RUNNING THE NUMBERS ON BALE PROCESSORS

Research shows that bale processors can increase digestibility and cut feed waste, especially if used in the right system

When I was growing up, if someone had mentioned the words "bale processor," I would have assumed they were describing my twice-daily task of manually transporting heavy square bales from the stack through herds of playful cattle intent on destroying them before they reached their destination. The processing part was snapping the sisal twine and kicking the straw around. Back then, bale processing depended on the strength of the back and accuracy of the boots.

The earliest processors, with their singular purpose of spreading straw, are no match for today's machines. The modern bale processor can be towed, mounted on front-end loaders or oscillated 300 degrees from a three-point hitch position, allowing pinpoint delivery. A variety of square or round material can be delivered near or far, piled for TMR rations, dropped in windrows, spread for land reclamation projects, fired over high walls or gently deposited into low bunks.

Standard and optional equipment includes hydraulic arms and chutes to lift bales into the machine, plus balance extra round or square bales, gravity flow grain tanks, scales, engageable drives for chains and rotors, and adjustable choppers that can be aligned for coarse or fine product lengths.

DISSECTING THE TRIAL NUMBERS

"When you are looking at lower quality forages such as slough hay, straw or timothy aftermath, these low-quality products could have a five to 10 per cent improvement in digestibility (when processed)," says Barry Yaremcio, beef forage specialist with Alberta Agriculture.

Yaremcio explains that Dr. Karen Beauchemin of Agriculture and Agri-Food Canada in Lethbridge has found that if the particle size is 3/4-inch or less in diameter for lower quality forages, digestibility increases.

The most important priority to Yaremcio is making sure these smaller particles get into the animals where they can make use of them. In 2009, together with staff at the Agriculture Canada Research Station in Lacombe, Alta., Yaremcio completed a feeding trial with 55 two-year-old bred heifers. Researchers fed the heifers round bales that contained 90 per cent meadow brome and 10 per cent alfalfa.

Using feed bunks ensures cattle consume the highest-quality portions of the plants.
PHOTO: BARRY YAREMCIO

"We put tarps down before it snowed in the feeding area, then we ran a bale processor over the placed tarps, making a windrow across the top of the snow on a fresh area every day," says Yaremcio.

Researchers used plastic tubs to collect samples of the delivered material. They then screened samples through a plywood box that had 3/4-inch holes placed on a two-inch grid. This was done to determine the percentages of coarse (longer than 3/4 inch) and fine material (less than 3/4 inch). Researchers recorded the percentages of each, at time of delivery.

Coarse and fine samples were sent in separately for feed analysis. After completing the trial, researchers collected the snow and wasted feed from the collection tarps. Once the snow melted and feed dried, they weighed samples.

"We found that 75 per cent of the wasted material was 3/4 of an inch or less. That is the highest-quality portion of the plant that was not consumed by the heifers."

"When you are looking at lower quality forages such as slough hay, straw or timothy aftermath, these low-quality products could have a five to 10 per cent improvement in digestibility," says Barry Yaremcio

CUTTING WASTE

The trial also revealed that when feed was processed directly into bunks, the waste was negligible or virtually zero. Using portable

bunks ensured the material with the most protein and energy was consumed, including the leaves, flowers and immature stems.

"The best thing you can do is feed into a concrete bunk, fence-line feeder or portable bunks, so that the cows can't walk over the windrow. That is the key in the whole process," says Yaremcio.

One potential option for Alberta producers is accessing the province's large supply of drill stem for building portable bunks. Another is using an electric fence set up at the right height and distance from the windrow. The goal with the electric fence is to keep cows from walking over the feed, but still allow them to clean it up.

Losing the highest-quality portion of the feed is expensive. By feed testing at the start of the trial, Yaremcio and his colleagues found that the protein content of the bales was 11.6 per cent.

"When we did the calculations backward on what was wasted, what the cows were actually consuming was material that was only 8.6 per cent protein. We were losing 26 per cent of the protein, 33 per cent of the calcium and 23 per cent of the phosphorous. And we were restricting their feed intake, feeding 22 pounds of hay per day or 1.8 per cent of body weight, so we didn't have them wasting feed due to overfeeding."

Researchers used plastic tubs to collect feed samples for the trial. PHOTO: BARRY YAREMCIO

Before purchasing a bale processor, producers do need to consider and calculate equipment cost plus fuel, depreciation, insurance and operator's time. Technological and computerized advancements give better control to monitor an animal's consumption rates, which in turn should result in more feed consumed and less wasted. For example, a scale on the processor is a valuable tool as similar-looking bales can vary by 100 to 200 pounds. But it is still important to calculate all combined costs.

A connected benefit of a bale processor is the ability to move the feeding area, naturally spreading the produced manure. Yaremcio cited a trial by Paul Jungnitsch done at the University of Saskatchewan that found nitrogen retention from the manure and urine deposited naturally onto a field was 40 per cent higher than the nitrogen retention from manure hauled out of pens.

"The nutrient impact is huge. It's not being piled or composted. It's there on the soil exactly where you want it to be."

While the abilities of the modern bale processor are varied, quantifying the time saved, the operating efficiencies and the eliminated waste isn't easy. As the requirements of each operation will vary, it's important to evaluate realistic needs to make the best use of all possibilities.