**Rationale & Objectives**

- New silage inoculants contain a bacterial strain that produces ferulic acid esterase (FAE) which may aid the break down of lignin, which could increase the digestibility of alfalfa silage.
- The objective of this study was to evaluate the effects of applying an FAE-enhanced microbial inoculant compared to a conventional inoculant on alfalfa or alfalfa-bermudagrass silage.
- Mini-silos of forage were prepared in 2018 from two cuttings of alfalfa and alfalfa-bermudagrass in Georgia comparing an FAE inoculant to an equivalent inoculant without FAE capacity, along with an uninoculated control.

**Study Description**

**Experimental units:**
Miniature silos made from PVC pipe.

**Locations:**
Pure stand alfalfa (ALF) in Tifton, GA; an alfalfa-bermudagrass (ABG) mixture in Watkinsville, GA.

**Factors:**

- **Two cuttings:** Early June and Early August.
- **Three inoculant treatments:** 1) Pioneer 11G22, a conventional non-FAE-producing microbial inoculant (MI), 2) the FAE-producing microbial inoculants (MI+FAE) of Pioneer 11AFT for the ALF trial or Pioneer 11GFT for the ABG trial, or 3) a mist of deionized water as a control (CON).

**Analysis:**
After 60-days of ensiling, silage samples were analyzed for fermentation profiles, forage quality, dry matter digestibility, and the profile of fatty acids released in simulated digestion in a rumen.

**Results**

**Nutritive Value**
- Forage quality was different between the two harvests, but the MI and MI+FAE did not have any significant effect in either forage type.
- Both inoculants decreased ethanol soluble carbohydrates (ESC) in the ABG mixture relative to the control, indicating they may have undergone a more extensive degree of fermentation than the untreated control (Figure 1). No such differences were observed in the ALF silage.

**Figure 1.** In the ABG mixture, the addition of either the MI or MI+FAE inoculant lowered ESC in the resulting silage. However, there was no difference between the inoculants. No difference was observed in the ALF silage.

![ ESC (g kg⁻¹) ]

<table>
<thead>
<tr>
<th>Inoculant</th>
<th>ESC (g kg⁻¹)</th>
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<tbody>
<tr>
<td>CON</td>
<td>25.0</td>
</tr>
<tr>
<td>MI</td>
<td>20.0</td>
</tr>
<tr>
<td>MI+FAE</td>
<td>15.0</td>
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</tbody>
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**Fermentation Characteristics**
- The pH and total volatile fatty acid (VFA) levels in both forage types were not affected by inoculant treatment (Figures 2 and 3, respectively).
- Though the concentration of acetic acid (Figure 4) and other specific VFAs were influenced by the addition of an inoculant (either the MI or MI+FAE), there were no differences detected between them in regards to their fermentation profiles.
CONCLUSIONS/SUGGESTIONS

- Microbial inoculants to improve fermentation and protect forage nutritive value have value, but the FAE-producing inoculants did not perform better than the comparable non-FAE producing microbial inoculants in this study.
- Based on our results, the FAE-producing inoculant appears unlikely to improve fermentation, nutritive value, or forage digestibility relative to a similar microbial inoculant product without the capacity for FAE production.
- Additional unbiased and independent trials are needed to examine the potential for FAE-producing inoculants before they should be recommended and used, but it appears that they at least do no harm to silage fermentation and nutritive value.