

TABLETS & CAPSULES

FORMULATION PRODUCTION PACKAGING

Volume 6 Number 6
September 2008 \$15.00

Tablet press scale-up with time-dependent formulations
Relying on your tablet press technicians
: Manufacturing perspectives

*****AUTO**3-DIGIT 070
TC 173
PAULA JACOBS
RAPP ADVERTISING
30 COMMERCE ST
SPRINGFIELD NJ 07081-3082

S2A
5/12
A09



INDUSTRY application

Pro-X Nutraceuticals triples mixing capacity while reducing labor, waste

When former athlete and body builder Rod Burreson was unable to find non-pharmaceutical supplements to enhance his physical condition, he developed and tested his own formulations. In 1994, he founded Roex to commercialize his products, relying on contract companies to manufacture and package most of them. In 2004, he added Pro-X Nutraceuticals, Irvine, CA, as a division of the company and brought manufacturing and packaging in-house. Roex has since become a multi-million dollar manufacturer of vitamins, dietary supplements, and herbals. But as the company grew, demand began exceeding the capacity of its equipment. Its 30-cubic-foot ribbon blender was a major bottleneck.

Because the blender was small, it couldn't handle full batches, and each batch had to be split up, leading to extra labor for feeding, weighing, discharging, and cleaning. "We were constantly splitting up batches, some-



Pro-X Nutraceuticals installed a mixer that includes a rotating drum with internal mixing flights. It achieves batch uniformity in less than 3 minutes.

times doing several batches to fill an order for a single product," said Kory Seitz, production manager at Pro-X. "We had to find a larger blender to keep pace with our process of making tablets, capsules, and blends from dry powders."

In addition to increasing capacity, the company wanted to comply with Good Manufacturing Practices (GMPs), and installing a stand-alone blender fit the bill. The plan was to install the blender in a separate room to provide a load-bearing structure so bins of material could be placed by forklift and emptied into a hopper over the blender.

The company ruled out V-blenders, and instead installed a 110-

cubic-foot 700 TS 110 stainless steel rotary batch mixer from Munson Machinery, Utica, NY. Whereas the ribbon blender's capacity is 1,741 pounds, the rotary batch mixer handles up to 5,358 pounds, tripling mixing capacity. That allowed the company to reduce labor, shorten blending cycles, ease cleaning, and minimize waste.

Eliminating extra labor

The new equipment has made a big difference in productivity, according to Seitz. "Think of the productivity gains in being able to mix once versus three times. Not only are we mixing fewer times, but labor for weighing, screening, and



The mixer discharges rapidly with minimal waste.

staging prior to mixing has also been reduced."

When an order comes into the Pro-X facility, the designated powder raw materials are selected and inspected for quality, screened, weighed, and staged for blending. "Certain items need special treatment," Seitz said. Some herbal mixtures are too large and need to be ground, while other materials have clumps that are broken apart by leaving them in the mixer for a short time. With the ribbon blender, difficult mixtures often required more work, but that's no longer the case. "When running several batches to fill a single order, we were performing these tasks several times. Those tasks are done only once now."

Since each raw material—anywhere from two to 50 powders per blend—has its own bulk density and quirks, many of them must be fed to

the mixer at different times. "For instance, we add the excipients, such as magnesium stearate, last to ensure that they are blended throughout the entire batch without affecting their function. If you over-blend excipients, they won't produce the desired effect of good material flow, solid compression, or anti-sticking, which they are intended to accomplish," Seitz said. "For every product there is a specific order in adding materials to the blend to assist in creating a problem-free batch."

Once Pro-X formulators determine the sequence in which materials should be fed, each bin of material is moved onto the structure surrounding the mixer. The material discharges by gravity into the hopper and then into the mixer, which turns at about 2 rpm during feeding. "The hopper allows us to pour raw materials into the mixer at 134 pounds per minute. The ability

to discharge material directly cut labor by 75 percent," Seitz said. "With the old blender, it took 4 to 5 hours to feed the powder by hand or via an auger conveyor."

Achieving 100 percent uniformity

The mixer can achieve 100 percent uniformity in less than 3 minutes, but Pro-X runs longer cycles to be on the safe side. "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 mixer and then back over itself." Moving the material to and fro in this way, coupled with continuous rotation, prevents segregation of materials with different bulk densities.

A new mixer helps the company to meet demand more easily and to comply with GMPs.

When the cycle ends, the mixer discharges the blend from a chute into a plastic-lined drum in less than 20 seconds. Each drum holds 241 to 321.5 pounds of powder. "With 5,358 pounds of material, we need to fill about 20 of these barrels per batch," Seitz said. "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 production of tablets and capsules, which are then packed and shipped.

Reducing waste

After discharge, less than 17.5 ounces of residue remain inside the mixer, according to Seitz. "Getting nearly 100 percent out of our blend increases revenue because we're dealing with expensive materials. With less waste remaining in the mixer, we increase the product yield in the end."

The negligible amount of material also simplifies cleaning. "With the



The company manufactures and packages vitamins, dietary supplements, and herbals.

ribbon blender, we have to open it, sweep the residual heel of material from the trough, and remove and clean the seals and other moving

parts," Seitz said. "Since the rotary mixer has no internal moving parts, operators simply attach a hose inside, which sprays water while the mixer is

running, removing any remaining powder. Then operators spray a cleaning solution inside the mixer, run it, and wipe it down. It's much faster and easier to clean than a ribbon blender."

While Pro-X still uses the ribbon blender for batches under 1,340 pounds, it relies mainly on the new rotary batch mixer. "Not only are we mixing more efficiently," Seitz said, "but we are also able to drop powder down the hopper and discharge the mixer with minimal waste, saving time and money." T&C

Munson Machinery, Utica, NY.

Tel. 315 797 0090

Fax: 315 797 5582

Website: www.munsonmachinery.com

Tablets & Capsules bookstore



We accept Visa
and Mastercard.



Nutraceuticals

Lisa Rapport and Brian Lockwood

Nutraceuticals is an authoritative text that assesses the medical and scientific evidence for some of the most commonly used nutraceuticals. Sources, uses, side-effects, and drug interactions are described for:

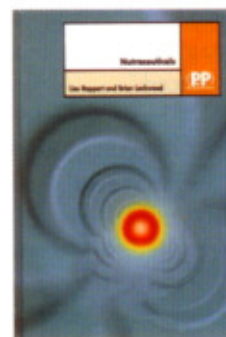
- Glucosamine
- Octacosanol
- Proanthocyanidins and grape products
- Lycopene
- Carnitine
- Flaxseed and flaxseed oil
- Melatonin
- Ornithine alpha ketoglutarate.

This authoritative text will be of value to practicing pharmacists, other health care professionals, and complementary medicine practitioners.

Lisa Rapport and Brian Lockwood are from the School of Pharmacy and Pharmaceutical Sciences, University of Manchester, UK.

163 pages

\$49.95



Purchase online @ www.tabletscapsules.com