

THE KETCHUP EFFECT

One of the world's favourite sauces, ketchup poses challenges for food producers. Here's how homogenization can help.



1
Tomatoes bred for processed product differ in several ways from tomatoes grown to eat fresh – for example, they have more durable fruit flesh in order to better withstand handling and transportation.



For high Brix* products, like ketchup, optimal homogenization pressure can vary between 50-200 bar. (*Brix is the percent of solutions solids calculated as sugar).

3 The perfect pressure

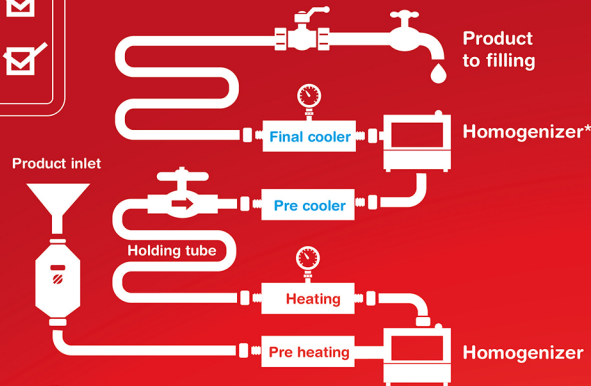
4 Tomatoes are abrasive



5

Lycopene: When tomatoes are homogenized the cells are ruptured and the lycopene – the colour pigment that gives tomatoes their bright red colour – is released, giving the product a more appetizing appearance.

Sand: Silica is an essential nutrient for the tomato and the excess will deposit between the cells, in the voids. The particles are called phytoliths and are in the range of 50-500nm. They are common in other foods as well, like rice.



6 Upstream or downstream?

* Tomato products are generally homogenized upstream, but in the case of tomato ketchup, it can be beneficial to place the homogenizer downstream from the heat exchanger due to the viscosity loss that follows with shear.

7 No one likes watery ketchup

Homogenizing tomato products minimizes watering off by increasing the hydrogen bonds between water and cellulose in the fibres. Shear forces and turbulence break the intermolecular bonds in the cellulose. Where the bonds break, water will enter to create a network between the fibres. This network will also prevent free flow of the non-bound water in the product.



Graded paper



Specific amount of ketchup is put on to paper



Left untouched for a set time



The spreading of the water is measured in [length/time unit]