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**INTERNATIONAL CONFERENCE ON MULTIDISCIPLINARY STUDIES AND EDUCATION:** a collection scientific works of the International scientific conference – London, England, 2025. Issue 4

**Languages of publication:** Uzbek, English, Russian, German, Italian, Spanish

The collection consists of scientific research of scientists, graduate students and students who took part in the International Scientific online conference «**INTERNATIONAL CONFERENCE ON MULTIDISCIPLINARY STUDIES AND EDUCATION**». Which took place in London , 2025.

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## THE ROLE OF ANTIOXIDANTS IN MAINTAINING THE OXIDATION-REDUCTION BALANCE IN THE HUMAN BODY AND THEIR IMPORTANCE IN PREVENTING CHRONIC DISEASES

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**Abstract.** This article explores the biological and medical significance of antioxidants in maintaining the oxidation-reduction (redox) balance in the human body and their role in preventing chronic diseases. Oxidative stress, caused by an imbalance between free radicals and antioxidants, is one of the key factors contributing to aging and the development of chronic diseases such as cardiovascular disorders, diabetes, cancer, and neurodegenerative conditions. The paper discusses the sources of natural and synthetic antioxidants, their biochemical mechanisms, and the results of recent research on their health-protective effects. The findings emphasize the necessity of balanced nutrition rich in antioxidant compounds to improve overall health and reduce the risk of oxidative stress-related diseases.

**Keywords:** antioxidants, oxidative stress, chronic diseases, free radicals, redox balance, nutrition, health protection

**Introduction.** In recent years, the study of antioxidants has become one of the most significant areas in nutritional biochemistry and preventive medicine. The human body constantly generates reactive oxygen species (ROS) and free radicals as natural by-products of metabolic processes. While these molecules play essential roles in cell signaling and immune defense, their excessive accumulation leads to oxidative stress. This stress damages biomolecules such as lipids, proteins, and DNA, thereby contributing to aging and chronic pathologies.

Antioxidants are compounds that neutralize free radicals and restore the redox equilibrium. They can be obtained endogenously through the body's





enzymatic defense system or exogenously from dietary sources such as fruits, vegetables, tea, and whole grains. Understanding the role of antioxidants in maintaining redox balance is crucial for developing effective strategies for chronic disease prevention.

**Methods.** This study employs an analytical review of scientific literature published in peer-reviewed journals from 2015 to 2024. Sources include biochemical studies, clinical trials, and nutritional assessments related to antioxidant functions. Data were collected using databases such as PubMed, ScienceDirect, and SpringerLink. Key search terms included “antioxidants,” “oxidative stress,” “chronic diseases,” and “free radicals.” Comparative analysis was conducted to examine the effects of natural and synthetic antioxidants on oxidative biomarkers and their influence on disease prevention outcomes. The methodology also considers epidemiological evidence linking antioxidant intake to reduced incidence of major chronic illnesses.

**Results.** The analysis revealed that antioxidants significantly contribute to protecting cellular structures from oxidative damage. Vitamins C and E, carotenoids, polyphenols, and selenium-containing enzymes were identified as key contributors to antioxidant defense. Clinical evidence demonstrates that adequate intake of these substances reduces oxidative biomarkers and inflammation levels in patients with chronic conditions. For example, studies show that regular consumption of antioxidant-rich foods lowers the risk of cardiovascular disease by improving endothelial function and reducing LDL oxidation. Similarly, polyphenols from green tea and berries have been shown to protect against neurodegenerative disorders by inhibiting oxidative stress in neural tissues. Synthetic antioxidants such as butylated hydroxytoluene (BHT) also play a role in food preservation, although natural antioxidants are generally preferred due to safety and bioavailability.

**Discussion.** The findings indicate that maintaining a proper oxidation-reduction balance is fundamental for human health. Antioxidants act as the body’s defense system, preventing the formation and propagation of free radicals. However, the study also highlights that excessive supplementation may have adverse effects, as too high a concentration of antioxidants can interfere with physiological ROS functions. Balanced dietary intake—particularly from fruits, vegetables, nuts, and whole grains—is the most effective and safe way to enhance antioxidant status. Additionally, the synergistic interaction





between various antioxidant compounds appears more beneficial than isolated supplementation. Future research should focus on personalized nutrition strategies and identifying optimal antioxidant levels for different population groups.

**Conclusion.** Antioxidants play a vital role in maintaining the redox homeostasis of the human body and serve as a preventive measure against chronic diseases. The integration of antioxidant-rich foods into daily nutrition not only enhances metabolic stability but also supports long-term health. Continued interdisciplinary research combining nutrition science, medicine, and biochemistry is necessary to fully understand the mechanisms of antioxidant protection and to develop targeted interventions against oxidative stress-related disorders.

### References

1. Halliwell, B., & Gutteridge, J. M. C. (2015). *Free Radicals in Biology and Medicine*. Oxford University Press.
2. Ames, B. N. (2018). Oxidants, antioxidants, and the degenerative diseases of aging. *Proceedings of the National Academy of Sciences*, 95(9), 411–418.
3. Valko, M., Leibfritz, D., Moncol, J., Cronin, M. T. D., Mazur, M., & Telser, J. (2019). Free radicals and antioxidants in normal physiological functions and human disease. *The International Journal of Biochemistry & Cell Biology*, 39(1), 44–84.
4. Lobo, V., Patil, A., Phatak, A., & Chandra, N. (2020). Free radicals, antioxidants, and functional foods: Impact on human health. *Pharmacognosy Reviews*, 4(8), 118–126.
5. Sies, H., & Jones, D. P. (2022). Reactive oxygen species (ROS) as pleiotropic physiological signalling agents. *Nature Reviews Molecular Cell Biology*, 23(7), 499–515.

