

APV Cavimator Technology in Ketchup and Barbeque Sauce Production

THE POWERFUL FORCES OF CAVITATION PRODUCE RESULTS THAT FAR EXCEED THOSE OF CONVENTIONAL TECHNOLOGY

Tomato ketchup is one of the most popular condiments and is made in many varieties. Barbeque sauces are similar in formulation, as both products are composed of tomato paste, sweeteners, vinegar, salt, flavors and spices.

The most important qualities of these products are their flavor, viscosity, and shelf-stability without the separation of water or “syneresis”. The APV brand Cavimator and its break-through microscopic mixing technology gives processors new ways to achieve these product properties, with key benefits.

For some formulations, high viscosity comes from the tomato fibre and pectin naturally found in hot break tomato paste. Ketchup is typically preheated to pasteurization temperature and passed through a homogenizer to increase the fibre surface area, allowing it to trap free water and to increase the viscosity. It is then deaerated to remove oxygen before filling.

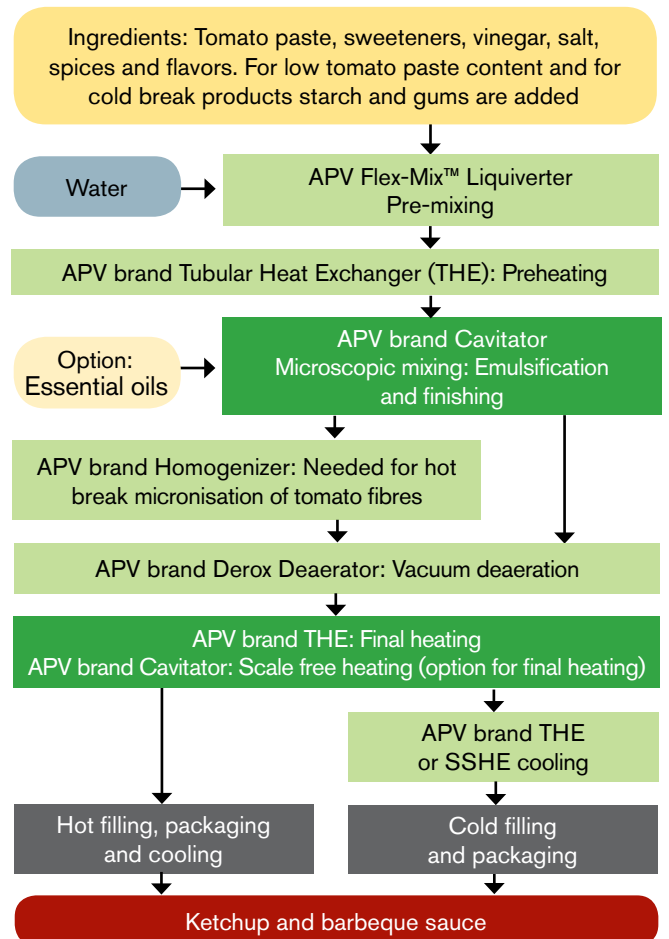
When a recipe with lower tomato paste content or cold break tomato paste is used, ketchup and barbeque sauce may be thickened using cooked starch and/or hydrocolloids like CMC, xanthan or guar gums.

Achieving consistent viscosity, appearance and texture is a significant challenge for all of these recipes. The Cavimator can pre-emulsify all ingredients before the homogenizer, reducing the homogenizing pressure in some cases. It can completely hydrate starches and gums, creating high viscosity with lower levels of these ingredients. It can also be used for final heating when starch or other ingredients that foul heat exchangers are present.

Optimum flavor profiles depend on a uniform and consistent dispersion of the often costly spices and essential oils. Another benefit of the Cavimator is the excellent dispersion of such materials into viscous products.



PROCESSING DIAGRAM FOR KETCHUP AND BARBEQUE SAUCE PROCESSING



The Cavicator can also pass spice particles and onion and garlic bits without damage, unlike a homogenizer. Heat-sensitive ingredients like volatile essential oils can be injected and thoroughly dispersed at the Cavicator, after the preheating section for maximum retention of flavour.

THE PRINCIPLE OF THE APV BRAND CAVITATOR

The heart of the technology is a rotor spinning in a liquid chamber. The rotor has a number of radial holes. The spinning action generates internal liquid frictions (disk friction) and the holes generate hydrodynamic cavitation. The cavitation creates high shear ensuring a very efficient microscopic mixing effect and friction which generates controllable scale-free heating.



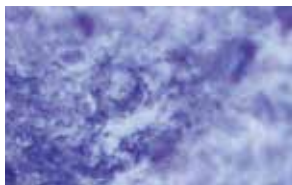
USE OF THE APV BRAND CAVITATOR IN KETCHUP AND BARBEQUE SAUCE

The Cavicator can be employed to completely hydrate any powdered ingredients like starch or gums, before they are metered into the batch tank or continuous process stream. It can also be used for final heating of recipes containing these ingredients to minimize fouling and extend run times. In addition, the Cavicator can be used to pre-emulsify ketchup ingredients before the homogenizer so that tomato fibre can be micronized at lower pressures. Finally, the Cavicator can thoroughly disperse flavor ingredients that are heat-sensitive or volatile so they can be injected continuously at the final heating stage.

Example of CMC hydration:

The APV brand Cavicator resulted in a payback time of < 1 year in reduced batch cycle time, cleaning, labor costs, and reduced consumption of gum

HYDRATION OF STARCH



Conventional technology



APV brand Cavicator technology

FEATURES AND BENEFITS

- The intense microscopic mixing action produces a uniform distribution of all ingredients, controlled simply by adjusting the motor speed electronically, rather than by mechanically adjusting a clearance as in a colloid mill or homogenizing valve.
- The accurate control of mixing can be used to produce a very consistent product viscosity and appearance, as well as full flavor development with reduced amounts of flavorings and sweeteners.
- Whole spices and other small particles may pass through the Cavicator without damage from the cavitation shock waves, and without building up inside the equipment as they might in close-clearance devices.
- The Cavicator is also ideal for performing the final heating stage when high-fouling starches and gums are present, providing longer run times.
- When used to hydrate powdered ingredients, the Cavicator can completely eliminate any fish eyes or clumping for a very smooth texture. This means less thickening agent may be needed since its full functionality will be available, thus saving cost.
- Very low maintenance requirements and inexpensive repair parts contribute to reduce OpEx.
- The Cavicator has a highly reliable, sanitary design meeting EHEDG standards and with 3-A certification.



Based in Charlotte, North Carolina, SPX FLOW, Inc. (NYSE: FLOW) is a multi-industry manufacturing leader. For more information, please visit www.spxflow.com

SPXFLOW

SPX FLOW 611 Sugar Creek Road Delavan, WI 53115

P: (262) 728-1900 or (800) 252-5200 E: answers.us@spxflow.com

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