

Solutions for Your TOUGHEST
MIXING Applications in

FOOD

Introduction

Production of Margarine
and Low Fat Spreads

The Process

The Problem

The Solution

The Advantages



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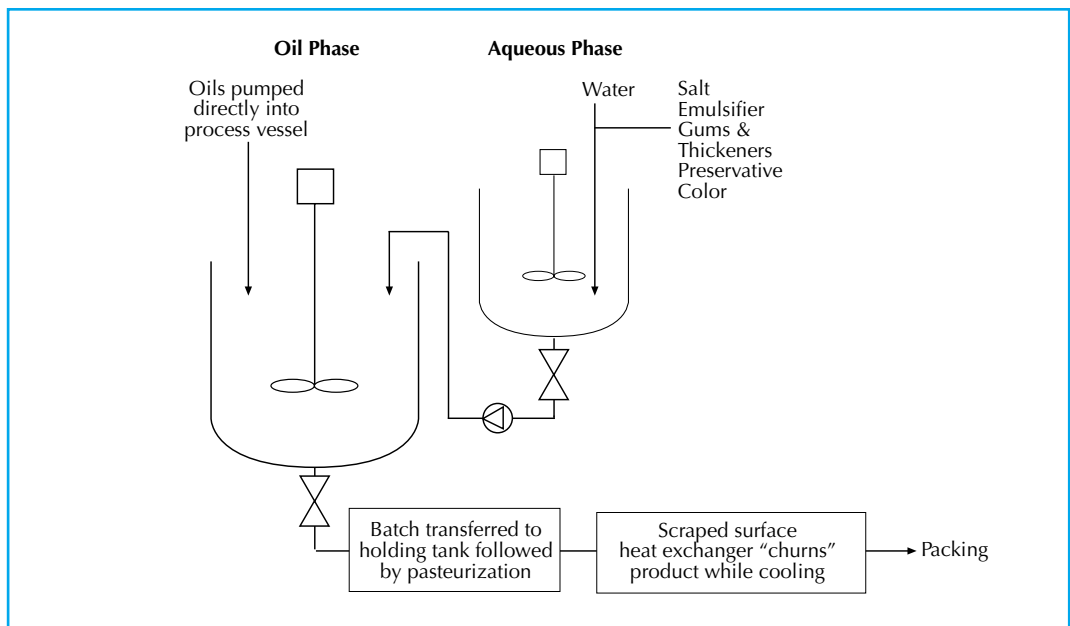
Production of Margarine and Low Fat Spreads

Margarine is a blend of around 80% vegetable oil or animal fat, and 20% water with added salt, flavorings, color, and preservatives. In many countries these proportions are controlled by legislation. Low fat spreads have similar ingredients, however the oil content can be as low as 20%. Gums and thickeners such as gelatin, alginates, and most commonly, caseinates are used to replace the viscosity and bulking effect of the fat and to ensure that a stable water-in-oil emulsion is formed.

Blends of margarine/low fat spread and buttermilk, or other dairy ingredients e.g. milk powder and whey powder are increasingly common. These combine the taste of butter with low fat content and “spreadability” from the refrigerator.

The Process

Manufacturing process varies according to ingredients used and product formula, however, a typical process can be summarized as follows:



The Problem

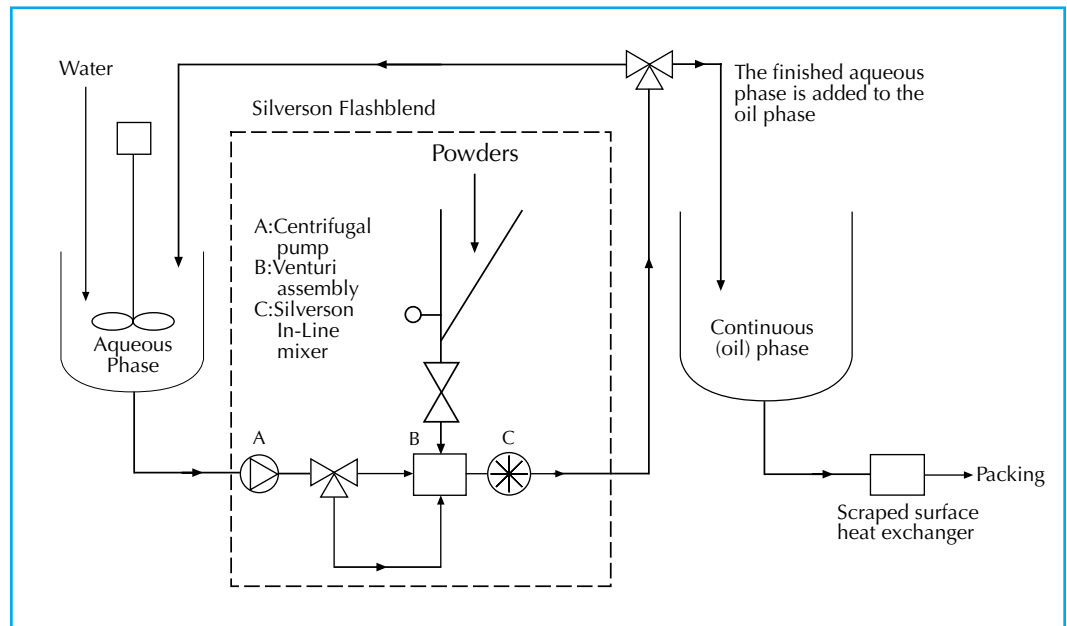
Using conventional mixers and agitators several difficulties can arise:

- Additives designed to thicken the product tend to form agglomerates which agitators cannot easily break down.
- Long processing times are often required to complete hydration.
- Poor hydration may lead to unsatisfactory “mouthfeel”, and an unstable product leading to storage problems once the product has been opened.

The Solution

A Silverson High Shear mixer is able to overcome all of these difficulties. This can be achieved using either a batch mixer immersed in the vessel, or an In-Line mixer operating in conjunction with an in-tank agitator. Processing with an In-Line mixer prior to churning gives a better emulsion and can improve “mouthfeel”, especially in ultra low fat spreads.

For applications with high concentrations of gums and large quantities of powders, the Flashblend is most suitable. This operates as follows:



Water is drawn from the vessel into the Flashblend by the centrifugal pump (A) and forced through the venturi assembly (B) into the In-Line Mixer (C). The high velocity flow through the venturi creates a vacuum in the chamber below the powder hopper. Powders can be fed into the hopper without the need for premixing.

The powder feed valve is opened, and the powder is drawn into the venturi, where the water and powder streams are instantly mixed and pass immediately to the In-Line mixer. The liquid and solids are subjected to intense high shear before being returned to the process vessel by the self-pumping In-Line mixer.

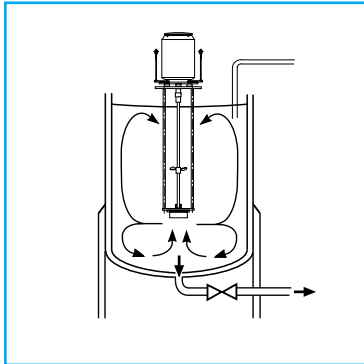
When powder addition is complete the diverter valve is opened, switching the Flashblend to high speed recirculation mode. The entire contents of the vessel pass through the Flashblend in a short mixing cycle, ensuring hydration is rapidly completed. The finished aqueous phases is then added to the oil phase and passed through a scraped surface heat exchanger.

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The Advantages

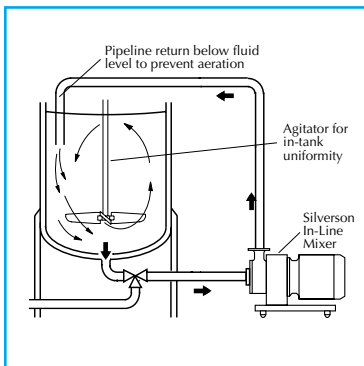
- Premixing of powdered ingredients is not necessary
- Agglomerate free mix
- Rapid Mixing times
- Improved pre-emulsion
- Maximized yield of raw materials as thickening agents are fully hydrated and other ingredients are completely dispersed

The batch size, formulation, type of ingredients and the viscosity of the end product dictates which machine from the Silverson product line is suited to individual processing requirements.



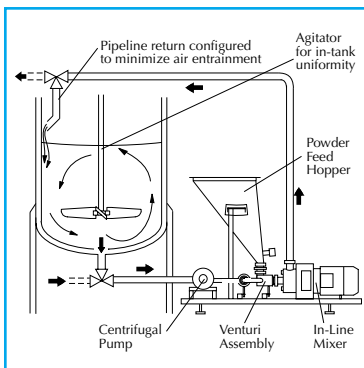
High Shear Batch Mixers

- Suitable for premix batches of up to 400 gallons
- Batch mixers can be vessel mounted, or fitted to a mobile hydraulic floor stand
- Can easily be moved from vessel to vessel
- Easily cleaned
- Small units available for R&D and pilot plant



High Shear In-Line Mixers

- Ideal for larger batches
- Aeration free
- Easily retro fitted to existing plant
- Self pumping
- Can be used to discharge vessel
- Designed to be cleaned in place



Flashblend

- Ideal for larger batches
- Capable of rapidly incorporating large volumes of powder
- Minimized aeration
- Minimized cleaning requirements
- Minimum operator input required
- Easily automated



Silverson Machines, Inc. 355 Chestnut Street, East Longmeadow, MA 01028
Ph: (413) 525-4825 • Fax: (413) 525-5804 • www.silverson.com

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