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ECONOMIC EFFICIENCY IN THE PRODUCTION OF CREAM-PERFUMED SOAP

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Abstract: This article presents the results of a study aimed at determining the expected economic efficiency in the production of cream-perfumed soaps based on non-traditional oil-based raw materials. The research includes data on the quantity and cost of raw materials used for producing cream-perfumed soap, as well as the total annual profit.

Keywords: cream-perfumed soap, economic efficiency, price, profit, cost price, expenses, raw materials.

Introduction. Economic efficiency in production is a key indicator that reflects the degree of optimal resource utilization to achieve maximum profit. Any production process is evaluated not only by the increase in product volume but also by the balance between resource consumption and output. Enhancing economic efficiency is currently a crucial factor in ensuring competitiveness, innovation, and sustainability [1].

Economic efficiency represents the ratio between the resources consumed during the production process (raw materials, labor, time, financial resources) and the outcomes obtained (profit, product volume, quality, competitiveness). The higher this ratio, the more efficient, competitive, and sustainable the production process is considered to be [2].

The concept of economic efficiency has a long-standing history in economic science, and its development is directly connected to the need for improving labor activity, resource allocation, and production processes within society. In the works of Aristotle (4th century BC) and Xenophon, issues such as rational resource allocation and labor organization in production were discussed. Although their teachings emphasized ideas such as “rational management” and “labor productivity,” economic efficiency was treated more as a philosophical notion rather than a measurable indicator [3].

Efficiency is determined not only by financial profit but also by the rational use of production resources, waste reduction and recycling, increased labor productivity, improved product quality, and adaptation to market demands [4].

Currently, rational and efficient use of resources in industry, environmental protection, waste recycling, and cost reduction have become among the main strategic directions. From this perspective, the use of secondary raw material sources in the production of cream-perfumed soaps is proving to be not only environmentally beneficial but also economically efficient [5].

In our research, a base for cream-perfumed soap was developed using an oil composition that includes non-traditional oils. Specifically, palm oil was blended with grape seed, pomegranate seed, and black cumin (Nigella sativa) oils to create the composition [6,7]. According to the results of the conducted studies, based on fatty acid composition, organoleptic, and physicochemical indicators, the optimal formulation consisted of 50% palm oil, 20% each of grape seed and pomegranate seed oils, and 10% black cumin oil [8,9]. The resulting cream-perfumed soap was analyzed in terms of its physicochemical properties, optimal alkali concentration, and organoleptic test results. Furthermore, it was recommended that the optimally formulated cream-perfumed soap product be classified under a specific commodity code according to the Harmonized System (HS) [10,11].

2. Matertials and methodology

2.1. Materials

According to statistical data, the annual volume of cream-perfumed soaps produced in our Republic alone currently amounts to several million tons [12]. At the same time, due to factors such as population growth, environmental degradation, poor nutrition, and the misuse and overuse of various chemical substances, the incidence of allergic diseases has increased by 2.1 times in recent years [13].

In the course of our research, grape and pomegranate seeds—secondary products from grape and pomegranate processing enterprises—were processed using the cold pressing method to extract the oils contained within them. Currently, the market price for 100 ml of grape seed oil is around 8,000 UZS, while 100 ml of pomegranate seed oil costs approximately 12,000 UZS [14]. In addition, commercially available black cumin oil and palm oil were also used for the research.

2.2. Methodology

To reduce the cost price of cream-perfumed soap and to make rational use of food industry waste and secondary products, oils were extracted in laboratory conditions using the aforementioned method. The cost price of 100 ml of the extracted oil was calculated as follows:

1. The cost price of 1 kg of grape seeds was 3,000 UZS. When the grape seeds were cold-pressed, the oil yield was 10.7%. The amount of oil obtained from 1 ton of grape seeds is calculated as:

$G_1 = 0.107 \times 1000 = 107$ kg of pressed oil.

2. The cost price of 1 kg of pomegranate seeds was 2,500 UZS. When cold-pressed, the oil yield from pomegranate seeds was 10.5%. The amount of oil obtained from 1 ton of pomegranate seeds is calculated as:

$G_2 = 0.105 \times 1000 = 105$ kg of pressed oil.

3. After filtration to remove residues (cake) from the pressed oil, the yield of purified oil was 96%.

a) The yield of purified grape seed oil:

$G_3 = 0.96 \times 107 = 103$ kg of purified oil

b) The yield of purified pomegranate seed oil:

$G_4 = 0.96 \times 105 = 101$ kg of purified oil

4. The raw material cost required to produce 1 kg of oil is calculated as follows:

a) For 1 kg of grape seed oil:

$G_5 = 1 / 0.103 \approx 9.7$ kg of grape seeds are needed.

The cost of 9.7 kg of grape seeds:

$P_1 = 9.7 \times 3000 = 29{,}100$ UZS

b) For 1 kg of pomegranate seed oil:

$G_5 = 1 / 0.101 \approx 9.9$ kg of pomegranate seeds are needed.

The cost of 9.9 kg of pomegranate seeds was calculated as:

$P_2 = 9.9 \times 2{,}500 = 24{,}750$ UZS

The total raw material cost for both grape seed and pomegranate seed oils also included the cost of electricity consumption, which was 1.5 kWh per unit of production. The depreciation of the pressing equipment was calculated at 10% of the total cost. The price of 1 kWh of electricity was taken as 1,000 UZS. The productivity of the pressing equipment ranged from 25 to 30 kg.

5. The total production cost per 1 kg of oil was calculated as follows:

a) Total cost for 1 kg of grape seed oil:

$P_3 = 33{,}660$ UZS

b) Total cost for 1 kg of pomegranate seed oil:

$P_4 = 29{,}150$ UZS

3. Results and discussion

To calculate the expected economic efficiency from the production of the developed cream-perfumed soap compositions, it is essential first to determine the prices of the required raw materials and the cost of the blended oils. The economic efficiency analysis was conducted based on the production of 1 ton of finished product under production conditions.

The required amounts of non-traditional oils and other raw materials needed for the production of 1 ton of cream-perfumed soap were determined through material calculation methods [8,9]. Table 3.1 below presents the cost data for the raw materials used in our research.

Table 3.1. Expanses for the production of cream-perfumed soap

№	Name of raw material	Price (UZS)	Quantity required for 1 ton of product	Total amount (UZS)
1	Palm oil, kg	18 000	402,5	7 245 000
2	Grape seed oil, kg	33 660	161	5 419 260
3	Pomegranate seed oil, kg	29 150	161	4 693 150
4	Black cumin oil, kg	90 000	80,5	7 245 000
5	Soda products, kg	7 600	173,17	1 316 092
6	Fragnance extracts, kg	4 000	10	40 000
7	Additives, kg	4 000	3,5	14 000

8	Elektric energy, kWh	1 000	44,5	445 000
9	Water, m^3	1 200	10	12 000
10	Gas, m^3	1 500	10	15 000
11	Packaging material, psc	400	10 000	400 000
Total:				26 844 502

Each product manufactured contributes to determining the economic efficiency of the enterprise. To assess this, in addition to the cost price of the produced goods, factors such as taxes, monthly wages of service personnel, depreciation expenses of the company's equipment, and unforeseen costs must also be taken into account.

The following table presents detailed information on the total expenses and economic costs associated with the production of cream-perfumed soaps.

Table 3.2. Economic costs for the production of cream-perfumed soap

№	Economic expenses	Amount (UZS)
1	Product cost price	26 844 502
	Monthly wage:	
2	- 1 technologist	5 000 000
	- 2 production workers	6 000 000
3	Depreciation expenses, 10%	3 784 450
4	Unforeseen expenses, 10%	3 784 450
5	Total taxes, 25%	9 461 125
6	Final cost price of 1 ton of product	54 874 527
7	Company profit, 20%	10 974 905
8	Selling price of 1 ton of product	65 849 432

As shown in Table 4.8 above, when 1 ton of cream-perfumed soap is produced monthly, the net profit for the enterprise amounts to 10,974,905 UZS. Considering that the cream-perfumed soap is produced in small units weighing 100 grams, the following calculations were made:

From 1 ton of soap, it was assumed that 10,000 units of finished soap bars would be produced.

To evaluate the market position of the product, a comparison was made with the imported "Umka" brand cream-perfumed soap, which is currently available on the market and was used in our research for benchmarking. As of today, the market price for one 100-gram bar of "Umka" cream-perfumed soap ranges between 18,000 and 22,000 UZS [14].

Given that the total sales price of 1 ton of the locally produced soap is 65,849,432 UZS, the price per unit was calculated as follows:

Price per bar = 65,849,432 / 10,000 = 6,584.94 ≈ 6,585 UZS

The economic efficiency compared to the "Umka" brand was calculated as:

18,000 – 6,585 = 11,415 UZS (profit margin per unit)

When applied to the total of 10,000 units per ton:

11,415 × 10,000 = 114,150,000 UZS total economic benefit.

Conclusion. Assigning specific Harmonized System (HS) codes to cream-perfumed soaps in customs procedures is expected to contribute further to the anticipated economic efficiency of the study.

The enterprise allocates approximately 60–65 days per calendar year for capital and routine maintenance. When calculating the annual economic efficiency, assuming the enterprise operates on average 300 days per year (10 months), the annual profit is determined as follows:

114,150,000 × 10 = 1,141,500,000 UZS

Based on the conducted research and calculations, it was determined that using a blended oil composition consisting of 50% palm oil, 20% grape seed oil, 20% pomegranate seed oil, and 10% black cumin oil, the oil base for cream-perfumed soap can be produced. When the product is packaged in small volumes and sold as a finished product, the annual profit is estimated to be 1,141,500,000 UZS.

Furthermore, the proper classification of imported cream-perfumed soaps under relevant HS codes during customs procedures and the correct collection of state duties will also contribute significantly to increasing the overall economic efficiency within the scope of our research.

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