest energy value. The energy calculated was primarily attributed to the presence of carbohydrates. The “Stanley” plum had the highest energy and carbohydrate values. The intake of “Modesto” apricot will primarily contribute to protein consumption in comparison to hybrid and plum fruits. All fruit varieties contribute a minor portion of the daily energy requirements. The consumption of fruit typically represents 2-3% of

Table 6. Energy and nutritional value in the studied plum-apricot ("Stendesto"), plum ("Stanley") and apricot ("Modesto") fruits

Sample	"Stendesto"	"Stanley"	"Modesto"
Energy value, kcal.100 g^{-1}	39.68	65.95	46.40
Proteins, g.100 g^{-1}	0.73±0.06	1.04±0.06	1.79±0.43
Fats, g.100 g^{-1}	0.28±0.02	0.15±0.07	0.08±0.001
Carbohydrates, g.100 g^{-1}	8.56±0.25	15.11±0.55	9.63±0.32

the daily energy intake among populations (Rejman et al. 2021). The majority of the energy derives from the carbohydrates found in the examined fruits, as they serve as the primary energy sources for living organisms. Dietary carbohydrates are macronutrients that possess various physical and physiological characteristics, along with numerous health advantages. They provide energy to both host cells and the intestinal microbiome (Kiely & Hickey 2022). Approximately 50-80% of the total dry matter in fruits consists of carbohydrates, primarily in the form of simple sugars such as glucose, fructose, and sucrose, which impart a sweet flavor. The quality and flavor of fruits are determined by the proportional distribution of sugars (Bawazeer et al. 2017). Generally, fruits contain low levels of lipids and proteins (Rejman et al. 2021). The most significant advantages for human health can be realized by consuming at least 5 servings of fruits and vegetables per individual each day, with a greater emphasis on vegetables (Rejman et al. 2021). Nevertheless, various factors, including availability, lack of knowledge and awareness, result in the average daily fruit consumption for many individuals globally being considerably lower than the suggested amount (Dreher 2018).

Conclusions

The present study concentrated on the nutritional and biological properties of three fruits: the "Modesto" apricot, the "Stanley" plum, and their hybrid, the "Stendesto". Both free and bound phenolic compounds were extracted from the fruits under investigation. Alkaline hydrolysis demonstrated greater efficacy in extracting the bound phenolics found in both the plum and the plum-apricot hybrid when compared to acid hydrolysis. However, the free phenolic fractions were observed to be higher in all three fruits analysed compared to the bound ones. The "Stendesto" hybrid is distinguished by possessing the highest concentrations of free phenolic compounds, total flavonoids, and total monomeric anthocyanins. Regarding antioxidant capacity, the ABTS method was found to be more effective for extracting free phenolics compared to the bound ones, while the CUPRAC method produced the highest values for all three fruits across all extraction techniques employed. The elements potassium, calcium, and magnesium were identified as the most prevalent in the studied fruit varieties. The hybrid fruit exhibited the lowest sugar content, with the exception of sorbitol, where the apricot showed the least amounts. The plum-apricot hybrid recorded the lowest percentage of dietary fiber. A comprehensive analysis of soluble and insoluble dietary fiber indicated that insoluble fibers are the most dominant in the fruits studied. A limiting factor of the study is the single growing season and specific location of fruit collection. However, this research is regarded as one of the pioneering studies on plum-apricot hybrids in Bulgaria and contributes to the existing scientific knowledge of specific Prunus varieties, thus enabling future comparisons.

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Author Contributions

Conceptualization, A.P. and D.M.; methodology, D.M., N.P.-O., G.G. and A.S.; software, D.M., N.P.-O., G.G. and A.S.; validation, D.M., N.P.-O., G.G. and A.S.; formal analysis, D.M., N.P.-O., G.G. and A.S.; investigation, D.M., N.P.-O., G.G., A.P., S.P. and A.S.; resources, A.P. and S.P.; data curation, D.M., N.P-O., G.G., A.P. and A.S.; writing-original draft preparation, A.P. and D.M.; writing-review and editing, D.M., N.P.-O., G.G., A.P.; S.P. and A.S.; visualization, A.P.; supervision, A.P.; project administration, A.P.; funding acquisition, A.P. All authors have read and agreed to the published version of this manuscript.

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The original contributions presented in this study are included in the article. Further inquiries can be directed to the corresponding authors.

Conflicts of Interest

The authors declare no conflicts of interest.

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