

INNOVATIVE ECA TECHNOLOGY MEETS ICE AGE WATER

A success story at Romina Mineralbrunnen



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Images INNOWATECH

Being based in Reutlingen, Romina draws mineral water from a deep well formed during the last Ice Age. State-of-the-art electrolysis technology guarantees a high standard of hygiene in beverage bottling.



Stefan Gugel, Managing Director for Technology and Administration, and beverage technology engineer Joerg Thumm prioritize state-of-the-art solutions at Romina.

For 18 years, beverage manufacturer Romina Mineralbrunnen has relied on ECA technology with membrane cell electrolysis for hygiene. Over the years, almost the entire production has been converted to disinfection with Innowatech Anolyte®.

Romina Mineralbrunnen GmbH from Reutlingen ranks among the top three mineral water companies in Baden-Wuerttemberg and is known for its brands “Eiszeit-Quell” and “SilberBrunnen”. The composition of Eiszeit-Quell mineral water is probably unique: it originated from glacial meltwater that seeped into the rock of the Swabian Alb at the end of the last Ice Age. A geological shift completely sealed off the spring from the surface water

cycle. Therefore, Eiszeit-Quell mineral water is still as pure as it used to be more than 10,000 years ago. The original purity of the spring is regularly verified through an independent institute’s analyses.

To ensure that the mineral water remains this pure when being processed and bottled, strict hygiene standards must be reliably implemented throughout operation. For 18 years, Romina has consistently relied on the highly effective ECA electrolysis process for disinfection, and since 2014, on the ECA technology from INNOWATECH.

In the beverage industry, bottling plants are considered some of the most critical areas with regard to microbiological contamination of beverages. Bottles can overflow or burst, and the leaking liquid serves as breeding ground for microorganisms. For beverage manufacturers like Romina, with a product range of 140 different items, this turns into a challenge when extras are added – as was the case in 2006 when Romina’s management considered bottling organic spritzers. Cold sterilization is not required for organic beverages: preservatives to prevent bacterial and yeast growth must not be added.

Stefan Gugel, Managing Director for Technology and Administration for the past 16 years, is one part of a dual leadership team with Andreas Mayer, Managing Director for Marketing and Sales. Gugel recalls:

“We faced particular challenges regarding hygiene when bottling organic beverages. We didn’t have, and still don’t have, an aseptic filler.

So, we had to keep our system hygienically sound enough to maintain the good initial condition after filler cleaning for at least two filling shifts – and this in the summer, at temperatures up to 40 degrees Celsius. In this climate, a single airborne germ is all it takes to settle on the filling valve or on another critical point. Logarithmic growth is simply a natural law with germs – so you have to take precautions to prevent this from happening. Otherwise, you quickly end up with yeast or mould in the bottle, and the product spoils.”

The challenge was to find a way to disinfect all critical parts of the bottling plant that works continuously during the filling process. “Hydrogen peroxide, peracetic acid, and ozone – none of them worked, explains Managing Director Gugel.

“All standard biocides were too weak to combat the biofilm.” Chlorine dioxide begins to off-gas at 32°C and would have required a concentration that would have immediately corroded the metal parts of the bottling plant.

Stefan Gugel stuck with it and, during a visit to a trade fair, learned about ECA technology (Electrochemical Activation), which at that time (in 2006) was not yet well-known. “We found a plant manufacturer who offered us a trial with an ECA system from Switzerland. And this trial was very successful from day one.”

In 2007, Romina acquired its first anolyte disinfection system. To increase and reliably ensure hygiene at the filling line,



Romina bottles 185 million bottles per year - a view of the new bottling plant in Reutlingen.
Image: Romina Mineralbrunnen

a sophisticated system of spray nozzles was installed on the filler. This fundamentally improved filler hygiene and the associated quality assurance during the filling process. The use of ECA technology also proved to be economically advantageous: the potential savings in water, energy, labour, and chemicals are significant.

Change to pH-neutral INNOWATECH Anolyte in 2016

In September 2016, the now ten-year-old ECA system from Switzerland was replaced by a modern Innowatech Aquadron system. The Aquadron systems produce anolyte with a neutral pH value of approximately 7.



Innowatech's Aquadron system from is as small as a large refrigerator and requires little space, but is highly efficient.

In contrast, the previously used electrolysis systems from the Swiss manufacturer produced an acidic product. The result were even more advantages for Romina.

Innowatech's anolyte is produced in the electrolysis cell at a neutral pH, without the formation of elemental chlorine (Cl-) during the manufacturing process. This increases the anolyte disinfection solution's effectiveness and stability and reduces the risk of corrosion even more. The previously typical chlorine odour of the acidic anolyte solution has turned into the smell of slightly chlorinated "swimming pool water". With the diluted anolyte solutions used for disinfection, even this odour is no longer perceptible.

Stefan Gugel says: "I am personally convinced: ECA works perfectly well! The systems run almost flawlessly and maintenance costs are manageable. Compared to chlorine dioxide systems, ECA completely eliminates handling and storage of hazardous materials. Regarding sustainability, this is an essential point. All you need to move is salt tablets and barely any electricity is required."

Gugel continues: "For us, moving towards ECA and switching to a rather unknown technology and a new disinfectant was a risk at first. However, now, after so many years, ECA has long since become a Romina-specific feature that we wouldn't want to do without. We've accomplished a great deal here, and since 2007, when we put the ECA system into operation, we haven't had a single bottling fail! The fact that nothing has ever gone wrong in all these years speaks for itself and is a real achievement."

The technology has now become established not only in the beverage and food industries, but also in municipal water supplies, hospitals, retirement homes, and industrial companies such as the dowel manufacturer Fischer, where Aquadron systems have been installed. Innowatech Managing Director Volker Fischer says: "Today, we no longer have to explain whether and how ECA works; it's common knowledge now, and technicians and quality managers have familiarized with it."

Meanwhile, in a company like Romina, there are other critical areas where an effective disinfectant is needed. Romina recently installed a new PET filling line with an integrated blow moulding unit. Gugel explains: Gugel explains: "We had an air conveyor system that would transport the finished PET bottles to the filler, where they were then crimped." Neither of these steps is part of the new filling line. This means the PET bottles are blow moulded directly at the filler. Then, the bottles' warm bottoms need to be cooled. If they enter the filler uncooled, the bottle bottoms deform and bulge, causing the bottles to tip over. Therefore, cooling water is needed, which is sprayed onto the bottoms of the plastic bottles to cool them quickly. "The cooling water heats up in the process and, without the addition of anolyte, becomes contaminated very quickly," Gugel explains. "So we also keep this process water under control with anolyte and prevent bacterial growth."

In the beverage industry, the primary focus is always on protecting the core product – the water or the beverage made from it. Romina Mineralbrunnen's water is glacial mineral water, and thus free from any traces of the modern world. The active ingredient anolyte and the Innowatech Aquadron system have proven effective in practical use over the past 18 years.

For Romina Mineralbrunnen GmbH from Reutlingen, the advantages are clear

- effective disinfection of operational and process water
- microbiologically clean surfaces in bottling plants, tanks, and pipelines
- reduced biofilm formation and less cleaning required
- no handling or storage of hazardous substances
- lower energy consumption and high material compatibility
- no dependence on chemical suppliers
- low operating costs

Conclusion

The use of ECA technology and on-site produced anolyte pay off. Disinfection related to the production and bottling of beverages is integral part of nearly all aspects of Romina's beverage production. The active ingredient reliably protects against microbiological contamination. The use of anolyte ensures operational hygiene in all critical areas, and especially in the bottling lines. Biofilm formation is effectively prevented. Production takes place only when anolyte is needed, guaranteeing minimal by-product formation. Storage and handling of hazardous materials can be spared. The savings achieved through the use of ECA technology have resulted in a short amortization period for the anolyte production facilities.

More Information
www.innowatech.de