

**DRY BULK BLENDING  
EQUIPMENT**

- Rotary Batch Mixers
- Ribbon/Paddle/  
Plow Blenders
- Rotary Continuous  
Blenders
- High Intensity  
Continuous Blenders
- Vee-Cone Blenders
- Fluidized Bed Mixers

**SIZE REDUCTION  
EQUIPMENT**

- Shredders
- Rotary Lump Breakers
- Heavy Duty Cutters
- Knife Cutters
- Pin Mills
- Attrition Mills
- Hammer Mills
- Custom Machinery

**Rotary Batch Mixer Facilitates Proprietary****NRS (Nutraceutical Research  
Sciences, LLC)****Munson Machinery Co., Inc.**

PO Box 855  
210 Seward Ave.  
Utica, NY 13502 USA  
Tel: 1-800-944-6644  
(In NY: 1-315-797-0090)  
Fax: 315-797-5582

[info@munsonmachinery.com](mailto:info@munsonmachinery.com)

# Rotary Batch Mixer Facilitates Proprietary Nutraceutical Processes

TEMPE, AZ — NRS (Nutraceutical Research Sciences, LLC) is a private-label manufacturer of nutraceuticals and novel ingredients. Its founder, John Anderson, is a 42-year veteran of the dietary supplement industry involved in launching over 3,500 products.

The company's products range from anti-aging supplements and sports nutrition to vitamins and meal replacements. The company has developed proprietary manufacturing processes that rely on a model 700-TS-50-SS Rotary Batch Mixer from Munson Machinery.

Most batches include one or more liquid additions, which are introduced into the 50 cu ft (1,416 L) mixer through spray bars with exchangeable spray tips, enabling the addition of aqueous and oil-based liquids by the liter or milliliter 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. "We have full control over how we process each product," Anderson says.

## 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, Anderson says. "It enables us to coat every single particle."

He also connects a dehumidifier to the mixer to remove moisture from the vessel, so he can make one liquid addition after another. It's a process that a rotary mixer handles well, he says. "It's 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.

## 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, which Anderson notes is fast and complete, maximizing yields. "I've used pretty much every kind of blender, including double-cone blenders and V-blenders, and neither



*Uniform blends are discharged rapidly through a plug gate valve as the drum rotates, with no residual or segregation.*



can be loaded or discharged as quickly."

With its auxiliary systems, Anderson says 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. It's one of a kind. No one has anything like it. We are growing fast due to these unique and novel custom ingredients we use 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. "We built a miniature replica of our process so we can test products in very small batch form — one or two or five kilograms — to create the technique, the technology and the blending instructions."

The pilot-scale work ensures that each process can run nonstop. "The name of the game is continuous processing," Anderson says. "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, he estimates the company produces between four to eight batches per eight-hour shift. To keep up with demand "We're adding a Munson model 700-TS-90-SS with a capacity of 90 cubic feet that we'll call Genesis 2," says Anderson.

Particle size is a big consideration. "Matching and sizing particles is important in blending," Anderson continues. "You can't just blend 20 mesh and 100 mesh material in a standard way and then expect it to run through your other manufacturing equipment without separation," he says. "But with our pilot prove-outs, the Rotary Batch Mixer and our customization, I can take 20 mesh material, apply some humidity and then slowly apply 100 mesh material, then dry while mixing without separation. That is unique."

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

## Rapid sanitizing verified with swab tests

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, Anderson says. "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."



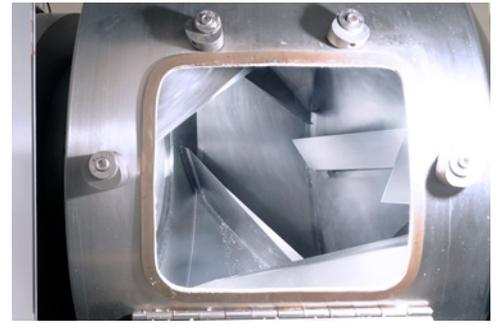
*Material enters a vacuum conveyor through a pick-up wand, and is discharged through a cyclone separator at the mixer's stationary inlet.*



*The mixer's inlet and outlet (shown) remain stationary while the drum rotates, allowing hard connections to upstream mechanical or pneumatic conveyors, and continuous mixing as material is fully discharged with no segregation.*

He also finds the unit cost efficient. "Our costs per kilogram or per batch have been greatly reduced. So we're more competitive with novel products that other companies can't offer. Someday this may be the norm, but I think we're years ahead of our time," Anderson says. "Our process also is scalable and we're also looking at adding a 300 cubic foot (8,495 L) Rotary Batch Mixer where we can do much larger blends. "We'll call it Genesis 3".

Nutraceutical Research Sciences, LLC  
1-602-368-3873  
sales@NRSciences.com  
www.NRSciences.com



*The mixer's four-way tumble, cut, turn and fold action provided by the internal mixing flights yields uniform blends without product degradation. Internal spray bars with exchangeable tips allow the addition of aqueous and oil-based liquids by the liter or milliliter, and as a fine vapor.*



*Auxilliary equipment in adjacent room for heating, cooling, pressurizing and dehumidifying the mixer vessel imparts unique properties to NRS products.*





*A dehumidification line from an adjacent room removes moisture from the vessel between batches containing liquid additions.*



*Drum rotation during discharge prevents segregation. Complete evacuation eliminates wasted product and minimizes cleaning time during changeovers.*