



ADVANCED AG SYSTEMS'

# Crop Soil News

<http://www.advancedagsys.com/>

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"It is the crops that feed the cows that make the milk which creates the money."

## Sorghum Harvest

Continuing our work reported in the December 2016 newsletter on BMR forage sorghum research, we have conducted a number of tests to determine the best management practice for harvesting and preserving this high-quality feed.

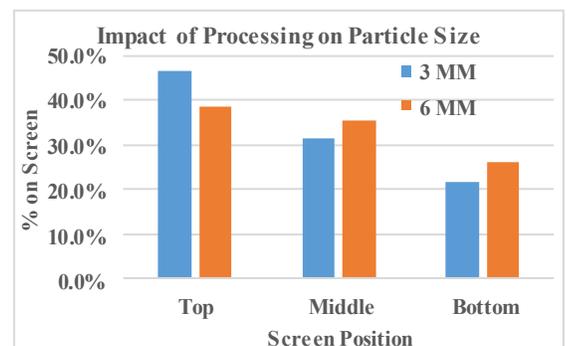


BMR forage sorghum, and winter triticale forage, are very similar crops. Both are very high yielding and drilled in narrow rows. Both have highly digestible, fragile fiber that breaks down quickly in the rumen (like bmr corn). Both can be a heavy yield of wet forage at harvest that is difficult to dry. Finally, depending on harvest at the proper stage of maturity, they have high to very high sugar levels. This substrate is perfect for rapid fermentation or rapid spoilage depending on management. A big question is dealing with the water.

### What About Processing?

We have been looking at the length of cut to determine the peNDF or rumen effective fiber. Most BMR products are cut a little longer because the fiber breaks down so fast in the rumen that it tends to get washed out before the fiber nutrients are fully used. The other objective we have found is that we can reduce the amount of leachate coming out of the silo by reducing the number of cuts in the plant material that releases liquid from the cells. Increasing the length of cut to an inch or more has been very effective – but what about processing?

Last year (<http://advancedagsys.com/sept-2016-sorghum-silage-harvest/>) we showed the impact of increasing the length of cut and the significant reduction in the amount of leachate when we were over  $\frac{3}{4}$  inch and greater than 6 mm processing. This year we focused on the processing. We chopped at 1.14 inch length of cut and took replicated samples processed at 3 mm (corn silage setting) and at 7 mm which was as wide as the Krone chopper's processor would go. The result was nearly identical particle size screened material from each of the samples (graph above, photo next page). There was no significant difference in percentage on each screen whether it was 3mm or 6 mm processing. The length of cut is the over-riding factor for determining what is the amount of material on the top and middle screens. The



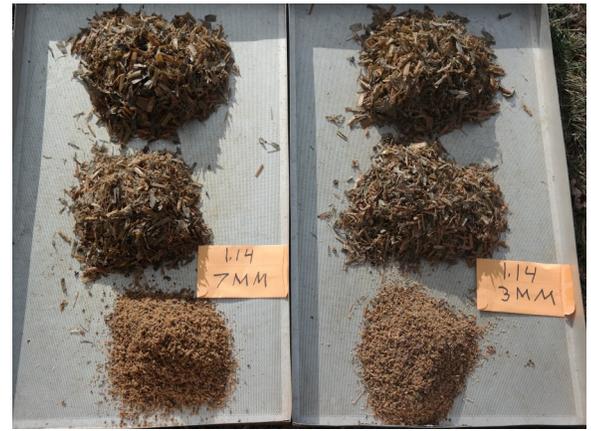
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bottom screen doesn't change as it is composed primarily of pieces of the sorghum head. **Processing has little to no effect on breaking the kernels** for greater digestion because they are so small—the size of #5 shot—and if at hard dough stage, **about as digestible as #5 buckshot!**

The processing did affect the amount of leachate coming out of our silo's. As you can see in the picture, we used blue, oxygen limiting, sealed silos (must have been the Lowe's farm as that was on the side)! We achieved a relatively uniform 10 – 11 pounds of dry matter/cubic foot from silage that was 25.6% dry matter. We then put a hole in the bottom with a bag to catch any leachate. After fermenting the results were measured. Two of the bags from the 3 mm obviously failed, possibly from the large leachate volume, and leaked over the floor. Two of the 7 mm cut possibly had air leakage that may have increased moisture (leachate) production through spoilage but it was still a small fraction of that from 3mm. In spite of those issues, it was obvious from the graph below and picture on the right, that the more intense processing significantly increased the leachate coming out. Couple this with the fact that sorghum kernels are too small to process anyway, means that **any processing with forage sorghum is both a waste of fuel and wear on the processor, and simply increases the amount of leachate coming out of the silo.** Pull it out or back before chopping sorghum (which is normally ready before corn silage). At the very least, **open it as far as it can go.** Analysis of the silos found that there was a significant sugar conserved for the 7 mm over the 3mm, reflecting possibly less cell rupture and so preservation of nutrients within intact cells. We don't have funding but hope to repeat this again next year to check on our results.

## Impact of Inoculants

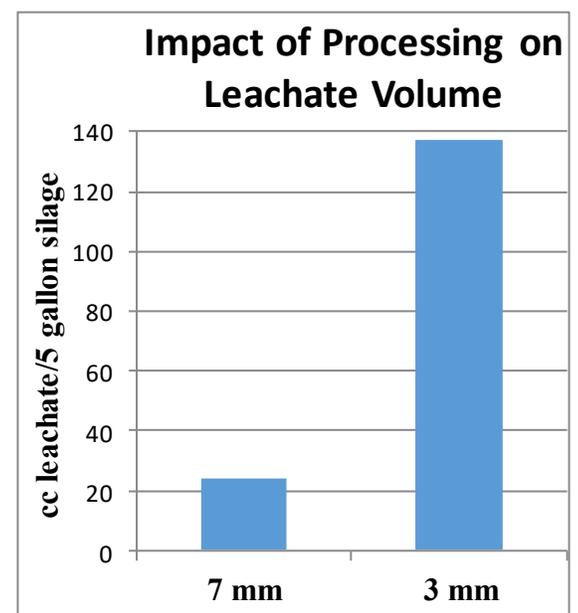
We ran a parallel study at the same time looking at the impact of inoculants. We have been suggesting them for some time now as a means of controlling the fermentation of highly digestible, high sugar forage that often are wet. Not using an inoculant is similar to working a field, fertilizing it, and then walking away and not putting any seed in—you just harvest whatever comes up. Inoculant controls what is doing the fermentation. With the help of American Farm Products (I have no monetary arrangement with the company nor do I recommend products-just reporting results), we tested their SilagePro and Agrisile products compared to the control which had no inoculant (4 replications for each test; vacuum bagged for just over a month). Silage Pro is “an inoculant with an enzyme that “releases sugars and “breaks fiber bonds”, opening the fiber and increasing surface area for digestive bacteria. This is designed to increase the rate of fiber digestion and improves NDF digestibility.” AgriSile is a similar inoculant but without the enzymes. In the results of this study, there was no difference in NDF digestibility between the inoculants that we could measure but there was a significant increase in available sugars post fermentation. The Silage Pro was signifi-



Top of picture is the top screen, middle is the middle screen and bottom is the fine particles. All were chopped at 1.14 inch at 25.6% dry matter.



7 mm processing on left had little or no leachate while the 3 mm processing on right had considerable leachate. Both were 1.14 inch length of cut.



cantly higher in sugar (table below) than the AgriSile and both were much higher than the control. For those who think you don't need an inoculant, the **control had significantly higher lignin** than the two treatments, **indicating that considerable more dry matter was converted to CO2 and water and so lost**, leaving the indigestible lignin behind. This could be seen in the greater inflation of the control bags. The Net Energy of Lactation and the Kd/hr VanAmburg digestion rates were both significantly higher for the inoculants than for the control (no difference between inoculants themselves). The NDFd-30 was significantly higher for both products (no significant difference between them) compared to the control. Again, as the more easily digested components of NDF were lost in fermentation without an inoculant, the remaining NDF was less digestible. A one point change in NDFd is equal to .55 lbs. milk/cow/day. The **loss of NDFd digestibility** in the table below, indicates that it was **equal to 2.3 pounds of milk/cow/day**. For a 100 cow farm that is equal to **about \$14,000**. Even if it was half of that you are still ahead by using a homolactic inoculant on your sorghum or winter forage silage.

Inoculant Impact	Lignin/NDF	NDFd 30	Sugar % DM	NEL	Kd/hr VanAmburgh
AgriSile	7.49 c	67.05 a	8.43 b	0.7125 a	5.07 a
SilagePro	7.87 b	67.775 a	9.78 a	0.71 a	5.3275 a
Control	8.25 a	63.125 b	6.83 c	0.695 b	4.69 b

Different letters after indicates significant difference at 95% level

## Direct Cut Sorghum Sudan for Organic Farms

One of the questions we had as follow up from the organic replacement for corn silage (one cut bmr sorghum-Sudan); <http://advancedagsys.com/site/wp-content/uploads/2016/03/Feb-2016-organic-sorghumSudan.pdf> was could we direct chop this with a modern rowless corn head? Last year our research showed that this crop is a viable option and can be grown without weeds and without cultivation if the correct seeding rate is used

This year we planted a BMR sorghum-Sudan and allowed it to grow through the summer to late milk stage. As you can see in the picture, in spite of the extremely dry weather, we had sufficient rain to grow a nice crop. The question we had was whether it could be direct chopped with the modern rowless corn heads. Taylor Williams of Wil-Roc farms was willing to give it a try and as you can see in the picture, we ran their Krone chopper through, with no problems what so ever. This means that larger organic (and smaller ones having it custom harvested) can utilize this crop producing much more consistent and efficient high energy forage.



Sincerely,

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