

CALCULATION OF ECONOMIC EFFICIENCY IN THE INTRODUCTION OF AN ACOUSTIC DEVICE FOR MEASURING THE MICRONEURAL INDEX OF COTTON FIBER

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Annotation: The economic impact of implementing a new laboratory instrument is the net profit or resource savings resulting from the difference between the "before" and "after" performance indicators, minus the costs of purchase, maintenance, and staff training. This includes reduced costs for electricity, depreciation of old systems, reagents, and consumables. Manual labor is minimized through process automation, freeing up the time of qualified specialists for other tasks. The number of tests or samples processed per unit of time increases. Eliminating human error leads to savings on expensive repeat tests.

Key words: standard, economic effect, micronaire index, fiber, calculation, laboratory equipment, testing

Introduction. Improving national competitiveness and increasing the efficiency of domestic enterprises in global and domestic markets are among the priority goals of the economic policy of any state. Based on global experience, we note that the implementation of cluster policy principles will lead to an increase in the competitiveness of the territories and industrial and economic complexes of the country. Small and medium-sized enterprises of the light industry, which are part of the modern industrial complex, have a significant impact on the formation of modernized production clusters, which will be focused on the production of competitive products. Thus, both export development and increased import substitution are simultaneously ensured. This has a significant impact on the role of small business in the economic system of society. Small and medium-sized enterprises are not so much a means of providing employment for the population, but a factor in the restructuring of production, as well as increasing its competitiveness and efficiency [1].

Currently, one of the pressing issues in the development of inter-industry relations is the formation of clusters. In the field of cotton growing, this problem is especially significant due to insufficiently developed inter-industry interaction, as well as the absence of effective relationships between such components as science, production, processing and marketing. The development of a cotton-textile cluster

is economically beneficial both for cotton market participants due to the speed with which manufactured goods reach the end consumer, and for consumers themselves due to significant savings on internal production costs and a corresponding reduction in product prices. All of this combined will contribute to increased productivity, increased production volumes, improved industrial relations, and a significant increase in production efficiency [2].

Theoretical analyses. The calculation of economic efficiency is generally carried out according to the following formula:

$$\Theta = (C_1 + E_H \times K_1) - (C_2 + E_H \times K_2),$$

Here:

C_1 and C_2 are the operating costs for variable materials in the basic and design variants;

K_1 and K_2 are the capital costs in the basic and design variants;

E_H is the standard efficiency coefficient, 0.15;

The “Metrotex” device used in the industry, which determines the quality indicators of the fiber, is morally and physically obsolete and is currently not produced.

The comparative technical and economic indicators of the proposed new universal device for determining the quality indicators of the fiber and the “Metrotex” device are presented in the table below.

Preliminary indicators for the calculation of economic efficiency are presented in table 1.

Table 1

№	Indicators	Unit of measure	Base	Project
1	Cotton size	Tn	25000	25000
2	Fiber size	Tn	8325	8325
3	Device operating time	hour	1188	594
4	Time per analysis	min	1	0,5
5	Installed power	W	150	10
6	Consumed electrical power	kW	178,2	5,94
7	Electricity price	1kW hour	1000	1000
8	Cost of electricity consumed	thousand soum	178200	5940
9	The price of the device is one thousand	thousand soum	72600	10200
10	Depreciation allowance	thousand soum	10890	1530
11	Repair, 5%	%	3630	510

If the price of the "Metroteks" device, which determines the quality indicators of the fiber installed in the laboratory of the cotton ginning enterprise and the preparation site, is 72600 thousand soums, and the installed power is 150 watts, the price of the proposed universal device is almost 7 times cheaper than it is 10200 thousand soums, and the installed power is only 10 watts.

Calculation of operating costs of devices:

Cost of electricity:

Base – 1888 hours * 0.15 kW * 1000 kW hours, soums = 178,200 thousand soums

Project – 594 hours * 0.01 kW * 1000 kW hours, soums = 5940 thousand soums

Depreciation Allowance

Base - 72600 * 15% :100 = 10890 thousand soums

Project – 10200 * 15% :100 = 1530 thousand soums

Repair:

Base - 72600 * 5%:100 = 3630 thousand soums

Project – 10200 * 5% :100 = 510 thousand soums

We summarize the obtained results in the table:

Indicators for calculating economic efficiency.

Table 2

№	Indicators	Unit of measure	Base	Project
1	Capital expenditure, K ₁ , K ₂	thousand soum	72600	10200
2	Operating costs	thousand soum	192720	7980
3	Electric energy	thousand soum	178200	5940
4	Depreciation	thousand soum	10890	1530
5	Repair	thousand soum	3630	510
6	Economic efficiency	thousand soum	-	194100

We determine economic efficiency based on the above formula:

$$E = (192720 + 0,15 \times 72600) - (7980 + 0,15 \times 10200) = \\ = 203610 - 9510 = 194.1 \text{ million soums}$$

Conclusion. The introduction of the proposed device will increase the accuracy and efficiency of quality control during the acceptance and processing of cotton raw materials and cotton fiber, improve the quality of the produced fiber by

increasing the efficiency of technical control of the operation of equipment and quality control of manufactured products, and thereby reduce the number of complaints about the quality of the fiber. Capital costs and energy costs for the introduction of the new device will be reduced by 15 times.

Thus, if the developed small-sized resource-saving, universal device is introduced instead of the existing Metrotex device, it is possible to achieve an annual economic efficiency of 194.1 million soums by installing a device for determining the micron index of cotton fiber in one project.

This economic efficiency is mainly due to the 15 times lower consumption of electricity and the fact that the price of the existing device is lower than the cost of the newly developed device.

REFERENCES:

1. O`zMST ASTM D 5867:2024 (ASTM D 5867:2012, MOD) Cotton fiber. Standard test methods for measuring physico-mechanical properties of cotton fiber using classifiers.
2. Study of the technological properties of cotton seedlings, physical and mechanical properties of the fiber of new cotton varieties with the issuance of a report. Scientific report. 2014.
3. Rashidov T.R., Shoziyotov Sh., Mominov Q.B. Fundamentals of theoretical mechanic.: Teacher, 1990.
4. Shohaydarova P., Shoziyotov Sh., Zoirov J. Theoretical mechanics.: Teacher, 1991. -407 p.
5. Miroshnichenko G.I. Basic design machine primary processing cotton. Moscow: Mashinostroeniya. 1972. -S 485.
6. Yoldoshev Q.P. Methodical manual for completing coursework in theoretical mechanics. 1993. –151 p.