

# nutraceutical

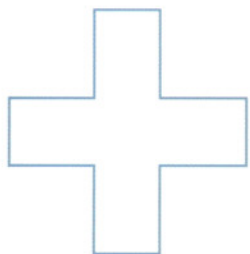
business & technology

Volume 5 Number 6 November/December 2009 ISSN 1745-8307



## Gut Health

*Synbiotics: Improving Immunity*  
*Prebiotics Ready to Boom*



Executive Profile  
*Up Close and Personal*  
*with EPAX and Glanbia*

Sports Nutrition  
*Keep on Running*  
*with Whey Protein*  
*The Benefits of L-Carnitine*

Technology  
*Blending and Balancing*

Is There a Future for  
Functional Foods?



# BENEFITING FROM A BIGGER BLEND

*In this case study, a nutraceutical company scales up production and triples its mixing capacity, simultaneously reducing labour and waste.*

A former athlete and body builder named Rod Burreson was looking for non-pharmaceutical supplements to enhance his physical condition. But, none met his quality requirements, prompting him to develop and personally test his own formulations. Based on the health benefits he experienced, Burreson started a company in 1994 called Roex, Inc. that used contract manufacturers and packagers to commercialize his formulations. In 2004, he added a division called Pro-X Nutraceuticals and brought the manufacturing and packaging operations in-house. Roex has since become a multimillion-dollar manufacturer of vitamins, dietary supplements and herbals. The company is growing so rapidly that Production Manager, Kory Seitz, realized that demand would soon exceed the capacity of the company's only mixer, a 0.85 cubic metre ribbon blender located in the Irvine (California, USA) facility.

The mixer was a bottleneck to the operation because of its small size, meaning that each batch had to be split up, which meant that extra labour was needed for feeding, weighing, discharging and cleaning. "We were constantly splitting up batches, sometimes doing several batches to fill an order for a single product. We had to find a larger blender to keep pace with our process of making tablets, capsules and blends from dry powders," says Seitz. In addition to increasing capacity, Pro-X wanted to comply with the US Food and Drug Administration's Good Manufacturing Practice (GMP) standards by installing a standalone blender in a separate room that would include a load-bearing structure onto which bins of material would be forklifted and emptied into a hopper over the blender intake. After considering V-blenders and rotary batch mixers, the company installed a 3.1 cubic metre 700 TS 110 Stainless Steel Rotary Batch Mixer from Munson Machinery (Utica, New York, USA). Whereas the original ribbon blender has a capacity of 650 kilos, the



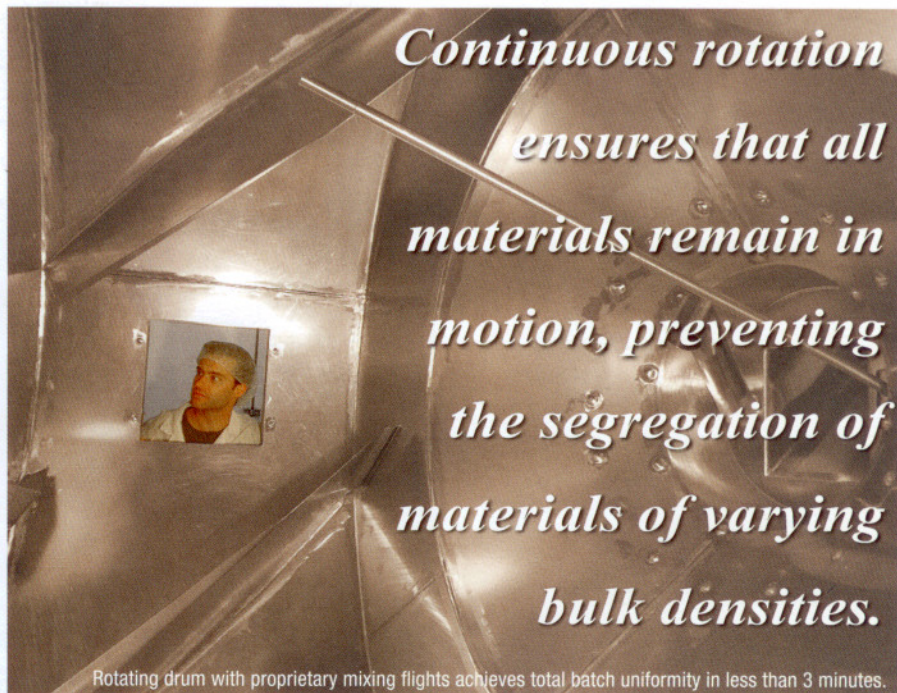
Internal mixing flights elevate the material, which is discharged through a plug gate valve into plastic-lined drums.

rotary batch mixer handles up to 2000 kilos, allowing Pro-X to triple its mixing capacity. The company also realized unexpected benefits in the form of reduced labour, shorter blending cycles, ease of cleaning and minimized waste.

## Eliminating Extra Steps

"Think of the productivity gains in being able to mix once compared with three times,"

says Seitz. "Not only are we mixing fewer times, but the labour required for weighing, screening and staging prior to mixing has also been reduced." When an order comes into the Pro-X facility, the appropriate raw material powders are selected and inspected for quality, screened, weighed and sent to an area where they are staged for blending. "Certain items need special treatment,"



*Continuous rotation ensures that all materials remain in motion, preventing the segregation of materials of varying bulk densities.*

Rotating drum with proprietary mixing flights achieves total batch uniformity in less than 3 minutes.

explains Seitz. "Some herbal mixtures are too big and need to be ground, whereas other materials need to be oscillated to reduce clumps. When running several batches to fill a single order, we were performing these tasks several times," continues Seitz. "Those tasks are done only once now."

The preparation stage ensures that materials become free flowing and ready to enter the blending and grinding area. As each raw material — anywhere from 2–50 powders per blend — has a different bulk density and its own "specific quirks," operators adjust for the differences by feeding the materials at different times. "For instance, we add the excipients, materials such as magnesium stearate, last to ensure that they are blended throughout the entire batch without affecting their function. If you overblend excipients, they will not produce the desired effect, such as good material flow, solid compression or antisticking, that they are intended to accomplish," says Seitz. "For every product, there is a specific order in which the materials are added to the blend to assist in creating a problem free batch."

Once Pro-X formulators determine the sequence in which the materials should be fed, each bin of material is forklifted to the top of the structure surrounding the blender; here, material is gravity discharged in the hopper and, in turn, into the blender that turns at approximately 2 RPM during feeding. "The hopper allows us to pour raw material into the blender at a rate of 50 kilos per minute," says Seitz. "The ability to discharge material directly

into the mixer, via the hopper, cut labour by 75%," continues Seitz. "With the old blender, it took 4–5 hours to feed the powder by hand or using an auger conveyor.

### Achieving 100% Uniformity

The mixer is capable of achieving 100% uniformity in less than 3 minutes, but Pro-X runs longer cycles to ensure the absolute uniformity of blends. Seitz says: "There are no moving parts inside the mixer, but the mixing flights attached to the interior of the rotating drum pick up the powder and move it to the front of the blender and then back over itself." Continuous rotation ensures that all materials remain in motion, preventing the segregation of materials of varying bulk densities. When mixing is complete, the blend is discharged from a chute into plastic-lined drums, each of which carries between 90 and 120 kilos of powder, which the blender discharges in less than 20 seconds. "With 2000 kilos of material, we need to fill about 20 of these barrels per batch," says Seitz. "The rapid discharge with minimal overflow has significantly increased our speed." Filled barrels move down the line, where the product is again inspected, weighed and sent to the appropriate manufacturing areas for the production of tablets, capsules or powders, which are then packed and shipped.

### Reduced Waste, Increased Yield, Faster Cleaning

After discharging the mixer, usually less than 500 g of residue remain inside, according

to Seitz. "Getting nearly 100% out of our blend increases revenue because we're dealing with expensive materials. With less waste remaining in the blender, we increase the yield of tablets, capsules and powders in the end." Negligible amounts of material remaining inside the blender also simplify cleaning. "With the ribbon blender we had to open it, sweep the residual heel of material from the trough and remove and clean the seals and other moving parts. Because the rotary mixer has no internal moving parts, operators simply attach a hose inside that sprays water while the mixer is running, removing any remaining powder. Next, operators spray a cleaning solution inside the blender, run it and wipe it down," says Seitz. "It's much faster and easier to clean than a ribbon blender." Although the ribbon blender is still used for batches of less than 500 kilos, Pro-X relies mainly on the rotary batch mixer. "Not only are we mixing more efficiently," says Seitz, "but the ability to drop powder down the hopper and discharge the blender with minimal waste is also saving us time and money." ■

### For more information

Munson Machinery Co., Inc.  
PO Box 855  
210 Seward Avenue  
Utica, New York 13503, USA  
Tel. +1 315 797 0090  
info@munsonmachinery.com  
www.munsonmachinery.com