

Mixers

Rotary Batch Mixer Facilitates Proprietary Nutraceutical Processes

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Nutraceutical Research Sciences, a private-label manufacturer of nutraceuticals and novel ingredients has developed proprietary manufacturing processes that rely on a model 700-TS-50-SS Rotary Batch Mixer from Munson Machinery. The company's products range from anti-aging supplements and sports nutrition to vitamins and meal replacements.



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(Source: Munson Machinery)

Most batches include one or more liquid additions, which are introduced into the 1,416 L (50 cu ft) mixer through spray bars with exchangeable spray tips, enabling the addition of aqueous and oil-based liquids by the litre or millilitre and as a fine vapor. The spray bars operate in conjunction with subsystems for heating and cooling the liquids and dehumidifying and pressurizing the mixer vessel. The company has full control over how it processes each product.

Mixer facilitates highly custom manufacturing techniques

Customization of the manufacturing process enables Nutraceutical Research to micro-encapsulate or coat the ingredients, and then add other things, like flavors, on top of that to build a larger particle. The mixer's tumble-turn-cut-fold action ensures complete coverage by the liquid additions, shares the firm. It enables the company to coat every single particle.

A dehumidifier can also be connected to the mixer to remove moisture from the vessel, so that one can make one liquid addition after another. It's a process that a rotary mixer handles well. This is much easier than with a V-blender because you have to exchange the air on the fly. The exhaust air will pick up a lot of material, and you'll have a huge loss. The rotary blender, on the other hand, minimizes dusting by its gentle mixing action and by a single seal preventing dust leakage from the drum, explains the company.

Non-stop rotation cuts cycle times, prevents segregation

The mixer's inlet and outlet remain stationary while the drum rotates, allowing hard piping to the discharge of an upstream screw conveyor or the cyclone separator of a pneumatic conveying system. Vessel rotation during loading and unloading reduces cycle times and prevents segregation upon discharge. Be it the double-cone blenders or V-blenders, neither can be loaded or discharged as quickly, mentions the firm.

With its auxiliary systems, the company shares that the mixer resembles an Apollo space module turned on its side. It's housed in a dedicated suite we call 'Genesis 1' because of its novelty, opines the firm. It's one of a kind. No one has anything like it. The company is growing fast due to these unique and novel custom ingredients it uses to make life changing products.

Novel processes scaled from R&D to high volume production

Nutraceutical Research's processes are developed in its R&D lab. The company has built a miniature replica of its process so that it can test products in very small batch form—one or two or five kilograms—to create the technique, the technology and the blending instructions, shares the firm.

The pilot-scale work ensures that each process can run nonstop. The name of the game is continuous processing, mentions the company. When you start the process, you continue

through all the steps until it's completed, discharged, and out of the mixer. While every product requires an individual process, the company produces between four to eight batches per eight-hour shift. To keep up with the demand the firm is adding a Munson model 700-TS-90-SS with a capacity of 2549 L (90 cubic feet) that it will call Genesis 2, opines the company.

Particle size is a big consideration. Matching and sizing particles is important in blending, continues the firm. You can't just blend 841 micron (20 mesh) and 149 micron (100 mesh) material in a standard way and then expect it to run through your other manufacturing equipment without separation, shares the firm. But with the firm's pilot prove-outs, the Rotary Batch Mixer and the company's customization, one can take 149 micron (20 mesh) material, apply some humidity and then slowly apply 149 micron (100 mesh) material, then dry while mixing without separation. That is unique, explains the firm.

Minor additions, such as vitamin D3, must be preblended with other materials. Indeed, even preblends sometimes need preblending. That was the case when the company needed to ensure that the same tiny amount of chromium picolinate went into each two-piece capsule. The mixer's uniform blending enabled the firm to hold it to within just two micrograms either way of hitting 100 micrograms per capsule. You have to know what you're doing with raw material, and how to introduce it. It's a science, comments the company.

Between batches, large doors allow unobstructed interior access for cleaning and visual inspection. Operators steam-clean and sanitize the mixer, and verify with swab tests. It's not complicated, opines the company. The room was built for the mixer and associated equipment, making cleaning much easier than going up on a mezzanine to clean a V-blender, adds the firm.

The unit is also cost efficient. The company's costs per kilogram or per batch have been greatly reduced. It is more competitive with novel products that other companies can't offer. Someday this may be the norm, but the firm is years ahead of its time. The firm's process also is scalable and the company is also looking at adding a 8,495 L (300 cubic foot) Rotary Batch Mixer where it can do much larger blends. The firm will call it Genesis 3.

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