



DOI:10.29013/AJT-26-3.4-217-223



MONITORING THE QUALITY OF DRINKING WATER AND MILK. (Inventions in the field of non-contact monitoring of the quality of drinking water and cow's milk in real time)

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Cite: Marakshyna A. (2026). *Monitoring the quality of drinking water and milk. (Inventions in the field of non-contact monitoring of the quality of drinking water and cow's milk in real time). Austrian Journal of Technical and Natural Sciences 2026, No 3–4.* <https://doi.org/10.29013/AJT-26-3.4-217-223>

Abstract

This article examines issues related to quality control of drinking water and milk as critically important components affecting human health and technologically sensitive production processes. The primary objective of the study is to identify the limitations of existing monitoring technologies and to substantiate the need for more comprehensive and continuous quality control systems capable of ensuring reliable assessment of key safety and purity indicators. The research is based on an analytical evaluation of current monitoring technologies and applicable regulatory requirements, including a comparative analysis of major quality indicators such as water conductivity and the specific characteristics of milk as a high water-content product requiring enhanced quality control. The findings demonstrate that existing systems do not provide full control over critical quality parameters. The article concludes that the implementation of continuous, accurate, and mobile monitoring systems for water and milk is necessary, particularly in sectors requiring elevated levels of safety, reliability, and technological precision.

Keywords: *Drinking water, Cow's milk, Range of technical capabilities, New visions of regulatory quality requirements, Equivalent mobile, reliable and accurate control technology, Need for continuous monitoring, Device for selective identification in real time of the current value of the complex digital indicator of the dynamic state of drinking water quality, Complex Digital indicator of the dynamic state of cow's milk, Integral equivalent of the current value of the content and concentration of components in water*

Introduction:

Inventions in the field of non-contact monitoring of the quality of drinking water and cow's milk. The quality of drinking water practically determines the quality of life. In all methods of water quality control, it is accept-

ed that the conductivity of water is a clear indicator of its purity.

The more impurities in water, the lower its electrical resistance, and the cleaner the water, the higher its electrical resistance.

This suited everyone for a long time, until international terrorism reached such a level of spread as it does now and until general environmental pollution reached such unprecedented scale and dimensions as it does now.

These are of course not all the factors that determine the urgent need for more complete control of water quality, but they are very important.

Almost all existing technologies, devices and equipment for water quality control have a very narrow range of technical capabilities and do not cover all the parameters that must be constantly monitored in order not to allow water to reach the user that, due to the above reasons, is contaminated to such an extent that it poses a danger to human life and health.

Milk is one of the most important products in a complete diet, and since a significant percentage of its composition is also water, it requires equivalent mobile, reliable and accurate control technology, adapted both to the increased quality requirements of milk and to new visions of regulatory requirements for quality.

When monitoring the quality of milk, adaptation to new technological conditions and processes of its industrial processing is also very important.

Based on this far from complete set of information, we can make a reasonable conclusion about the need for constant monitoring of the quality of milk and water before use.

Such technologies have been invented and below is a brief description of these technologies:

1. Device for monitoring the current value of drinking water quality in real time

The device is designed to monitor and evaluate in real time the current value of a complex digital indicator of the dynamic state of drinking water quality; The device can be adapted to process water quality control systems at the inlet to the process and to monitor the quality of wastewater before discharge into the sewer system or before returning to the process after regeneration

Complex Digital indicator of the dynamic state of water and aqueous solutions, this is an integral parameter, which, according to

the criteria of frequency, amplitude, resistance, parameters of resonance phenomena, inductance and a complex of dynamic characteristics of the water flow, is an integral equivalent of the current value of the content and concentration of components in water and the relationship, including biological, between the specified components and parameters.

The device for selective identification in real time of the current value of a complex digital indicator of the dynamic state of drinking water quality is a compact device designed for operation as part of water supply pipeline systems, as part of water flow meters or in field conditions powered by solar batteries

The device has minimal energy consumption.

The device includes functionally interconnected systems for input, output, control and transformation of water flow, wherein the system for transformation of water flow includes an aerodynamic mechanism for removing gases from said flow.

The device can be designed for use in stationary conditions and designed for express analysis.

The device and the procedure for working with it do not require special training of the operator or user.

2. Device for monitoring the current value of cow's milk condition in real time

The device is designed to monitor and evaluate in real time the current value of a complex digital indicator of the dynamic state of cow's milk quality

Complex Digital indicator of the dynamic state of cow's milk is an integral parameter, which, according to the criteria of frequency, amplitude, resistance, inductance and a complex of dynamic characteristics of the milk flow, is an integral equivalent of the current value of the content and concentration of components in cow's milk and the relationship, including biological, between the specified components

The device for its selective identification in real time is a compact device designed for operation in dairy farm conditions or in the field, powered by solar batteries.

The device has minimal energy consumption.

The device includes functionally interconnected systems for input, output, control and transformation of milk flow, wherein the system for transformation of milk flow includes an aerodynamic mechanism for removing gases from the milk flow.

The device can be designed for use in stationary conditions and designed for express analysis.

3. Complex integral indicator of water and aqueous solutions quality and device for its identification in real time

A digital indicator of the dynamic state of drinking water quality, which, when comparing the pulse directed to the sensor according to the criteria of frequency, amplitude, resistance, inductance and the same parameters arising in the pipeline from resonance phenomena in the flow, in combination with a set of dynamic characteristics of the water flow, is an integral equivalent of the current value of the content and concentration of components in the water

The device for its selective identification in real time is a compact device designed for operation in urban or main water supply systems or in the field, powered by solar batteries.

The device has minimal energy consumption.

The device includes functionally interconnected systems for input, output, control and transformation of the water flow supplied for control, wherein the water flow transformation system includes an aerodynamic mechanism for removing gases from the flow.

The complex integral indicator of water quality also includes a complex integral indicator of the sensor, which for each type of sensor, its design parameters and parameters of the signal supplied to the sensor, is a constant value, which is confirmed by the results of a series of tests in more than 1000 cycles on 4 types of sensors.

The device can be designed for use in stationary conditions and designed for express analysis.

4. Comprehensive integral indicator of cow's milk quality and a device for its identification in real time

A digital indicator of the dynamic state of cow's milk, which, according to the criteria of frequency, amplitude, resistance, inductance and a complex of dynamic characteristics of the milk flow, is an integral equivalent of the current value of the content and concentration of components in cow's milk.

The device for its selective identification in real time is a compact device designed for operation in dairy farm conditions or in the field, powered by solar batteries.

The device has minimal energy consumption.

The device includes functionally interconnected systems for input, output, control and transformation of milk flow, wherein the system for transformation of milk flow includes an aerodynamic mechanism for removing gases from the milk flow.

The device can be designed for use in stationary conditions and designed for express analysis.

5. Dynamic indicator of the current value of the number of somatic cells in cow's milk and a device for its selective identification in real time

A digital indicator of the dynamic state of cow's milk, which, according to the criteria of frequency, amplitude, resistance, inductance and a complex of dynamic characteristics of the milk flow, is an integral equivalent of the current value of the content and concentration of somatic cells in cow's milk.

The device for its selective identification in real time is a compact device designed for operation in dairy farm conditions or in the field, powered by solar batteries.

The device has minimal energy consumption.

The device includes functionally interconnected systems for input, output, control and transformation of milk flow, wherein the system for transformation of milk flow includes an aerodynamic mechanism for removing gases from the milk flow.

The device can be designed for use in stationary conditions and designed for express analysis.

6. Dynamic complex indicator of the current value of fat concentration in cow's milk and a device for its selective identification in real time

A digital indicator of the dynamic state of cow's milk, which, according to the criteria of frequency, amplitude, resistance, inductance and a set of dynamic characteristics of the milk flow, is an integral equivalent of the current value of the content and concentration of fat or fatty acids in cow's milk

The device for its selective identification in real time is a compact device designed for operation in dairy farm conditions or in the field, powered by solar batteries.

The device has minimal energy consumption.

The device includes functionally interconnected systems for input, output, control and transformation of milk flow, wherein the system for transformation of milk flow includes an aerodynamic mechanism for removing gases from the milk flow.

The device can be designed for use in stationary conditions and designed for express analysis.

7. Dynamic complex indicator of the current value of lactose content in cow's milk and a device for its selective identification in real time

A digital indicator of the dynamic state of cow's milk, which, according to the criteria of frequency, amplitude, resistance, inductance and a complex of dynamic characteristics of the milk flow, is an integral equivalent of the current value of the lactose content in cow's milk.

The device for its selective identification in real time is a compact device designed for operation in dairy farm conditions or in the field, powered by solar batteries.

The device has minimal energy consumption.

The device includes functionally interconnected systems for input, output, control and transformation of milk flow, wherein the system for transformation of milk flow includes an aerodynamic mechanism for removing gases from the milk flow.

The device can be designed for use in stationary conditions and designed for express analysis.

8. A comprehensive integral indicator of mastitis in a cow and a device for its identification in real time

A digital indicator that, based on the criteria of frequency, amplitude, resistance and inductance, is an integral equivalent or indicator of the occurrence of mastitis in a cow

The device for its real-time identification is a compact device designed for operation in dairy farm conditions or in the field, powered by solar batteries.

The device has minimal energy consumption.

The device includes functionally interconnected systems for input, output, control and transformation of milk flow, wherein the system for transformation of milk flow includes an aerodynamic mechanism for removing gases from the milk flow.

The device can be designed for use in stationary conditions and designed for express analysis.

9. Device for selective identification in real time of cow's milk quality during its transportation to the collection tank after milking

A compact unit designed for use on a dairy farm or in the field, powered by solar panels.

The device has minimal energy consumption.

The device includes functionally interconnected systems for input, output, control and transformation of milk flow, wherein the system for transformation of milk flow includes an aerodynamic mechanism for removing gases from the milk flow.

10. Device for contactless monitoring of cow's milk condition parameters

The device includes systems for introducing milk for control, removing the milk flow from the control zone, a sensory electronic integrated control module with an interface

The device may include a signal identification system and a device for accelerated comparison of identified signals with a standard.

11. Device for simultaneous monitoring of several parameters of cow's milk condition during transportation

The device has two versions

The first version is intended for installation on tanks to control the quality of milk during transportation and when transferring milk for processing into dairy products.

The second version is designed for installation on flexible or rigid pipelines through which milk is directed to storage tanks; this version can additionally have real-time temperature measurement functions.

12. Device for express analysis of cow's milk quality

The device is a mobile compact device with an internal cavity into which milk (or any other liquid) is introduced for analysis.

Around the cavity there is a sensor, selectively tuned to a specific parameter of either milk or any other liquid.

The device does not require setup or calibration and has several levels of protection.

13. Device for selective express analysis of cow's milk quality parameters

The device is a mobile compact device with an internal cavity into which milk (or any other liquid) is introduced for analysis.

Around the cavity there is a sensor, selectively tuned to a specific parameter of either milk or any other liquid.

The device does not require setup or calibration and has several levels of protection.

14. Contactless sensors for milk level in containers

The device controls the level of milk (or any other liquid) in a special section of the pipeline connected to the tank in which the liquid level is controlled.

The device has several design options.

It can be located in a container with liquid, it can be located outside the container, it can have different sensor designs.

15. Device for complex control of milk level in containers with simultaneous assessment of integral milk quality indicator at this level

The device controls the level of milk (or any other liquid) in a special section of the pipeline connected to the tank in which the liquid level is controlled.

The specified section of the pipeline is both a resonant sensor, which is configured to monitor and evaluate the integral quality indicator of milk (and any other liquid), and a level sensor.

The device can also simultaneously monitor any physical characteristics of milk or liquid, such as conductivity, density, acidity level.

16. Device for complex control of milk level in containers with simultaneous assessment of the number of somatic cells in milk at this level

The device controls the level of milk (or any other liquid) in a special section of the pipeline connected to the tank in which the liquid level is controlled.

The specified section of the pipeline is both a resonant sensor, which is configured to monitor the number of somatic cells, and a level sensor.

The device can also simultaneously monitor any physical characteristics of milk or liquid, such as conductivity, density, acidity level.

17. Device for complex control of milk level in containers with simultaneous assessment of fat content in milk at this level

The device controls the level of milk (or any other liquid) in a special section of the pipeline connected to the tank in which the liquid level is controlled.

The specified section of the pipeline is both a resonant sensor, which is configured to monitor the concentration of fat, and a level sensor.

18. Device for complex control of milk level in containers with simultaneous assessment of lactose content in milk at this level

The device controls the level of milk (or any other liquid) in a special section of the pipeline connected to the tank in which the liquid level is controlled.

The specified section of the pipeline is both a resonant sensor, which is configured to monitor the concentration of lactose, and a level sensor.

19. Device for complex monitoring of milk level in containers with

simultaneous assessment of blood traces in milk at this level

The device controls the level of milk (or any other liquid) in a special section of the pipeline connected to the tank in which the liquid level is controlled.

The specified section of the pipeline is both a resonant sensor, which is configured to monitor the concentration of blood, and a level sensor.

20. Device for complex control of milk level in containers with simultaneous sequential assessment of the concentration of basic components in this milk at this level

The device controls the level of milk (or any other liquid) in a special section of the pipeline connected to the tank in which the liquid level is controlled.

The specified section of the pipeline is both a resonant sensor, which is configured to control parameters, and a level sensor.

21. Device for complex control of milk level in containers with simultaneous assessment of concentration of several basic components in this milk at this level

The device controls the level of milk (or any other liquid) in a special section of the pipeline connected to the tank in which the liquid level is controlled.

The specified section of the pipeline is simultaneously a resonant sensor that is configured to control the parameters and concentrations of components in milk or any other liquid and has several sensors, each configured to control one parameter, and each sensor is also a level sensor.

22. Device for changing the level of turbulence of milk flow

The device is designed to convert and dynamically transform the turbulent flow of milk with the formation of a local zone of laminar flow in it, in which milk is monitored using a resonant sensor.

In addition, when transforming the flow, the device releases air from the milk flow and stabilizes its hydrodynamic characteristics.

23. Device for preparing milk flow for real-time monitoring of condition parameters

The device is designed to convert and dynamically transform the milk flow with the formation of a local laminar flow zone, in which milk is monitored using a resonant sensor.

24. Device for monitoring the level of gas content in milk in real time

The device is a resonant sensor that records changes in a set of parameters in milk depending on the concentration of air or any other gas in it.

The device can simultaneously control the degree of filling of the pipeline in which the milk flow moves and the level of turbulence of the milk flow in the pipeline.

25. Milk aeration process control system with real-time air content monitoring in milk

Milk aeration process control system with air content level control in milk; the system has feedback with a resonant sensor and changes the parameters of compressed air depending on the air concentration in milk

The system includes a resonant sensor, an interface and a converter of signals from the sensor into control signals to the compressed air source, with the help of which the pressure and flow rate of compressed air are changed.

The system also includes an aerodynamic function for introducing air into the milk.

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submitted 12.04.2026;

accepted for publication 26.04.2026;

published 30.04.2026

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