CDR DrinkLab: the system to address beverage quality control challenges

Abstract
The beverage sector is undergoing continuous transformation, with an increasing diversification of products ranging from plant-based drinks to fermented beverages, from juices to soft drinks. This variety involves complex analytical challenges related to safety, stability, and regulatory compliance. In this scenario, ***CDR DrinkLab*** *represents an innovative solution: a compact, versatile, and safe analyzer capable of delivering rapid and reliable analyses not only in the laboratory but also directly on the production line. The following sections illustrate how CDR DrinkLab fits into the industry context, meets quality control needs, and what analytical applications it offers to users.*

An evolving sector

The beverage industry is undergoing profound transformation, driven by changing consumer preferences, growing attention to health and wellness, and the emergence of new production trends. Alongside beer, wine, and spirits, today's market includes a very broad portfolio: **soft drinks, fruit juices, enriched mineral waters, teas, plant-based beverages, and fermented products such as kefir**.

This heterogeneity reflects a strong push toward **sustainability, naturalness, and nutritional functionality**, but also entails significant challenges for producers: each matrix has its own chemical characteristics, production processes, and quality parameters, all of which must be carefully monitored to ensure **food safety, sensory reproducibility, and regulatory compliance**.

In this context, analytical tools play a central role: solutions are needed to perform reliable quality checks not only in specialized laboratories but also close to the production line, reducing both time and complexity.

The CDR DrinkLab solution

To meet these needs, CDR has developed **CDR DrinkLab**, a compact and versatile chemical analysis system designed to support quality control across the entire beverage supply chain. Building on the consolidated philosophy of the **CDR FOODLAB®** line, CDR DrinkLab introduces simplified methods and pre-filled, ready-to-use reagents that eliminate the need for complex preparations and reduce the use of glassware and hazardous solvents.

Main advantages:

- **Safety and sustainability**: no carcinogenic reagents, reduced chemical waste, lower operator risk.
- **Speed and reliability**: results in just a few minutes, reproducible and accurate, even for complex parameters.
- **Versatility**: applicable to a wide range of matrices, from kefir to mineral waters, without changes to production infrastructure.
- **Accessibility**: usable by non-specialized staff thanks to intuitive and standardized procedures.
- **Adaptability**: suitable for large industrial brands as well as small craft producers and research centers.

Applications across beverage categories

Plant-based beverages

The plant-based drink segment is rapidly expanding, driven by demand for milk alternatives, environmental awareness, and new dietary trends. Their formulations are complex, with blends of plant extracts, oils, and stabilizers.
CDR DrinkLab enables monitoring of key parameters such as:

- **Sugars**: fundamental for both nutraceutical value and labeling.
- **Starch**: quality indicator in cereal-based beverages (oat, rice), with impact on digestibility and stability.
- **Lactic acid**: useful to prevent unwanted fermentations and control microbiological stability.

Soft drinks
Highly standardized yet massively consumed, soft drinks demand strict reproducibility. With CDR DrinkLab it is possible to measure:

- **Total acidity and pH**.
- **Organic acids (citric, malic, phosphoric)**, crucial for taste and regulatory compliance.
- **Caffeine**, to ensure correct dosage and safety in energy drinks and flavored waters.
- **Alcohol content**, increasingly relevant for "low" and "no alcohol" products.

Fruit juices
Juice quality depends on raw materials subject to seasonal variability. CDR DrinkLab allows monitoring of:

- **Sugars and total acidity**, quick indicators of stability and process control.
- **Organic acids (citric, malic, lactic)**, directly influencing flavor profile and freshness.

Kefir and fermented beverages
Live and dynamic products such as kefir require close monitoring during fermentation and storage. CDR DrinkLab enables the analysis of:

- **Lactic acid**, reflecting the activity of lactic acid bacteria.
- **Acetic acid**, to prevent undesired oxidation and track flavor development.
- **Malic acid**, a marker of acid balance and potential spoilage risk.
- **Residual sugars and alcohol**, indicators of fermentation progress and product stability.

Tea
Tea quality depends on both raw leaf composition and extraction or fermentation processes. With CDR DrinkLab it is already possible to monitor **SO_2**, a key parameter for ensuring safety and shelf-life without sensory alterations. At the same time, further applications are under study and development, such as acid profile evaluation and bioactive compound determination, essential for consistency of taste and nutritional properties.

Water
Packaged water represents the base for many beverages and must ensure absolute consistency in mineral profile. CDR DrinkLab provides precise measurement of ions such as **calcium, magnesium, and chloride**, which are crucial both for sensory perception and for label compliance.

A tool for every production reality
Quality control in the beverage sector is not the prerogative of large facilities alone. In industrial plants, CDR DrinkLab streamlines workflows and reduces response times; in craft productions, it delivers **reliable analytical data** without requiring costly infrastructures.

Thanks to **pre-filled cuvettes, patented methods, and micro-quantities of reagents**, the system also meets sustainability requirements, minimizing environmental impact. In every context, it offers concrete support to:

- Monitor batch consistency.
- Ensure regulatory compliance.
- Evaluate shelf-life and stability.
- Accelerate the development of new formulations.

Conclusion
The evolution of the beverage sector requires analytical tools that are **flexible, rapid, and safe**. CDR DrinkLab positions itself as a state-of-the-art solution, combining **scientific precision, operational simplicity, and sustainability**.

Whether it is a standardized soft drink, a fermented kefir, or a new plant-based beverage, CDR DrinkLab enables targeted and rapid testing, bringing laboratory-grade quality control directly to the production line.

Useful link

- The Role of Plant-Based Beverages in Nutrition: An Expert Opinion
- Chemical and Sensory Characteristics of Fruit Juice and Fruit Fermented Beverages and Their Consumer Acceptance
- Safety of Food and Beverages: Soft Drinks and Fruit Juices
- CDR DrinkLab: multiple applications in just one instrument