


High Nitrates in Sorghum

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The Beginning

- ▶ I received an email from members of the Iowa Rapid Response Team.
 - ▶ A Missouri sorghum product was given to two infants in Iowa and mixed with goat's milk.
 - ▶ Both infants were hospitalized with methemoglobinemia.
 - ▶ The infants also received supplements and “silver” as an antibiotic before they became ill.
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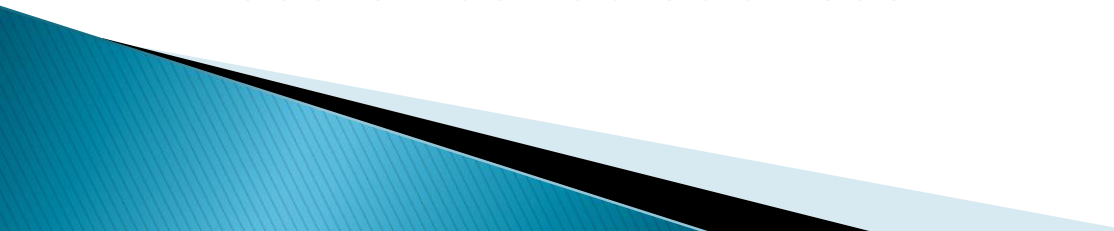
Earliest Information

- ▶ Iowa tested the opened sorghum and found nitrates at the 9,300 parts-per-million level.
- ▶ Genetic predisposition and high nitrates in food can cause methemoglobinemia.

Methemoglobinemia

- ▶ Methemoglobinemia can be serious. It can cause too little oxygen to be delivered in the blood.

Symptoms from Methemoglobinemia can include:

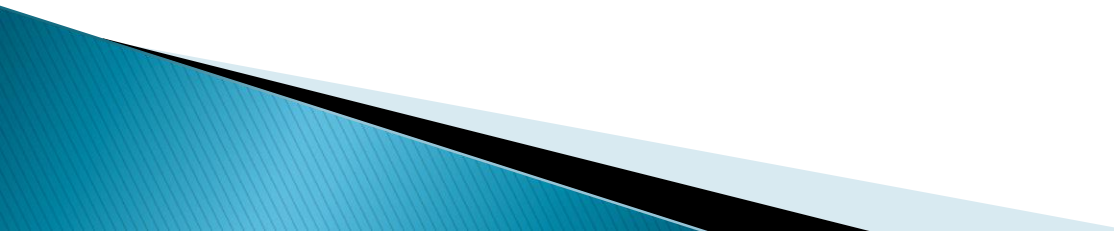
- ▶ Shortness of breath
 - ▶ Nausea
 - ▶ Rapid heart rate
 - ▶ Confusion or stupor
 - ▶ Loss of consciousness
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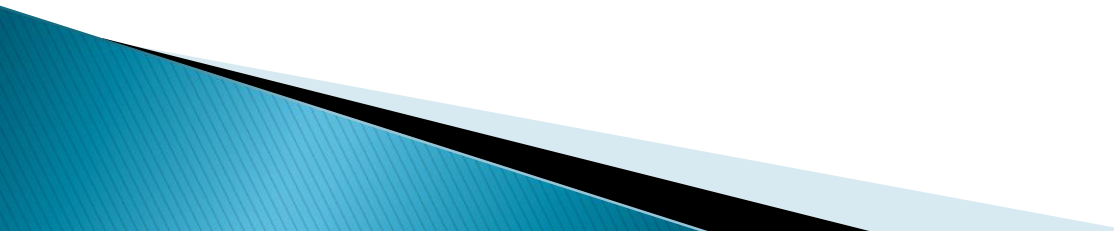
Sorghum Jar Photo Sent from Iowa

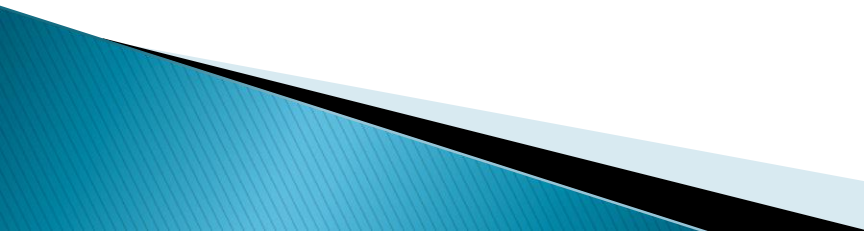
The containers had no lot numbers or dates. So, if there was an embargo or recall, everything would have to go. The producer was instructed to provide key identifiers on the previous inspection, but didn't get around to doing it.

Nationwide Release

- ▶ Iowa embargoed the product.
 - ▶ Iowa also issued a consumer advisory that the sorghum was very high in nitrate levels which could be especially hazardous if consumed by infants.
 - ▶ The Iowa advisory instructed people not to eat the product and discard it if they had it.
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Methemoglobinemia. Are There More Cases in Missouri?

- ▶ Methemoglobinemia is a reportable condition in Missouri.
 - ▶ Searches of MOHSAIC–the Missouri Health Strategic Architectures and Information Cooperative and ESSENCE data did not show any cases in 2017–2018 related to high nitrates in sorghum.
 - ▶ Work with Missouri's poison control centers did not find any cases related to high nitrates in sorghum.
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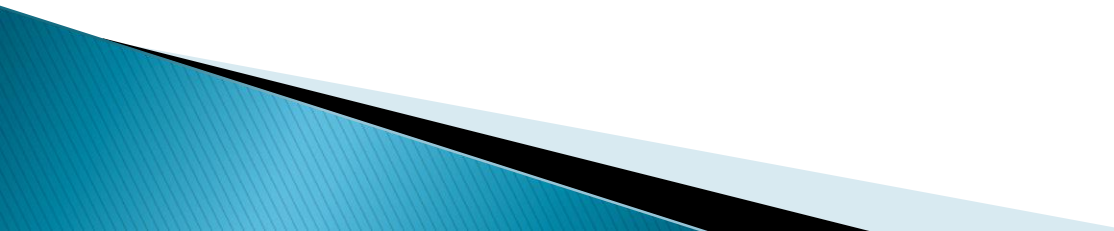
- ▶ We worked with the farmer/producer to voluntarily recall the product through his customers.
 - ▶ There was very little product left.
 - ▶ When there is product, it sells fast.
 - ▶ We tested what little was left and found high, but varying levels of nitrates.
 - ▶ The farmer/producer is Amish. There is only one phone for the whole community.
 - ▶ There were only a few paper, handwritten records for recall.
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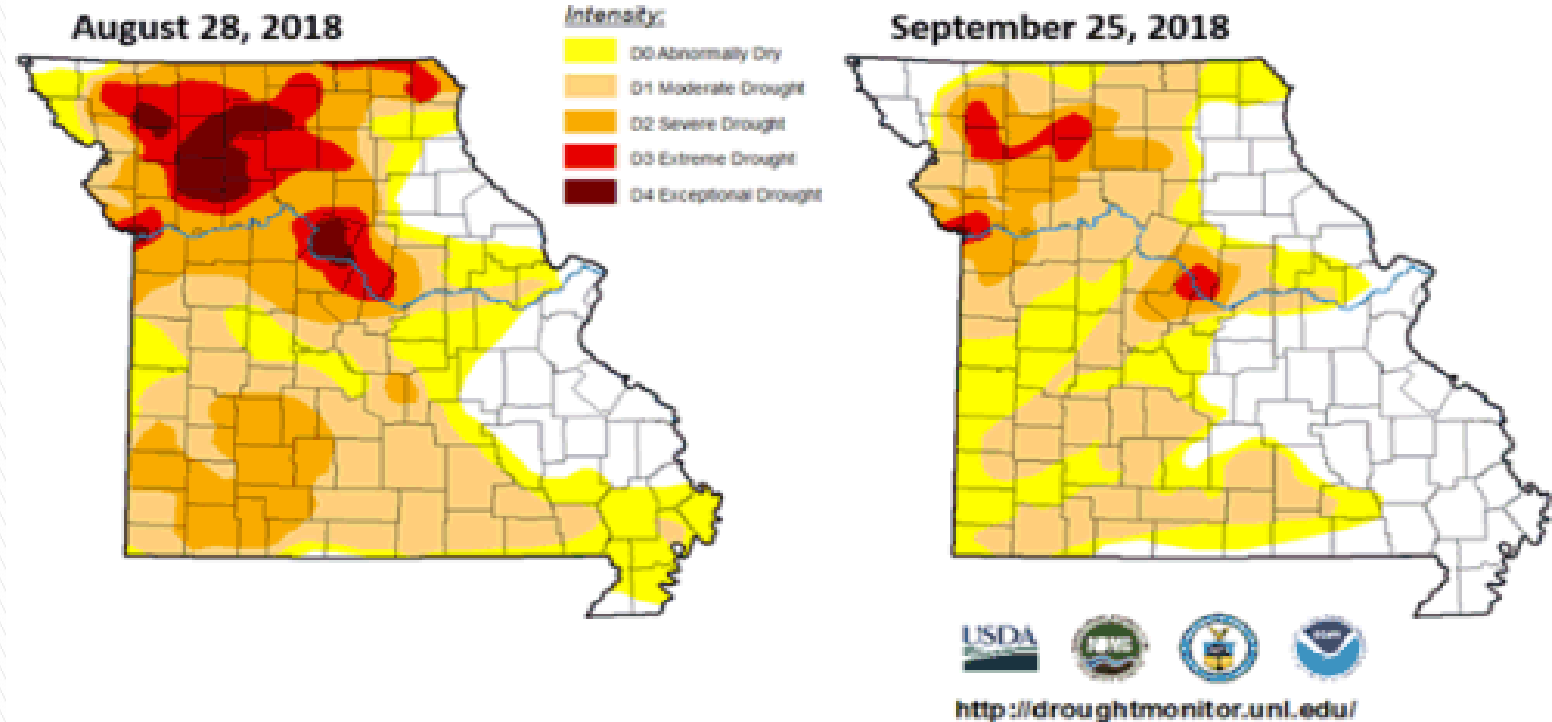
Learning More About the Harvest

Sorghum is primarily used for animal feed. But, one of the first lessons learned about this new challenge is that the grain is becoming more popular for human food. The grain is gluten free.

The Harvest Learning Curve

- ▶ The sorghum in question was from the previous year's harvest.
 - ▶ A new crop would be harvested around the first or second week of October.
 - ▶ The more heat and drought, the more likely the sorghum plant will absorb nitrates and not break them down.
 - ▶ The 2017 crop may have bumped into a stretch of hot dry weather at the end of the summer. In 2018, we were in a full fledged drought.
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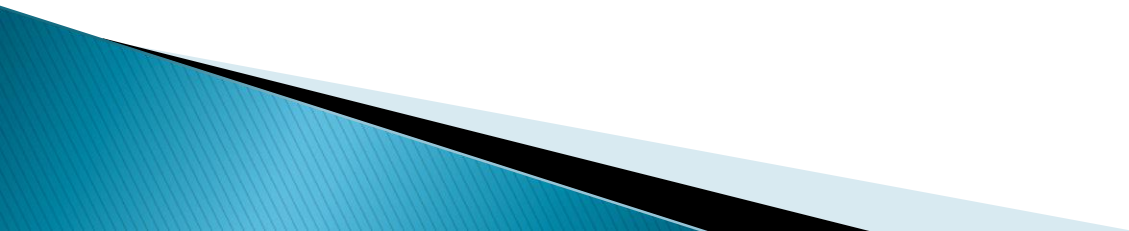
U.S. Drought Monitor



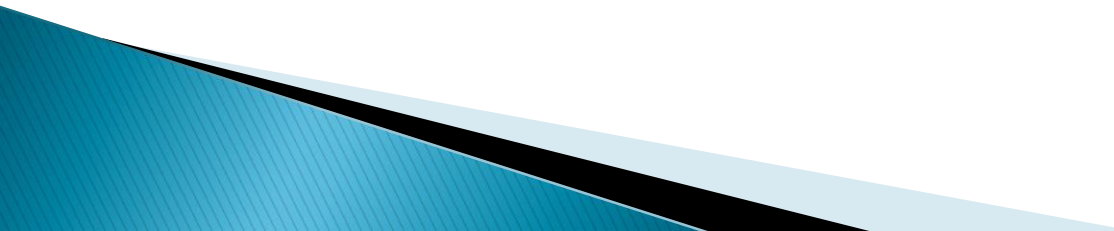
Drought Maps from the University of Missouri Climate Center

Maps for August and September 2018, show moderate to severe drought for the Southwest part of the state where the sorghum farm is located.

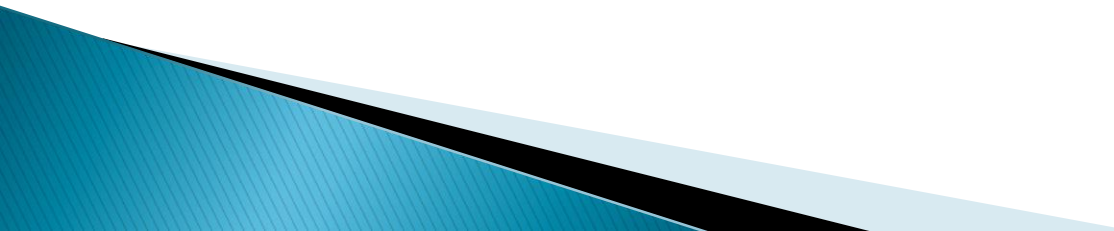
Ultimately, we had a whole new concern. A new crop with new product was less than a month away.




Rapid Response Team Partnerships Payoff

- ▶ Worked with the Missouri Department of Agriculture (MDA) to learn more about sorghum.
 - ▶ We learned more about the plants and options that might be helpful.
 - ▶ MDA provided DHSS with contacts at the University of Missouri Extension Service.
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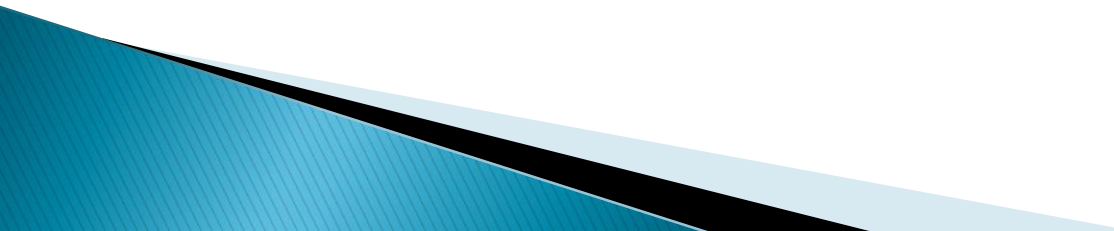
New Territory

- ▶ A lot is known about sorghum for feed purposes.
 - ▶ Human food is different.
 - ▶ Is there a possibility that the nitrates in sorghum molasses could be reduced?
Unfortunately, no.
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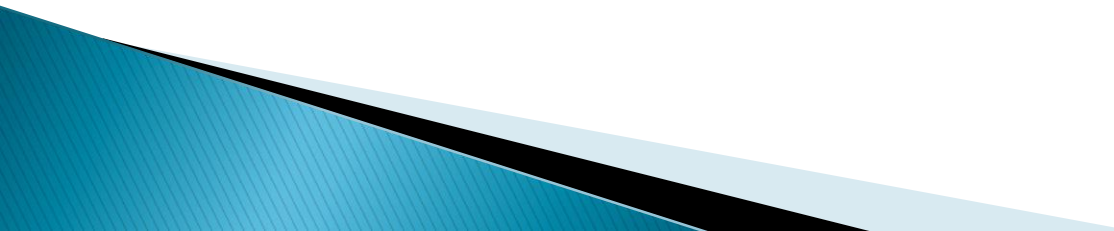
How Can We Do More Prevention?

- ▶ We worked with the University of Missouri Extension Service and a Southwest Missouri Laboratory.
 - ▶ How can we measure and anticipate problems that might be ahead? Maybe part of the crop isn't worth harvesting.
 - ▶ How can we help the farmer prevent this from happening again?
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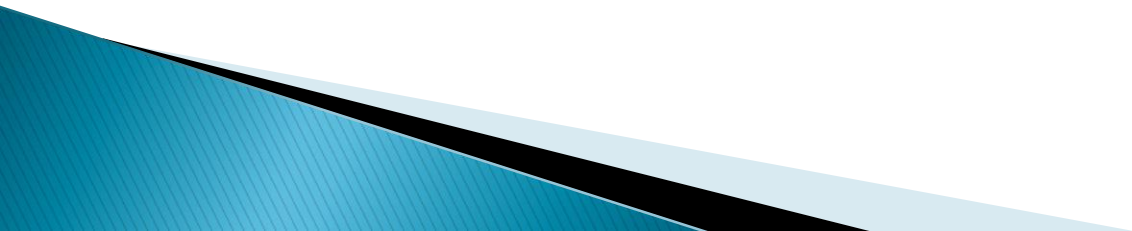
Most Immediate Preventive Measures

- ▶ We would test the final product.
 - ▶ If the nitrate levels were similar to the year before, we would embargo the product.
 - ▶ We wanted stronger identifiers on the label so we could recall product whenever any problems were detected.
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Working Together With Experts

- ▶ We wanted the Extension Service to join us at the farm.
 - ▶ We wanted to check the fields, examine the soil.
 - ▶ We wanted to be sure fertilizer was appropriately applied.
 - ▶ We wanted to test the crops in the field. Maybe there were fields that weren't worth harvesting.
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All of Us Feared the Worst.



Not So Fast

- ▶ There were only a few cases in small areas where soil might have been less likely to keep water longer.
 - ▶ Fertilizer was appropriately applied in small amounts long before harvest.
 - ▶ Testing the stalks in the fields surprised us.
 - ▶ There was better news than any of us expected.
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This is the Machinery Used to Squeeze Juice from the Sorghum Plants



Where the Sorghum Molasses is Bottled

Improvements

- ▶ At its highest level, a batch tested about one third less than the highest level detected in Iowa.
 - ▶ Highest level detected--6,300 parts per million.
 - ▶ We actually found sorghum produced from other states at 6,300 parts per million.
 - ▶ Lots were identified and labeled by field.
 - ▶ The farmer/producer added a caution label stating the product is not recommended for children age two and younger.
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Areas for Improvement

- ▶ There is no established maximum level of nitrates for sorghum molasses.
- ▶ We did a lot with Missouri Rapid Response Team personnel, resources and partnerships, but we did not activate.