HYGIENIC REQUIREMENTS FOR THE QUALITY OF DRINKING WATER

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Abstract *Drinking water quality is fundamental to human health and well-being, requiring strict adherence to hygienic standards. This article explores the essential hygienic requirements for potable water, emphasizing parameters such as physical, chemical, and microbiological properties. The discussion highlights the importance of regular monitoring, water treatment processes, and compliance with global and local regulations to ensure safe drinking water. Special attention is given to the health risks associated with non-compliance and strategies to mitigate contamination, including public awareness and technological innovations.*

Keywords *Drinking water, hygiene, quality standards, water contamination, health risks, water treatment, microbiological safety.*

Introduction Water is a vital resource for sustaining life, yet the quality of drinking water remains a significant public health concern worldwide. Contaminated water is a leading cause of waterborne diseases, which disproportionately affect vulnerable populations. Ensuring safe and hygienic drinking water involves adhering to standards that minimize physical, chemical, and microbiological hazards. This article reviews the core hygienic requirements for drinking water quality, emphasizing their role in safeguarding health.

Physical Requirements The physical properties of drinking water include color, odor, taste, and turbidity. Water should be colorless, odorless, and free from

unpleasant tastes to be deemed potable. Turbidity, caused by suspended particles, should be within acceptable limits (typically less than 1 NTU) to prevent the proliferation of pathogens and ensure aesthetic acceptability.

Chemical Requirements Chemical safety involves maintaining permissible levels of minerals, metals, and contaminants. Key parameters include:

1. **pH Levels**: Drinking water should have a pH between 6.5 and 8.5 to prevent corrosivity and support human health.
2. **Heavy Metals**: Elements such as lead, mercury, and arsenic must be below detectable limits to avoid chronic toxicity.
3. **Nutrient Balance**: Essential minerals like calcium and magnesium should be present in adequate amounts to promote health while avoiding excessive concentrations that could cause hardness and scaling.
4. **Chemical Contaminants**: Pesticides, nitrates, and industrial pollutants must be absent or within strict regulatory limits.

Microbiological Requirements Microbiological safety is critical in preventing waterborne diseases. Drinking water must be free of pathogenic microorganisms, including bacteria (e.g., Escherichia coli), viruses, and protozoa. Regular microbiological testing is essential to detect and eliminate potential threats, particularly in regions relying on untreated water sources.

Hygienic Standards and Regulations Global organizations, such as the World Health Organization (WHO), and local regulatory bodies establish drinking water quality standards. These standards provide guidelines for acceptable contaminant levels, ensuring consistency in water safety measures. Compliance with these guidelines requires:

- Periodic water quality testing.

- Proper infrastructure for water treatment and distribution.
- Training and certification for water management personnel.

Water Treatment Processes Effective water treatment involves a combination of methods to remove contaminants and improve quality. These methods include:

1. **Filtration**: Eliminates physical impurities and reduces turbidity.
2. **Chlorination**: Disinfects water by killing bacteria and viruses.
3. **Reverse Osmosis**: Removes dissolved salts and chemical pollutants.
4. **UV Sterilization**: Provides additional microbial safety.

Health Risks of Poor Water Quality Non-compliance with hygienic standards poses severe health risks, including diarrhea, cholera, and long-term conditions such as cancer due to chemical exposure. Vulnerable populations, including children and immunocompromised individuals, are particularly at risk.

Strategies for Improvement Ensuring hygienic drinking water requires a multifaceted approach, including:

1. **Public Awareness**: Educating communities about safe water practices.
2. **Technological Innovations**: Advancing water purification technologies.
3. **Policy and Investment**: Strengthening water infrastructure and regulatory frameworks.

Conclusion Maintaining the hygienic quality of drinking water is a cornerstone of public health. Adherence to rigorous standards and investment in

water treatment technologies are essential for minimizing risks and ensuring access to safe water for all. By prioritizing hygiene in water management, societies can safeguard health and promote sustainable development.

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