



Case story

A refreshed way of producing fruit juices

With innovative thinking, Brazilian fruit juice producer Tial managed to achieve considerably lower processing costs. Here is how they reduced steam consumption by 65% and water usage by over 50% in their production.

Great grape nectar – great savings

Fruit juice producer Tial has found a new and more efficient way to turn those precious grapes and oranges into all-natural and tasty fruit juice drinks.

Brazilian fruit juice producer Tial's best seller is grape nectar followed by orange juice. Recently, the company has found a new and more efficient way to turn those precious grapes and oranges into all-natural and tasty fruit juice drinks. The new aseptic blending line from Tetra Pak addresses Tial's demand for energy and water savings, but it also saves on raw materials through greater blending accuracy and by minimising product losses.

"When Tetra Pak presented this new technology to us, we saw an opportunity to expand our production capacity, reduce

energy and water consumption, minimise waste and produce even more efficiently," says Rafael Araújo, Chief Operations Officer, Tial. "After thoroughly exploring all aspects of the project, we had no doubts about bringing it in for testing and validation. We focus on operational efficiency, with production lines that rank among the best in the world, and on the sustainability of our processes. Therefore, we were excited about the possibility of having this new technology to support our growth and deliver the values that are so important to us."





Sofie Lang, Process Engineer, Tetra Pak.

First in the world

Tial is the first company in the world to embrace this rather revolutionary line solution from Tetra Pak. "Innovation is a strong driver for us when it comes to technology and new products," says Araújo. "Innovation has always been at the core of our DNA. Tial was created at the university where the company founders developed the technology for producing ready-to-drink fruit juices without preservatives. As a company that values innovation, adopting cutting-edge technology is essential for staying ahead in the market," he says.

The common approach to produce juice today is to blend all ingredients with water and then pasteurise the product to deactivate harmful microorganisms. But the pasteurisation process requires energy to heat-treat the entire beverage volume. Also, for each product change, besides requiring additional water, energy and cleaning chemicals, the cleaning process results in product loss.

Only concentrate is pasteurised in Tetra Pak's new line solution.

Saving big by splitting streams

The simple but brilliant idea behind the new line solution is to pasteurise only the concentrate, not the whole product. There are two streams; one for the juice concentrate and one for water. The small volume of concentrate goes through the regular pasteurisation process while the bigger volume, consisting of just water, is purified through a UV light treatment and filtration process. The blending takes place after the pasteurisation and UV/ filtration handling on the aseptic side of the process.

The UV and filtration unit purifies the water stream, ensuring that there are no harmful or spoiling microorganisms. This is an extra step in the juice production process compared to a conventional line, but it unlocks potential for significant energy savings.

One might think that this solution with an extra UV and filtration unit would be much more expensive than a conventional pasteurisation line. Actually, it is a highly affordable solution. The total investment cost is just 10% more compared to a traditional line; and this extra cost has a payback time of less than a year due to the multiple savings it offers.*1

When you simply need to heat-treat only a small part of the product, you consequently minimise energy usage. In addition, when the product volume in the pasteuriser is significantly reduced, this saves a lot of water and other resources in the cleaning procedure. Another benefit with this new line is that the size of the pasteuriser, pumps and pipes can be considerably smaller due to the lower volume handled in the pasteurisation process. Furthermore, the need to cool the product after pasteurisation is eliminated, as the water stream cools the concentrate.

Linnea Gustafsson, Technology Specialist at Tetra Pak, was at Tial's site to validate the solution. "Validation is about proving that our technical solution meets the required specifications to enable an efficient and reliable process. For several weeks, we have tested, fine-tuned and validated key areas of our solution, such as capacity, energy efficiency, blending accuracy and functions related to product and water savings," she says.

*1. A conventional line with an Tetra Pak® Inline Blender B, a Tetra Pak® Pasteurizer B and an aseptic tank is compared to the aseptic Blending Line consisting of a Tetra Pak® Pasteurizer B, a water treatment unit, an aseptic tank and aseptic blending functionality.



-65%

Reduction of steam consumption during production



-50%

Cleaning water circulation volume (system volume)



190.000

Saved litres of concentrate per year



-92%

Product losses

*2 Explanation of the savings is found on page 6.

“This is a step change
for Tial and for the
market in general.”





*2. Compared to a Tetra Pak conventional beverage juice pasteurisation line with a 11,000 l/h capacity: Annual production volume: 50,000,000 l. Product: Grape nectar with 6.7 Brix. Capacity increase: from 8,000 l/h + 3,000 l/h to a maximum of up to 37,500 l/h in the new installation. Line solution: From sirup room to aseptic tank. Steam consumption during production: from 35 kg/1,000 l beverage pasteurisation to 12.4 kg/1,000 l beverage. Cleaning-in-Place water savings: circulating volumes during cleaning 735 vs. 365 litres on a 3 CIP weekly average. Concentrate savings: from 6.25 ml/liter beverage overdosing to 2.5 ml/l. Product loss savings: from 330 l/drain mixphase to 25 l/drain.

Capacity of 37,000 l/h

The solution at Tial has been developed for high-acid juices and nectars. For now, the capacity is 11,000 litres per hour. The limitation of the production flow sits in the downstream fillers and Tial already has plans to upgrade the filling capacity. “We aim to install two more filling lines,” says Araújo. “With them, we will increase our production capacity by 67%” However, the installed line is ready to process beverages up to 37,000 litres per hour.

The two companies have a tight relationship and continuously exchange ideas on new innovations, trends and future projects. They share values such as innovation, sustainability and responsibility towards consumers. “It’s a very good partnership and we have found Tetra Pak to be an ideal partner,” Araújo says. “It includes not only expanding our production capabilities, use of new technology and improved performance but also great marketing activities and a sustainability approach. It’s a relationship that makes it safe for us to try disruptive ideas,” he says.

“To meet Tial’s challenges and foster both our relationship and innovation, we have a clear and proactive agenda,” says Andrea Pacetta, Processing Key Account Manager

at Tetra Pak. “We meet every three months to discuss projects, and we also plan inspirational trips where we bring Tial to other markets,” she says.

“It’s a relationship that makes it safe for us to try disruptive ideas.”

Tial was the first in Brazil with fully bio-based packages. With the new line, they are taking the next step in terms of efficient production. “We are very excited about this rather complex project,” says Araújo. “We wanted to be the first with this solution. This is a step change for Tial and for the market in general,” he says.



From left: Mohit Maru and Gabriel Scafi, both from Tetra Pak.

“We saw an opportunity to expand our production capacity, reduce energy and water consumption, minimise waste and produce even more efficiently.”

Four wins with this solution

There are four sustainable benefits with the new aseptic blending line. First of all, there are substantial energy savings. Since the complete beverage doesn't need to be heated, just the concentrate, Tial saves a lot of energy; as much as 64.6% is saved in steam consumption during production. The steam needed for pasteurisation only is reduced by 84.3%.

A second benefit is the water savings in the Cleaning-In-Place procedure. This relates to circulating volumes for the pasteuriser and the water treatment unit. As the pasteuriser is smaller, the complete “system volume” – the amount of water that is needed to flood and rinse the installation – is smaller. That means with every cleaning Tial needs less water for production and this adds to at least 50.3% in savings annually. In the hot season of the Minas Gerais region, water supply is limited. This solution means those precious water drops can be used to produce beverage, instead of for cleaning.

A third benefit concerns raw-material savings. The line allows production at a much higher accuracy compared to batch production, where more raw material is needed to stay within quality requirements. The usual hard-to-avoid overdosing of several millilitres of expensive juice concentrate per each litre

produced product is reduced by 60% with the inline blending function that is managing the aseptic blending line. This results in a significant increase in product output with the same amount of ingredients.

Incorporating the mix phase is a fourth benefit with the line. At the beginning and the end of every production run and at every product change there are water/product mix phases that will be partially sent to drain. That is equivalent to several litres of indirect water and product losses. With the new line, these mix phases are sent accurately to the aseptic blending tank and turned into product. Taking care of every drop makes a difference. It adds up to about up to 70,000 litres of beverage saved yearly from drain and turned into product, which is safely packed in a Tetra Pak carton.

“Innovation has always been at the core of our DNA.”

Since the line simply needs formulation of the concentrate, the operators now only need to prepare one tank in the same time they used to prepare three or four in the

old production process. This allows them to be more focused on the actual work, their production stress is reduced, as is the risk of human error. This is an important “soft improvement factor” of the new line solution.

Rafael Araújo, Chief Operations Officer states: “The main advantages of this solution include significant reductions in energy consumption, which are crucial for both cost savings and environmental sustainability. Additionally, it offers lower levels of waste, leading to more efficient use of resources and less environmental impact. The enhanced accuracy in the mixing processes ensures consistent product quality, and the increased production capacity allows us to produce

more with the same resources, supporting our growth and market demands. These benefits align perfectly with our goals of efficiency, sustainability, and high-quality production,” he says.



Rafael Araújo, Chief Operations Officer, Tial.

This is Tial

Tial was founded in 1986 in Visconde do Rio Branco in the state of Minas Gerais and was the first Brazilian company to produce ready-to-drink fruit drinks with 100% natural ingredients and no chemical additives. The company has nearly 400 employees and a turnover of 350 million reais (MEUR 58.9) in 2024. Tial sells its products all over Brazil and

is the fruit-juice market leader in the Minas Gerais region, with a 19% market share, nearly double that of the closest competitor (figures from 2023).



From left: Renan Azanha (Production Supervisor, Tial), Gabriel Scafi (Process Engineer, Tetra Pak), Mohit Maru (Commissioning Engineer, Tetra Pak), Gabriela Pissinato (Project Manager, Tetra Pak), Victor Wanderley (CEO, Tial), Andrea Pacetta (Processing Sales Manager, Tetra Pak), Rafael Araújo (COO, Tial) and Daniel Leitão (Key Account Manager, Tetra Pak).

Useful links:

- Tial's website
- Line solutions for juice, nectars and still drinks
- White paper
- Tetra Pak's website
- Contact Tetra Pak



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