



Beverages with bite: how to process drinks with particles

BEVERAGE, HEAT TRANSFER

Can you bite a beverage? You can if it contains chewy cubes made from coconut. One of the latest trends in Asia is to add nata de coco (jelly-like fermented cubes of coconut water) to juices. It is part of a global trend to make beverages chunkier, thicker and more nutritious. This is opening up new opportunities – but also creating new challenges for beverage processors.

Beverages are becoming more of a mouthful. The dividing line between foods and beverages is becoming blurred with the global trend towards adding more and bigger particles to beverages. But how do you process these drinks so that the delicate particles don't suffer damage or maceration?

The expanding market for beverages with particles (as well as fibres and pulp) is putting new demands on processors and the technologies they use to deliver high-quality products. This is because these constituents are often fragile and easily damaged during processing.

Beverage processors have traditionally worked with pulp and fibres, but particles have become more popular ingredients in the last decade, and the trend is expected to continue.

Consumers are increasingly looking for enhanced, exciting, refreshing drinks with the trend accelerating towards keeping natural fruit fibres in the beverages – or mixing particles or pulp into them. This trend is prevalent in parts of Asia. For example in China, nata de coco (chunks

of jelly-like coconut water) is added to juice and pieces of Aloe vera to ice tea. The idea is to create products where consumers experience the feeling of drinking fruit in liquid form or even perceive drinking a beverage as like having a snack. In other words, consumers are looking for more than 'just' a beverage.

Challenges in heat treatment

A number of considerations have to be taken into account when processing beverages with particles, fibres and pulp: How much damage is acceptable? Where in the process is the damage most likely to occur, and can something be done about it? How do variations, such as ripeness or sugar content in the raw material, affect the process and the product? How does the equipment – the pumps, valves, heat exchangers – influence the final product?

Tetra Pak has delivered numerous installations to beverage producers, including those handling particles such as Aloe vera, nata de coco and peach pieces. One of the best solutions, if the investment can be justified, is to have an aseptic dual line: one line for the particle stream and one for the liquid stream. Then they are [blended](#) continuously inline or in an aseptic tank before filling. In this way, the particle stream containing a minimum of liquid can be treated in an optimal way for the particles, while the liquid stream can be optimized separately. Of course, particles, fibres and pulp require longer heating time than the liquid.

“With [heat treatment](#), you need to ensure a certain temperature for food safety. The main challenge is that food with particles has two phases: a liquid phase and a particle phase,” says Helena Arph, Technology Specialist, Viscous and Particulate Foods at Tetra Pak. “The challenge is to achieve the right temperature in the centre of the particle without overheating the liquid, because it takes greater heat and a longer time to heat the particle than the liquid. That’s why a dual line is a good solution when product quality is a top priority.”

Demands on heat exchangers

For particles, heat exchangers should be designed with fewer – but larger – tubes of sufficient diameter with smooth inlets. The larger the particle, the larger the tube diameters needed.

Getting the size of the heat transfer surface right requires [accurate tools](#) based on the correct heat-transfer coefficients. Calculations should take into account the fact that the presence of particles actually increases the mixing in the tubes, due to turbulence.

“We have cracked the heat transfer code,” says Arph, referring to new calculation tools including PartCalc. “We have built and validated heat-transfer tools that can be used for optimal design for foods or beverages with particles.”

Optimizing the heat treatment of particulate fo...



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Learn how to optimize juice pasteurization

New findings from a Tetra Pak research group indicate that we may be over-pasteurizing some of our drinking juices – and wasting energy, money and time in the process. The group's findings show that the pasteurization recommendations can be optimized while retaining product quality. Subscribe to the Tetra Pak Processing Inspiration newsletter for insights like this on juice pasteurization and more!

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