

Quadro Ytron®

PRODUCTION OF BRINES AND MARINADES

BACKGROUND / REQUIREMENT

Brines and marinades are commonly used in the meat processing industry. Traditionally, a brine consisted of water, salt and sugar. Today, a multitude of dry ingredients can be incorporated including protein powders, flavoring agents, nitrites, antioxidants, phosphates and hydro-colloids such as carageenan.

Brines serve multiple purposes including:

- aiding in the drawing out of proteins from the meat muscle to the surface - this allows the proteins to be more evenly distributed throughout the product during the grinding phase which improves structural integrity of the meat
- increasing the volume and weight (or yield) of the product
- act as a preservative, flavoring, coloring, etc.



Their percentage of the whole is a function of the desired type, price and quality of the final product.

Marinades are coated on, in liquid form (liquid rub), on the outside of the meat. Generally, a marinade consists of three basic elements - acids to tenderize, oils to moisturize, and a flavor profile. There are several benefits to marinating meats. The most obvious is the increased yield. The total volume of the meat can be increased from 10 - 25%, and still be a high quality product. Juiciness, or moistness, is another benefit. By capturing that marinade, the meat now has a moist texture, even after cooking. Also important, is shelf life which can be extended somewhat, but is not the primary purpose of a marinade.

THE MANUFACTURING PROCESS AND CHALLENGES

Brine and marinade ingredients are purchased in powder form and mixed on-site. Typically, they are prepared on-demand in large tanks which can be rectangular in shape. Temperature control is important. Brines and marinades must be maintained between 0 - 2°C. The brine solution is pumped from the mixing tanks to the injection system. The injection system employs fine needles which inject the brine deep into the muscle. To avoid clogging of the needle tips, the mixer in the brine solution tank must be capable of completely dissolving the powder ingredients. Stabilizers, flavorings and other ingredients must similarly be properly hydrated and distributed in the brine and marinade solution to ensure proper flowability and homogeneous distribution of ingredients. Some ingredients tend to precipitate over time so a constant, uniform in-tank movement must be maintained. Also, as corrosive ingredients such as salt are used, the mixing equipment must be resistant to abrasion and corrosion.

Traditionally, conventional mixers have been able to handle the simple salt, sugar and water combinations. With the addition of other ingredients, new problems arise:

- Many phosphates tend to be difficult to dissolve.
- Stabilizers form agglomerates that are difficult to break down by traditional mixing techniques.
- The higher the concentration of salt, the more energy that is required to solubilize the solids.
- As more ingredients are added, the viscosity increases and long mixing times are required to fully hydrate and dissolve the solids which can lead to temperature increase and excessive air incorporation.
- Ingredients tend to be dusty causing work environmental issues.

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QUADRO'S APPROACH

Many of the problems resulting from the new formulations of brines and marinades can be overcome with either the Quadro Ytron® Y Jet Mixer or the ZC Powder Dispenser. The Jet Mixer uses a unique rotor/stator mixing head that creates a pure axial flow discharge jet to provide efficient in-tank mixing and blending. The wasteful radial flow and vortexing that are the downfall of conventional open impeller design mixers are gone forever. Air entrainment is virtually eliminated without the use of baffles.

The Y Jet Mixer's strong axial flow pattern produces a uniform velocity profile, throughout the vessel with no stratification or dead areas, improving heat transfer rates and reducing batch blending times by as much as 80%. The Y Jet Mixer's flow characteristics are ideal for the suspension and re-suspension of high-settling-rate solids.

With the Quadro Ytron® ZC Powder Dispenser, a near-perfect vacuum, created by the liquid seal between the rotor and stator, permits concentrations exceeding 25% by weight to be generated in a single-pass, with minimal air entrainment. Because the powder is completely hydrated, yield is maximized and wastage is reduced or eliminated, translating into powder savings of up to 30%, compared to processing with in-tank or other in-line high-shear technologies. In addition, the over-processing common with conventional dispersing technologies is entirely eliminated, preserving the rheological properties of shear-sensitive products.

Batch time reductions as high as 80% can be realized with the Quadro Ytron® ZC Dispenser technology. No dispersion aids such as pre-heating the water or the pre-dispersion of ingredients into non-aqueous solvents are required. Even with difficult products such as hydro-colloid gums, cellulose gums and carbomers you can expect complete dispersion in a **single-pass**.



ZC Powder Dispenser



Jet Mixer With Bypass Assembly

QUADRO YTRON® BENEFITS

- *Rapid, sub-surface, lump-free dispersions, less product waste.*
- *Significantly reduces air entrainment.*
- *Consistent product quality and repeatability.*
- *Stainless steel construction.*
- *Excellent for difficult, floating powders.*
- *Eliminates dead spots in the vessel, also eliminates powder build-up on the vessel walls - reduces cleaning times.*
- *Strong axial flow pattern with the Jet Mixer overcomes difficulties associated with rectangular tanks.*
- *Single-pass processing with the ZC Powder Dispenser.*
- *Reduced batch times.*

LOCAL REPRESENTATIVE



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