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EXPORT POTENTIAL OF FRUIT PRODUCTS IN AGRICULTURAL BUSINESS

Introduction. *The present-day market of fruit products in Ukraine and in the European Union has been growing now and has a great potential. In this context, the problem of planting and preserving fresh fruit products in Ukraine is relevant, as the demand for them increases every year both in our country and abroad.*

Problem Statement. *Fast freezing, controlled atmosphere and special containers as well as pre-treatment of fruits with chemicals are the priority technologies for the storage of fruit products. These methods extend the shelf life, however they require high financial costs, are harmful to human health and do not address the problem of biological decay.*

Purpose. *The purpose of this research is to assess the agro-industrial potential of Ukraine and to determine the social and economic effect of production of high-quality plums and apricots with extended shelf life due to processing them with film-forming compositions of medicinal plant materials.*

Material and Methods. *The methods of critical and economic analysis have been used to achieve the purpose of this research. The economic effect from the application of the developed method of fruit processing has been analyzed by the efficiency estimate algorithm.*

Results. *The current state of fruit exports has been analyzed. The world trade has benn determined to steadily grow over the last decade. Processing of medicinal and plant raw materials of plum and apricot fruits with film-forming compositions is safe and complies with the rules of European Environmental Safety Directives. The results of calculations have confirmed the improvement of fruit quality and extension of their shelf life.*

Conclusions. *The economic effect is: an increase in the sales by 3,432 thousand tons leads to augmented consumption of these fruit products by 0.20 kg per person annually. The social effect is the availability of high-quality environment friendly products at estimated prices and the increase in their consumption.*

Keywords: agro-industry, agribusiness, fruit products, film-forming compositions of medicinal and plant raw materials, new technologies, storage, and export.

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Modern Ukraine is considered not to have utilized the potential of the agro-industrial sector to increase exports of value added products. Therefore, to ensure the development of the export potential of agricultural enterprises of Ukraine, the Export Strategy of the Agricultural Products, Food and Processing Industry of Ukraine until 2026 has been approved. For the Ukrainian agribusiness, this is an opportunity to conquer target markets and to strengthen competitive positions [1]. In this context, the problem of growing and preserving fresh fruit products in Ukraine is relevant, as the demand for such products is growing every year both in our country and abroad.

It should be noted that the European Union controls the safety not only of manufactured food products, but also the quality of products supplied to the market. In order to control the quality and safety of fruit products, it is recommended to comply with Directive 2001/95/EU of the European Parliament and of the Council *On General Product Safety* dated 3 December 2001. The Directive establishes "general safety obligation" for all manufacturers of any product and specifies it through certain standards. The system is open for both the EU and then on-EU Member States and Ukraine in particular [2].

It should be pointed out that in 2019, the Ukrainian Agriculture and Food Export Secretariat recorded that Ukraine had increased exports of fruit and berries products by 10%. If to compare with 2018, the sales of stone fruit abroad grew from 26 thousand tons to 58 thousand tons. The modern experts have noted that domestic exporters are quite able to achieve maximum revenues from the sales of fruit products to foreign consumers in the case of appropriate quality and storage conditions [3]. Thus, the Ukrainian market of fruit products has great prospects.

The analysis of modern Ukrainian and foreign scholarly research and patent literature [4—23] has shown that the priority technologies for storage of fruit products are the fast freezing, the controlled atmosphere, and the storage in special containers. The application of the above-mentioned storage technologies is accompanied by the pretreatment of fresh fruit products with chemicals, which significantly reduces the useful properties of fruits. These methods allow extending the shelf life for a short while, but they mean high financial costs, are environmentally hazardous, and do not address the problem of biological decay.

Therefore, the development and implementation of a new means of processing fruit products, which is safe for human health and prevents spoilage for a longer period of storage for little money, remains relevant. It can be a method of suppressing or reducing the spread of infections, with the use of natural components, which fully complies with the requirements of Directive 2011/92/EU of the European Parliament and of the Council *On the Assessment of the Effects of Certain Public and Private Projects on the Environment* (codification) [24] and Directive Council 91/676/EEC *On the Protection of Waters against Pollution caused by Nitrates from Agricultural Sources* [25].

The purpose of this research is to assess the agro-industrial potential of Ukraine and to determine the social and economic effect of production of high-quality plums and apricots with extended shelf life due to processing them with film-forming compositions of medicinal plant materials.

According to the purpose of our research, the following tasks have been set:

- to analyze the potential of foreign economic trade in fruit and berry products;
- to estimate the economic and social effect depending on an increase in the sales of these products.

The agro-industrial complex is one of the key sectors of the economy of most countries. It provides the population with safe food products and the industry with raw materials for the manufacture of new products, as well as contributes to the state budget from exports to foreign markets. The use of advanced energy and environmental technologies as well as methods of processing allow increasing the manufacture of agricultural production. However, the climate remains the most important factor.

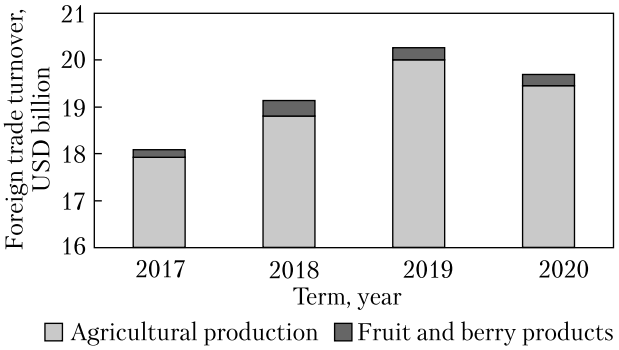

Fig. 1. Foreign economic trade for the period 2017—2021

Source: summarized data of the Ukrainian Association of Agrarian Exports (UAAE).

The geographical position of Ukraine and its favorable climate allow the development of agricultural business in the country. At the same time, the development of the agro-industrial sector requires the restructuring of all its branches, which enables solving the following problems: the redistribution of land and property, including the deepening of land ownership relations and the introduction of mechanisms for the realization of property rights; the privatization of processing enterprises; the restructuring of enterprises and forms of management; the development of cooperation; the introduction of management and marketing; the state regulation of the agricultural economy through more efficient use of pricing policy, financial and credit system, and tax system; the development of markets for agricultural products, material and technical resources and services; the intensification and diversification of foreign economic activity, etc. [26].

The analysis of foreign economic trade for the period 2017—2021 (Fig. 1) has shown a change in the dynamics of exports of agricultural products.

The Ukrainian agricultural exports in Ukraine increased in 2018. The turnover in the agricultural sector reached USD 18.8 billion that was 4.68% more than in 2017 [27, 28]. In 2019, as compared with 2018, the exports of Ukrainian fruit and berry products to foreign partners increased by 10.00% (Fig. 2). The profit from exports made up USD 260 million, including 53.08% from the export of peeled and unpeeled walnuts, 32.31% from frozen fruits and berries, 6.54% from fresh apples and pears, and 4.62% from fresh berries.

In 2020, the sales of fruit and berry products in foreign markets decreased by 8.46% as compared with 2019 and made up USD 238 million. As compared with 2019, the sales of frozen fruits and berries in 2020 increased by 24.32%, while the sales of peeled and unpeeled walnuts, apples, and pears decreased by 28.99% and by 41.18%, respectively. The UAAE noted that in 2020 the sales of frozen fruits of Ukraine-made products augmented in international markets and consequently, so did the export revenues (by 32.00%), with the amount (55 thousand tons) being the largest one since independence [28].

The main importer of Ukrainian fruit and berry products is the European Union. In 2018, the exports accounted for more than 15.00%, whereas in 2019, it was 45.31% and in 2020, it grew up to 56.89% of the total foreign trade turnover of Ukrainian fruit and berry products annually. Having analyzed the data, we can conclude that the sales of Ukrainian fruit and berry products were growing in Poland, France, Germany, and the Netherlands for 3 years.

The analysis of the data from the International Trade Center (ITC) has shown that the fruit and berry products are the most profitable in international trade in agri-food products (Fig. 3). In 2019, the world export of fruits, berries, and nuts amounted to USD 124.8 billion [29].

The largest revenues from the export of fruit and berry products in 2019 were reported for the United States (USD 15.1 billion) and Spain (USD 10.5 billion). The exports of fruits and berries from the Netherlands and Mexico decreased by 45.70% and 68.87%, respectively, according to the US data, while the exports from China and Chile decreased by 58.24% and 61.59%, respectively. It should be noted that the main export products in each country were different: nuts (almonds, pistachios, and walnuts), for the United States; citrus fruits, berries and nuts, avocados, for Spain; various blueberries, citrus and grapes, for the Netherlands.

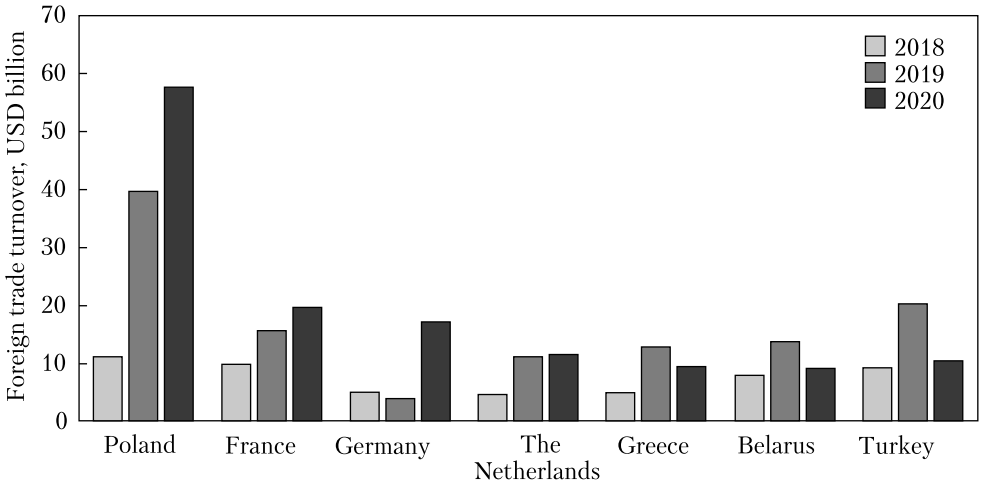

Fig. 2. Dynamics of export of fruit and berry products from Ukraine to the major buyers
Source: summarized from UAAE data.

The world trade in fruit products grew steadily over the last decade, except for recent years. In particular, the trade in apricots and cherries increased rapidly. The plum trade showed slow upward dynamics, while the exports of peaches and nectarines were stable. Within the EU, such southern member states as Spain, Italy, and Greece are the main countries for stone fruit production and export, however Turkey and Chile are also important suppliers to Europe. The world exports of plums grew steadily and exceeded 800 thousand tons, in 2019. In 2019, the world most important exporter was Chile (170 thousand tons) that exported plums to China (50.00%), the United States (15.85%), Brazil (7.65%), and the Netherlands (6.88%). In 2019, the main exporters of apricots were Spain, Turkey, and Uzbekistan, while the main importer of apricots was Germany (60 thousand tons). Germany mainly imports from Spain and Italy. In this context, Ukraine's agro-industrial business can take advantage of demand for fruit products and increase exports of these products through introducing new environment friendly and safe storage technologies.

Having analyzed the modern Ukrainian and foreign scholarly research and patent literature, the following technologies for the storage of fruit

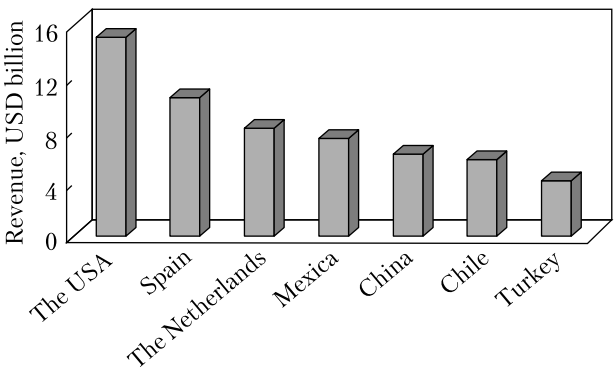

Fig. 3. Export of fruit and berry products in 2019
Source: summarized from UAAE data

products can be identified [31]: controlled atmosphere with a system of humidification and cooling air [4—6]; controlled gaseous medium [7—9]; and cold carriers [10, 11]. Due to fungal diseases of fruit and berry products, in particular the stone ones [31—34], the use of only special equipment for storing fresh fruit is not sufficient. Therefore, more and more often special boxes, containers, and packages are used [12—19] or fresh fruits are processed with special mixtures (compositions) [20—23] before storage. Due to additional costs, manufacturers mainly use synthetic chemicals that are toxic and cause various diseases in the

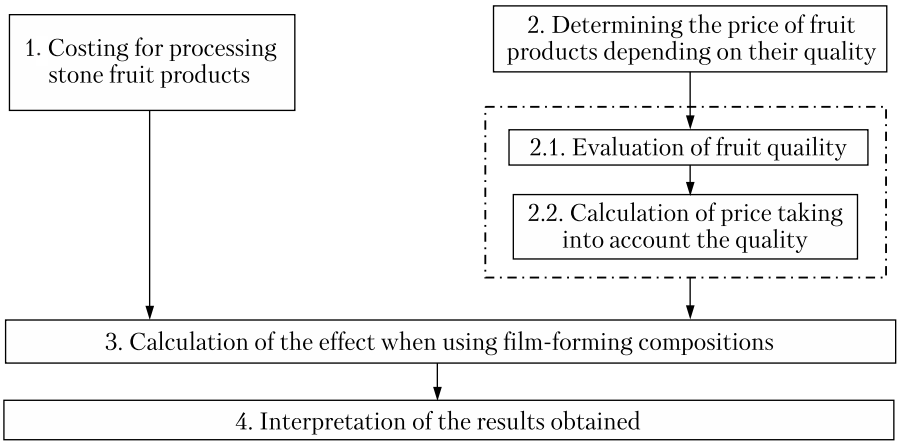

Fig. 4. Algorithm for the calculation of the efficiency of application of film-forming compositions of medicinal plant raw materials to store stone fruit products

human body when accumulated. In addition, the synthetic chemicals are able to travel long distances, and their decay period lasts for decades, which violates the rules and regulations of European Directives.

The innovative component of this research is the effect of the application of the developed method for processing the stone fruit products, namely increasing profits and improving quality of plums and apricots.

For the growing cost of new technologies and limited financial resources of enterprises the implementation of technologies needs to be well justified as part of assessing the economic efficiency. The general principle of the assessment of efficiency is to compare the effect (result) and the cost of achieving it. Depending on the results and costs considered in the process of justification, the following types of effect can be distinguished (Table 1).

The efficiency has been estimated according to its essence in compliance with the following algorithm (Fig. 4).

At the first stage, the costs of processing the stone fruits before storage are determined given their relevance (the components that are the major constituents of film-forming compositions and the prototype selected as reference for comparison). Other storage costs remain unchanged. As compared with the reference samples, the costs for the components to produce the reference and film-forming compositions, as well as the costs of fruit processing are considered relevant.

Table 1. **Types and Characteristics of the Effect of the Development and Implementation of Innovative Products**

Type of the effect	Characteristics
Economic	Revenues from storage of production with application of the offered method exceed the associated costs: gaining an additional profit at the expense of prolongation of the shelf life of fruit products, reduction in the losses, and increase in the sales
Social	Increasing the consumer value of products due to quality characteristics, increasing the consumption of stone fruit products, balancing the "price-quality" ratio
Resource	Better use of seasonal products, reduction of quantitative and qualitative losses during their storage
At the national level	Developing the resource food base with a corresponding increase in the sales of stone fruit products, improving the standard of living

The film-forming composition has been developed in the laboratory of the Department of Commodity Science and Study of Goods of Kharkiv State University of Food and Trade and the Department of Mycology and Phytoimmunology of V. N. Karazin Kharkiv National University; the composition is the authors' work [35].

The costs of the components of the film-forming compositions and the reference agent are given in Tables 2—4.

Table 2. **Estimate of the Costs of the Film-Forming Compositions for Plum Processing**

Name of prescription components and costs	Costs per 10 l of composition	Unit price, UAH	Cost, UAH
Chamomile inflorescence extract, l	1.592	118.96	189.38
Basil extract, l	4.775	118.96	568.03
Melissa leaf extract, l	5.73	121.20	694.48
Chitosan, kg	0,2	1333.28	266.66
Glycerin, l	0.1	98.58	9.86
Calcium chloride, kg	0.05	54.16	2.71
Citric acid, kg	0.05	70.83	3.54
Chamomile inflorescence oil, l	0.05	1424.11	71.21
Total cost of raw materials			1805.87
Cost of electricity			0.45
Other expenses			2.32
Total cost of 10 liters of the composition			1808.64
Cost of 1 liter			180.86
Expenses per 1 kg			3.75
In % to the price			9.38

Table 3. **Estimate of the Cost of the Film-Forming Compositions for Apricot Processing**

Name of prescription components and costs	Costs per 10 l of composition	Unit price, UAH	Cost, UAH
Melissa leaf extract, l	5.73	121.20	694.48
Sage leaf extract, l	1.91	123.72	236.31
Verbena herb extract, l	1.91	118.96	227.21
Chitosan, kg	0.2	1333.28	266.66
Glycerin, l	0.1	98.58	9.86
Calcium chloride, kg	0.05	54.16	2.71
Citric acid, kg	0.05	70.83	3.54
Verbena oil, l	0.05	1921.09	96.05
Total cost of raw materials			1536.82
Cost of electricity			0.45
Other expenses			2.32
Total cost of 10 liters of the composition			1539.59
Cost of 1 liter			153.96
Expenses per 1 kg			3.85
In% to the price			7.7

According to the pricing procedure, the cost of raw materials for film-forming compositions and the respective prices are calculated net of value added tax (VAT). The cost of electricity is determined given the capacity of the equipment, the raw material load per 1 cycle, the number of cycles per 10 l (100 l), the mixing time, and the tariff of 1 kW · h. Other costs are related to the complexity of production. The estimated cost of film-forming compositions of medicinal plant raw materials significantly exceeds the cost of the prototype.

At the second stage, the possible sales prices of stone fruit products are determined given their qualitative characteristics under the conditions of processing with the film-forming compositions and prototypes, in comparison with the reference sample. Let us use such an economic and parametric method of pricing as the complex point with the use of the quality-based standard, which allows finding the relationship between the price and the consumer properties of stone fruit products.

The price calculations are made in the following sequence:

1. Choosing the basic method for fruit processing, based on the characteristics of which the price of fruit is calculated after processing according to the new method. Since pricing depends on the choice of the basic method of processing, in order to compare the qualitative characteristics of the fruits, let us consistently choose the reference samples and those processed with the prototype.

2. Choosing the main parameters that characterize the quality of fruit products. As the main parameters let us use the results of qualitative evaluation of fruit products by the following properties identified in the previous studies:

- the respiratory rate of fruit;
- the mass fraction of total sugar per soluble dry matter;
- changes in the content of vitamin C.

3. Calculating the unit parametric indexes by the formula:

$$Iup = P_1 / P, \quad (1)$$

where *Iup* is the unit parametric index; P_1 is the value of the product parameter for this method of processing; P is the value of the product parameter for the reference method of processing.

Since the relationship between the respiratory rate and the quality of stone fruit is inverse (the slower the respiratory rate is, the higher the level

Table 4. **Cost Estimate of a Prototype for Stone Fruit Processing**

Name of prescription components and costs	Costs per 100 l of composition	Unit price, UAH	Cost, UAH
Iodine, l	0.003	950.00	2.85
Potassium iodide, l	0.007	3840.00	26.88
Organic acid, l	0.15	260.00	39.00
Modified starch, kg	0.55	60.00	33.00
Surfactant, kg	0.225	185.00	41.63
Purified water, l	99.2	0.95	94.24
Total cost of raw materials			237.60
Cost of electricity			4.50
Other expenses			23.20
Total cost of 10 liters of the composition			265.30
Cost of 1 liter			2.65
Expenses per 1 kg			0.07
In % to the price			0.2

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Table 5. **The Chemical Composition of the Stone Fruit Products ($p \leq 0.05$, $n = 5$)**

Day of storage	*Flavor Queen* Plum			*Sulmona* Apricot		
	without processing	processing with prototype	processing with composition	without processing	processing with prototype	processing with composition
	Respiratory rate, mg CO_2					
0	26.77	26.77	26.77	33.88	33.88	33.88
5	26.02	26.75	26.70	40.10	37.15	36.24
10	25.10	25.98	26.55	52.41	40.04	37.00
15	23.87	24.99	26.02	74.12	41.68	39.54
20	21.05	24.12	25.76	78.99	43.60	41.11
25	19.78	22.97	25.05	56.30	45.44	40.24
30	18.75	21.76	24.78	42.78	50.70	41.23
35	—	19.05	24.06	—	55.98	42.00
40	—	18.15	23.99	—	64.78	51.78
45	—	—	23.15	—	55.02	66.49
50	—	—	22.67	—	47.44	64.51
55	—	—	22.00	—	—	54.15
60	—	—	21.79	—	—	48.79
	Mass fraction of total sugar per soluble dry matter, %					
0	75.97	75.97	75.97	65.75	65.75	65.75
5	74.97	74.81	75.39	74.53	71.12	70.24
10	73.79	73.83	74.71	68.84	76.75	73.77
15	74.27	74.25	73.74	72.78	82.33	78.57
20	72.75	73.83	73.45	75.30	83.61	83.88
25	73.05	74.61	72.84	65.79	84.26	85.95
30	71.96	72.69	73.24	58.60	88.96	85.21
35	—	74.64	73.89	—	85.65	85.94
40	—	71.28	74.69	—	86.35	80.59
45	—	—	73.15	—	77.19	80.98
50	—	—	75.22	—	71.20	84.70
55	—	—	75.12	—	—	83.88
60	—	—	74.98	—	—	73.81
	Vitamin C content, mg/100 g					
0	9.12	9.12	9.12	8.35	8.35	8.35
5	8.78	8.90	9.10	9.54	8.89	8.71
10	8.20	8.76	9.05	10.12	9.21	9.00
15	7.65	8.30	8.87	11.50	9.55	9.35
20	7.06	7.67	8.85	12.35	9.95	9.73
25	6.37	7.12	8.49	9.21	10.28	9.97
30	5.45	6.77	8.12	6.27	11.12	10.31
35	—	6.25	7.87	—	12.59	11.00
40	—	5.76	7.60	—	15.37	12.25
45	—	—	7.23	—	12.89	14.90
50	—	—	7.00	—	8.98	15.33
55	—	—	6.80	—	—	12.75
60	—	—	6.34	—	—	8.71

of usage is), the calculations can be made by the inverse formula.

4. Evaluating the fruit quality. To do this, let us use economic and mathematical modeling based on the multiplicative model:

$$Iq = \sqrt[n]{\text{Iup}_1} \times \text{Iup}_2 \times ... \times \text{Iup}_n, \quad (2)$$

where Iq is the generalized index of stone fruit quality and the coefficient; n is the number of indexes.

For the calculations, let us choose one of the varieties of plums and apricots, the quality indexes of which correspond to the average values studied during 2017—2020 at the laboratory of the Department of Commodity Science and Study of Goods of Kharkiv State University of Food and Trade (Table 4).

The results of the calculations of the unit and the integrated quality indexes of fruit products with film-forming compositions of medicinal plant materials in comparison with the reference samples and the samples processed with the prototype are shown in Table 5.

The integrated quality index for unprocessed fruits has been calculated in a similar way in order to determine the price of the prototype as compared with the reference sample:

- *Flavor Queen* plums: 1.052;
- *Sulmona* apricots: 1.214.

The integrated quality index of the basic processing option is equal to 1.

5. Determining the unit price for the basic method of processing by the formula:

$$Pu = Pb / Iq_b, \quad (3)$$

where Pu is the unit price, UAH; Pb is the price of the basic method of processing, UAH; Iq_b is the index of product quality of the basic method of processing and the coefficient.

6. Calculating the price of fruits in the case of application of the new method of processing by the formula:

$$P = Pu \times Iq_n, \quad (4)$$

where P is the price in the case of the new method of processing, UAH; Iq_n is the integrated index of product quality of the new method of processing and the coefficient.

The basic prices of stone fruit products for determining the price of the new option of processing are taken at the level of average prices prevailing in the market (2018—2019) [35, 36], which correspond to the prices of the reference samples. Thus, the following prices of 1 kg fruit have been used in the calculations:

- UAH 25 for plums;
- UAH 50 for apricots.

Given the integrated quality factor of the reference samples, which is equal to 1, the unit prices are equal to the market average.

The results of the calculations of the price of stone fruit products under the conditions of processing with film-forming compositions are given in Table 6.

At the third stage, the effect of the application of film-forming compositions of medicinal plant

Table 6. **The Unit Parametric Indexes of Qualitative Characteristics of the Stone Fruit Products in Comparison with the Reference and the Prototype**

Index	*Flavor Queen* Plum		*Sulmona* Apricot	
	with respect to control	with respect to prototype	with respect to control	with respect to prototype
Respiratory rate	1.095	0.952	1.374	1.021
Mass fraction of total sugar per soluble dry matter, %	1.254	0.995	1.010	0.992
Vitamin C content	1.325	1.053	1.413	1.033
Integral index	1.221	0.999	1.252	1.015

raw materials for the processing of stone fruit products has been determined. It is increasing the profit and the sales due to reducing the losses and extending the shelf life.

Let us define the profit growth as follows:

$$\Delta Pr = \Delta P - \Delta C, \quad (5)$$

where ΔPr is the profit growth, %; ΔP is the change in price (sale revenues pera unit), %; ΔC is the change in the costs due to the application of the proposed method of fruit processing, % to the basic price.

In the calculations of profit growth, the value of the change in price, which is characterized by the sales revenue pera unit of product, has been used. The increase in the sales is determined based on the natural weight of stone fruit losses (studied in the previous sections).

The yield increase depends on the weight loss, extension of the shelf life, which allows bringing more fruits to the consumer and selling them for a longer period. Therefore, the rate of yield change should be adjusted by the coefficient of increase in the shelf life, which relative to the reference sample is 2.0, and relative to the prototype ranges from 1.2 to 1.5.The calculations of increase in the profit and in the sales are shown in Table 7.

The social effect of the method of processing stone fruit products is:

Table 7. **Calculations of the Price of Fruit Products with Film-Forming Compositions by the Complex Point Method Based on the Reference**

Index	*Anna Shpet* Plums	*Sulmona* Apricots
The average price of 1 kg on the market, UAH	25.0	50.0
Integral quality index:		
basic version:		
reference sample	1.0	1.0
with a prototype	1.052	1.214
new version:	1.221	1.252
Price of stone fruit products under processing conditions, UAH/kg:		
with a prototype	26.29	60.7
with film-forming compositions	30.52	62.58
Price in% before:		
reference sample	122.08	125.17
prototype	116.07	103.10

- improving product quality and safety;
- increasing fruit consumption due to reduced losses during storage and increasing the share of suitable products.

The increase in consumption is calculated according to the amount of stone fruit products, additional products suitable for consumption, and the current population of Ukraine.

Table 8. **Increase in the Profit and in the Sales of Stone Fruit Products**

Index	*Lyubska* plums		*Sulmona* Apricots	
	with respect to the reference	with respect to the prototype	with respect to the reference	with respect to the prototype
Price increase, %	22.1	16.1	25.2	3.1
Increase in losses, %	9.38	0.2	7.7	0.2
Profit growth in:				
in %	12.7	15.9	17.5	2.9
UAH per 1 kg	3.18	4.18	8.75	1.76
Reduction of losses, %	–0.89	–0.2	2.12	1.93
Increase in yield, %	2.4	2.1	3.1	4.2
Change in shelf life, coefficient	2.0	1.5	2.0	1.2
Increase of yield given the shelf life, %	1.5	2.8	1.2	2.8

Table 9. **The Effect of the Proposed Method of Processing Stone Fruits**

Types and sources of effect	*Lyubska* plums		*Sulmona* Apricots	
	with respect to the reference	with respect to the prototype	with respect to the reference	with respect to the prototype
Economic (per 1,000 kg)				
Increase in profit, UAH	3180	4181	8750	1760
Social				
Improvement of quality, %	22.1	16.1	25.2	3.1

Given the increase in the yield of suitable products, the additional amount is:

- plums: 173.2 × 0.015 = 2.598 thousand tons;
- apricots: 69.5 × 0.012 = 0.834 thousand tons;

The total amount is 3.432 thousand tons, which increases the consumption of stone fruit products by 0.20 kg per 1 person annually and brings it to 12.5 kg (the rational consumption is 16 kg) [37].

The effect of the method of processing stone fruit products with film-forming compositions of medicinal plant materials is shown in Table 8.

The exports of fruit and berry products have been growing in recent years and reached 1.2—1.8% of the total agricultural products. Over the past 3 years, the export of Ukrainian fruit and berry products to the European Union has been steadily increasing from 15.00% to 56.89%, which indicates an increase in the profitability of sales of this product. The modern experts have noted that Ukrainian exporters are able to achieve maximum revenues from the sales of fruit and berry products, in particular, the stone fruits, to foreign consumers, provided the fruit shelf life is extended and the products have appropriate quality and environment safety. Today, the global manufacturers use special boxes, containers, packages or special mixtures (compositions) that sometimes do not comply with the Environmental Safety Directives. The proposed film-forming composition from medicinal plant raw materials contains only natural components and is safe for people and environment, easy to wash off with running water from the surface of fresh fruits. Coating the fruits with the film-forming compositions not only extends the shelf life up to 1.2—1.5 times as compared with the processing with the prototype, but also increases the sales by 3,432 thousand tons, which augments the consumption of stone fruits by 0.20 kg per 1 person annually. The social effect is that the new method increases the availability of higher quality products at calculated prices, enables augmenting the manufacture of suitable products and their consumption.

The research was carried out until February 24, 2022, but the Russian aggression has broken the terms and logistics of the export of Ukrainian goods from March 2022. In addition, Ukraine temporarily does not control part of the territories that have always specialized in the production of the specified fruits. Nowadays, it is becoming urgent to restore and create new logistics for the export of these products both to the EU and to other countries, which requires further research.

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ЕКСПОРТНИЙ ПОТЕНЦІАЛ ПЛОДОВОЇ ПРОДУКЦІЇ В АГРАРНОМУ БІЗНЕСІ

Вступ. Сучасний ринок плодової продукції в Україні та державах Європейського Союзу знаходиться в стані розвитку та має суттєвий потенціал. У цьому контексті актуальною виявляється проблема вирощування та збереження свіжої плодової продукції в Україні, попит на яку зростає з кожним роком як у нашій країні, так і за її межами.

Проблематика. Пріоритетними способами зберігання плодової продукції є технологія швидкого заморожування, регульованої атмосфери та зберігання в спеціальній тарі, що супроводжується попередньою обробкою плодів хімічними препаратами. Зазначені методи подовжують термін зберігання продукції, проте є дороговартісними, чинять шкоду здоров'ю людини та не вирішують проблему біологічного псування.

Мета. Оцінити агропромисловий потенціал України й визначити соціальний та економічний ефект виробництва плодів сливи та абрикоса підвищеної якості й подовження термінів зберігання за умов їх обробки плівкоутворюючими композиціями з лікарської рослинної сировини.

Матеріали й методи. Використано методи критичного й економічного аналізу. Оцінку економічного ефекту від застосування розробленого способу обробки плодів проводили відповідно до алгоритму розрахунків ефективності.

Результати. Проаналізовано сучасний стан експорту плодової продукції та визначено, що світова торгівля постійно зростала за останнє десятиліття. Обробка плівко утворюючими композиціями з лікарської рослинної сировини плодів сливи та абрикоса є безпечною та відповідає правилам Європейських Директив щодо екологічної безпечності, а результати розрахунків підтверджують підвищення якості плодів і подовження термінів їхнього зберігання.

Висновки. Економічний ефект: збільшення обсягу реалізації на 3,432 тис. т. дозволяє збільшити споживання означеної плодової продукції на 0,20 кг на 1 особу на рік. Соціальний ефект: придбання за розрахованими цінами продукції підвищеної якості, отримання екологічно чистої продукції та збільшення її споживання.

Ключові слова: агропромисловість, агробізнес, плодова продукція, плівкоутворюючі композиції з лікарської рослинної сировини, нові технології, зберігання, експорт.