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TECHNOLOGY

A BLEND OF SAFETY, CONSISTENCY

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Food & beverage processors can improve efficiency in mixing and blending operations, but they cannot lose sight of the safety of their products and their workforce.



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hen it comes to many food and beverage products, success begins in the mix. All types of processed foods require batching, blending and mixing with precision as a basic step to ensure proper taste and performance — whether it involves juices, baked goods, sauces or further-processed meat and poultry items.

Even though mixing and blending might seem to the untrained eye to be as simple as dumping ingredients together and pushing a button, sharp attention to detail must be paid based on the product and desired outcome, explains Erin Dillon, media & marketing coordinator for Charles Ross & Son Co. (www.mixers.com).

“Choosing the wrong type of mixer can lead to ineffective blending, inadequate shear force or uneven distribution of ingredients, which ultimately can compromise the quality, consistency and shelf-stability of the end product,” she says. “Another crucial issue is ease of cleaning and sanitation. By deploying the best mixing techniques and cleaning procedures, manufacturers can achieve efficient and consistent results, saving both time and money.”

With many different products factoring into mixing and blending, it certainly pays for processors to perform due diligence and approach these steps carefully.

Consistency is key

To retain customers, processors must ensure the quality of the final food or beverage products is consistent across all production runs and batches of product. If a formulation enters the production stream poorly blended, it could affect the uniformity of the end product.

This holds true for all types of blends — whether wet or dry, final product or initial ingredient mix — and goes beyond the mixing and blending step to storage and distribution, particularly when it comes to dry blends.

Segregation (or separation of the individual ingredients) within the mixture can destroy product quality down the line. Meanwhile, equipment limitations and the ingredients themselves can hamper the consistency of the blends. Some ingredients can stick or clump together during the mixing process, preventing even distribution throughout the blend.

Rigorous quality control measures, therefore, are needed to mitigate this issue. Upgrading or installing the latest mixing and blending technology can help smooth out inconsistencies, as these advanced systems can give processors precise control over ingredient inputs and the mixing process levels (time, temperature, etc.).

Still, processors must heed

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the nuances of the products. For example, with meat products, time, temperature and mixing action vary depending upon the protein and the characteristics that are most important for the product being made, explains Lynn Knipe, processed meats extension specialist and associate professor of food science and technology at Ohio State University (cfaes.osu.edu).

“Paddle mixers would be preferred when making dry and semi-dry sausages or coarse-ground fresh and cooked sausages, where particle definition is critical,” he says. “Ribbon blenders are preferred when making hot dogs and smoked sausages, where solubilization and extraction of salt-soluble meat proteins are important to the final texture of the product.”

Blending of dry ingredients comes with its own challenges, Dillon adds.

“Dry blends that require very gentle agitation and/or a high degree of precision are normally batched in tumble blenders where

longer blends times are acceptable,” she says. “All this is to say that selecting the right blender for a specific application and processing goals cannot be overstated.”

The energy applied to the mixture is also crucial — and that isn’t limited to meat products. Over- or underworking the mixture can worsen any uneven distribution of particles in the blend or damage or destroy the texture attributes of the batch, leading to poor performance in the final product.

Product development teams can test and run trials using different mixer styles, speeds, time and temperatures to document the steps needed to create the perfect blend. OEMs can lend a helping hand to these teams, and technology has evolved to handle the varying demands, says John Paul, CEO and managing director of PerMix Tec Co. Ltd.-North America (www.permix-mixers.com).

“Processors can have multiple styles of agitation and switch them according to their mixing requirements,” he says. PerMix, for example, offers a machine that can be converted from a fluidized zone mixer to a plow, paddle or ribbon mixer as needed.

Then, when the process is scaled up to the primary production floor, innovative technology can help processors monitor the action in real time, allowing adjustments to fine-tune batch by batch, if needed.

Scale up with safety in mind

Product development at larger processors often starts with smaller batches of product processed in small pilot plants — which means scaling up recipes and proper techniques can be a hurdle companies need to plan ahead to overcome.

Again, technology can help here. OEMs of mixing and blending technology work with processors to properly scale their operations and meet their needs. Efficiency, speed and flexibility are top goals, but food and worker safety cannot be overlooked.

When it comes to sanitation, mixing and blending equipment should stand among the high-profile targets for workers to extensively clean and sanitize on a regular basis. Proper training and a sharp focus on execution can help a processing plant avoid potential harborage of pathogens and cross-contamination of products that pass through mixing and blending equipment.

In addition, processors should ensure no food or ingredient residue is left behind, and that any niches or harborage points inside the equipment are properly cleaned and sanitized. In those niches, bacteria can grow and spread easily to any subsequent batch of product, endangering the lives of consumers. Equipment manufacturers can help processors reach their food safety goals.

In processing facilities with large mixers and/or blenders, cleaning these machines thoroughly can pose a worker safety risk if sanitation crews and other employees are not trained on protocols around the machinery.

In October 2022, a sanitation worker at a food processing plant in Ohio had to have his leg amputated after it got caught in an industrial blender while he was cleaning it. The U.S. Dept. of Labor stated that the company had not properly trained the overnight workforce on proper lockout procedures to prevent the machine from moving.

Similar accidents have unfortunately made headlines in recent times, and processors must do better to protect their workers and the contractors in their plants.

Adaptation to new technologies is a hallmark of the food & beverage processing industry, and mixing and blending should not be overlooked for innovation. Challenges exist, but a good approach means starting with a solid analysis of the materials they’re trying to blend and finding the right type of mixer or blender to accommodate their product.

Then, developing and transferring a staunch food and worker safety culture to the mixing operations will help them keep products of the highest quality and safe for consumers. ■



Compared to traditional equipment, cantilever-designed mixers streamline cleaning by allowing the operator to easily open the machinery and access crevices and hard-to-reach areas.

PHOTO: PERMIX TEC