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IMPROVING THE AUDIT OF INVENTORIES IN WINE INDUSTRY ENTERPRISES

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Abstract:

This article examines the organization and improvement of inventory auditing in wineries. It analyzes the specific features of inventory accounting and auditing such as seasonality, natural loss rates, biochemical changes of raw materials, and batch-based production. Recommendations are proposed for implementing digital audit tools and technologies to ensure transparency of inventory movement and reliability of financial information.

Keywords: wine industry, inventory audit, natural loss, batch production, inventory count, audit evidence, digital audit.

INTRODUCTION. The wine industry occupies an important position in the national economy as a connecting link between agriculture and the processing industry. The seasonal harvesting of raw materials, their susceptibility to biochemical changes, and the existence of natural loss coefficients make the accounting and auditing of inventories in wine industry enterprises significantly more complex compared to other sectors. According to data from the International Organisation of Vine and Wine (OIV), global wine production amounted to 244 million hectoliters in 2023. In Uzbekistan, grape production reached 1.8 million tons in 2024, while the production of wine materials exceeded 3.2 million decaliters. Such growth trends further increase the necessity of improving inventory audit practices in enterprises of the wine industry.
The purpose of this article is to examine the specific characteristics of inventory auditing in the wine industry and to develop scientific and practical recommendations for its effective organization.

LITERATURE REVIEW. The theoretical foundations of inventory auditing are comprehensively reflected in International Standards on Auditing ISA 501, ISA 330, and ISA 315. Among foreign scholars, G. Inderst, R. Kaplan, and T. Shindo have studied the specific features of inventory accounting related to biochemical changes. In the wine industry, the impact of batch-based production and fermentation processes on accounting practices is addressed in the standards of the International Organisation of Vine and Wine (OIV) of the European Union.
Local researchers—H. Umarov (ESG and quality control), B. Rahimov (storage and inventory count), and S. Omonov (the role of inventories in investment activities)—have paid particular attention to the analysis of material resources.
The synthesis of the reviewed literature indicates that inventory auditing in the wine industry requires the identification of industry-specific risks and the proper planning of audit procedures with due consideration of natural loss coefficients.

RESEARCH METHODS. The study was conducted using the following scientific methods:

- Comparative analysis — comparing inventory audit practices in the wine industry with those in other food industry sectors;
- Evidence collection methods — inventory counts, inspection of documentation, and recalculation procedures;
- Economic and statistical analysis — analyzing the dynamics of natural loss and batch-based expenditures;
- Modeling — assessing audit risks associated with changes in seasonal inventory volumes;
- Expert evaluation — synthesizing the opinions of industry specialists.

ANALYSIS AND RESULTS. The effectiveness of inventory auditing in wine industry enterprises primarily depends on the extent to which inventory movements are fully and reliably reflected. Below, the current situation, existing problems, and proposals aimed at addressing them are analyzed through tables and the conclusions derived from those tables.

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Table 1
Main risks and errors encountered in inventory auditing at wine industry enterprises

№	Type of risk / error	Description of the situation	Audit implications
1	Incorrect calculation of natural loss	Losses caused by evaporation, sediment, and filtration are either miscalculated or not standardized	Artificial overstatement or understatement of inventory value, material misstatements in financial reporting
2	Absence of batch-based accounting	Grapes and wine materials are recorded in an aggregated ("bulk") manner	Loss of traceability by quality, harvest year, and product type; weakened audit evidence
3	Deficiencies in inventory counts by warehouses and reservoirs	Barrel and reservoir capacities are not measured accurately; quantities are estimated	Discrepancies between actual physical quantities and reported inventory balances
4	Failure to account for biochemical changes	Changes in mass and composition during fermentation stages are not considered	Incorrect formation of inventory cost and valuation
5	Insufficient digitalization of document flow	Warehouse receipt and issue documents, laboratory protocols are stored in paper form	Reduced audit quality; difficulties in analysis and sampling procedures
6	Lack of segmentation based on product quality	Premium and standard product lines are recorded together	Unreliable revenue and margin analysis

The analysis shows that the most significant risks in inventory auditing are related to the lack of scientific and practical justification of natural loss norms, the incomplete implementation of batch-based accounting, the formal execution of inventory procedures, and the low level of digitalization of document flow.

These conditions give rise to significant risks of material misstatement for auditors and require the planning of additional audit procedures in accordance with International Standards on Auditing ISA 315 and ISA 330.

The following table compares норматив (standard) natural loss rates with the actual loss indicators identified in practice, using a wine industry enterprise as an example.

Table 2
Comparison of standard and actual natural losses

Inventory type	Input volume, dal	Standard natural loss, %	Standard loss volume, dal	Actual loss volume, dal	Difference (±), dal	Remarks
Grape juice (fermentation stage)	10,000	2.0%	200	260	+60	Above-standard evaporation and sediment
Wine material (storage stage)	8,000	1.5%	120	110	−10	Loss below the standard level
Finished wine (bottled)	6,000	0.5%	30	48	+18	High share of damaged containers
Semi-finished product in barrels	4,000	1.0%	40	75	+35	Problems related to barrels and storage conditions

From an auditing perspective, the results presented in the table indicate that, with regard to natural losses in inventory movement, the following issues require particular attention:

- natural loss standards should be reviewed and revised on a scientific and technological basis;
- the processes of documenting and classifying losses should be digitalized;
- special attention should be paid to the risks of unrecorded losses or potential misappropriation.

For wine industry enterprises, a comparison is

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made between traditional audit practices and the proposed improved approach.

Table 3
Comparison of traditional and proposed improved approaches to inventory auditing in wine industry enterprises

Audit stage / area	Description of the traditional approach	Description of the proposed improved approach
Risk assessment	Mainly general industry risks are considered; natural loss is assessed superficially	Biochemical changes, fermentation phases, and batch-based production risks are modeled separately
Inventory count	Manual counting, approximate measurement, paper-based records	Electronic registers, barcode/QR code systems, IoT sensors, and electronic documentation
Audit evidence	Primarily document inspection and physical observation of warehouses	Data analytics, marginal analysis by batch, integration of data from technological journals
Analysis of natural loss	Only compliance or non-compliance with standards is verified	Multi-factor analysis of standard–actual dynamics by product type, storage conditions, and processes
Evaluation of accounting policies	Compliance of one or two methods with legislation is verified	Comprehensive evaluation by FIFO, batch-based valuation, natural loss, revaluation, harvest year, and quality segments
Audit reporting	Standard format, limited to general recommendations	Reports enhanced with industry-specific checklists, infographics, and digital audit indicators (KPIs)

The proposed model introduces an audit concept for the wine industry that is based on industry-specific risks. This approach enables audit resources to be directed toward the most high-risk areas, allows conclusions to be drawn not on the basis of subjective "assumptions" but on quantitative data and technological information, and expands the ability to provide clear and practically relevant recommendations for enterprise management.

CONCLUSION. Based on the above tables and analyses, the following key scientific and practical findings can be highlighted:

1. Inventory auditing in the wine industry requires an active risk-oriented approach. Seasonality, biochemical changes, natural loss, and batch-based production factors should be identified as separate audit risks.
2. Current practices related to natural loss are often formal in nature (with weak documentation) or rely on excessively generalized standards. As demonstrated in Table 2, the differences between standard and actual indicators should constitute a significant subject of analysis for auditors.
3. The traditional audit approach based on document inspection and physical observation of warehouses does not fully meet the specific needs of the industry. As proposed in Table 3, the use of digital technologies and industry-specific checklists significantly enhances the quality of audit evidence.
4. The results of the study indicate that improving inventory auditing not only increases the reliability of financial reporting but also:
   - reduces losses and waste;
   - strengthens control over product quality;
   - contributes to increasing enterprise profitability and investment attractiveness.

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