HYGIENIC ASSESSMENT OF WORKING CONDITIONS OF EMPLOYEES IN MODERN HORTICULTURE AND VITICULTURE FARMS AND MEASURES FOR THEIR IMPROVEMENT

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ABSTRACT

This article provides a comprehensive hygienic assessment of working conditions in modern horticulture and viticulture farms. The study identifies major occupational hazards, including physical, chemical, and ergonomic factors, and evaluates their impact on workers' health. Field observations, environmental measurements, ergonomic analysis, and questionnaire surveys were used. The results show that workers are exposed to high temperatures, solar radiation, agrochemical residues, and physically demanding tasks. Practical recommendations aimed at improving occupational safety and reducing professional risks are proposed.

Keywords: horticulture, viticulture, labor hygiene, occupational hazards, ergonomics, agrochemicals, worker safety.

ГИГИЕНИЧЕСКАЯ ОЦЕНКА УСЛОВИЙ ТРУДА И МЕРЫ ПО ИХ УЛУЧШЕНИЮ ДЛЯ РАБОТНИКОВ СОВРЕМЕННЫХ ХОЗЯЙСТВ ПО САДОВОДСТВУ И ВИНОГРАДАРСТВУ

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АННОТАЦИЯ

В статье рассматриваются гигиенические и трудовые условия работников, занятых в современных хозяйствах по садоводству и виноградарству. Анализируются основные физические, химические, эргономические и биологические факторы, влияющие на здоровье работников, определяются основные профессиональные риски и оцениваются существующие профилактические меры. На основе анализа научной литературы и практических данных предлагается комплекс

организационных, санитарных и технологических решений, направленных на улучшение безопасности труда, предупреждение профессиональных заболеваний и повышение производительности в садоводстве и виноградарстве. Результаты подчёркивают необходимость модернизации рабочих мест, внедрения средств индивидуальной защиты и реализации комплексных программ по гигиене труда.

Ключевые слова: садоводство, виноградарство, гигиена труда, условия труда, эргономические риски, сельскохозяйственные работники.

INTRODUCTION

Horticulture and viticulture are key branches of agriculture contributing significantly to national food security, export potential, and rural economic development. In countries with favorable climatic conditions such as Uzbekistan, the rapid expansion of orchards and vineyards has increased the demand for a skilled workforce and modern production technologies (FAO, 2023).

Despite their economic importance, these sectors are considered high-risk in terms of occupational health. Workers are frequently exposed to intense sunlight, elevated temperatures, agrochemical substances, repetitive manual labor, and prolonged awkward postures. These factors can lead to acute and chronic health disorders, negatively affecting work capacity and productivity (WHO, 2020).

Exposure to pesticides is one of the most serious health risks in horticulture. Numerous studies have reported allergic reactions, skin and eye irritation, respiratory problems, and chronic intoxication among workers handling agrochemicals (FAO/WHO, 2019). Additionally, the predominance of manual labor and inadequate mechanization contribute to musculoskeletal disorders such as low back pain, knee strain, and joint degeneration (Smith & Lee, 2020; Rahmonov, 2019).

According to ILO (2021), improving occupational safety in agriculture can increase productivity by 15–25%. Therefore, hygienic assessment of working conditions is crucial for preventing occupational diseases, reducing injury rates, and improving economic efficiency.

The aim of this research is to conduct a comprehensive hygienic assessment of the working conditions in modern horticulture and viticulture farms and to propose evidence-based measures to improve worker safety and health.

MATERIALS AND METHODS

The study was carried out in several horticultural and viticultural farms between 2024 and 2025. The following methods were employed:

1. Hygienic Assessment of Environmental Conditions

Measurement of air temperature, humidity, solar radiation, and wind speed.

Laboratory analysis of soil and air samples for nitrate, phosphorus, and organophosphate pesticide residues.

2. Health Monitoring

Standardized questionnaire for workers regarding fatigue, dizziness, cardiovascular complaints, and allergic reactions.

Measurement of blood pressure, pulse, and general somatic indicators.

3. Ergonomic Analysis

Observation and assessment of working postures.

Evaluation of the frequency and duration of repetitive motions and the weight of loads handled by workers.

4. Statistical Analysis

Data processed using SPSS 26 software.

t-test, chi-square test, and correlation analysis were applied.

RESULTS

Physical Environmental Factors

1. During the summer season, workplace temperatures reached 36–42°C.
2. 68% of workers reported symptoms of heat exhaustion.
3. Signs of dehydration were observed in 41% of workers.

2. Chemical Risk Factors

Organophosphate pesticide residues in the air were 1.4 times higher than the permissible exposure limit in treated areas.

39% of workers reported allergic symptoms, including skin rash and eye irritation.

3. Ergonomic Findings

54% of workers reported lower back pain.

47% complained of knee discomfort.

In 70% of vineyards, low trellis structures forced workers to maintain prolonged bending postures.

4. Use of Personal Protective Equipment (PPE)

Only 32% of workers regularly used PPE.

48% lacked respirators and 61% lacked protective gloves.

DISCUSSION

The findings demonstrate that working conditions in horticulture and viticulture farms pose significant occupational risks. High temperatures and prolonged exposure to sunlight contribute to heat stress and dehydration, consistent with global data on outdoor labor risks (Smith & Lee, 2020). Excessive levels of pesticide residues confirm the seriousness of chemical exposure risks, which can lead to chronic neurological and immunological disorders (FAO/WHO, 2019).

Ergonomic problems—including repetitive tasks, manual handling of heavy loads, and awkward postures—are major contributors to musculoskeletal diseases, one of the most common occupational health issues in agriculture worldwide (Rahmonov, 2019).

PPE usage among workers was found to be critically low, which significantly increases vulnerability to chemical and physical hazards. Strengthening occupational safety culture, implementing regular training programs, and improving employer responsibility are essential to reducing workplace risks.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study revealed that workers in horticulture and viticulture farms are exposed to multiple physical, chemical, and ergonomic hazards. These risk factors significantly affect their health, contributing to heat stress, allergic conditions, and musculoskeletal disorders.

Recommendations

1. Optimize work schedules during hot seasons: shift work to early morning, increase rest breaks, ensure shade availability.
2. Strengthen pesticide safety protocols: enforce protective measures during pesticide application.

3. Provide 100% PPE coverage and enforce its mandatory use.

4. Improve ergonomic conditions: raise vineyard trellis height, introduce mechanization, and use lightweight tools.

5. Conduct regular medical check-ups twice a year.

6. Organize continuous occupational safety training programs.

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