# Research Notes

Arm & Hammer Animal and Food Production

## CERTILLUS Microbial Terroir™ Controls *Clostridium* Populations in Pigs

CERTILLUS™ Targeted Microbial Solutions™ use proprietary strains of *Bacillus* selected to combat specific pathogenic challenges.

### STUDY OVERVIEW[1]

- A total of 100 weanling pigs with an average weaning age of 19 days were transported to an offsite nursery facility in Minnesota to evaluate the efficacy of CERTILLUS *Bacillus* strains for mitigating the effects of an oral *Clostridium perfringens* Type A challenge.
- Upon arrival, pigs were divided into 50 pens (2 pigs/pen) and offered one of five treatment diets:
    1) Control diet comprised of corn, soybean meal, hydrolyzed soy protein and fish meal
    2) Control diet and CERTILLUS *Bacillus* strain 747
    3) Control diet and CERTILLUS *Bacillus* strain 1781
    4) Control diet and CERTILLUS *Bacillus* strain 1999
    5) Control diet and CERTILLUS *Bacillus* strains 747 and 1781 combined
- Three days after weaning, all pigs were orally challenged with 5 mL of liquid inoculant containing a total of $10^9$ CFU of *Clostridium perfringens* Type A.
- Because feed intake in weanling pigs is erratic the first 3-5 days after weaning, pigs on the CERTILLUS treatments were individually administered a 2 mL oral dose of their respective *Bacillus* treatment strain(s) to deliver 1.7 x $10^8$ CFU total *Bacillus*/hd/day for three consecutive days post-placement.
- Just prior to the *Clostridium* challenge (Baseline) and four days after the *Clostridium* challenge (Day 7 post-weaning), fecal samples were collected from pigs (10 replicates/treatment) to determine *Clostridium* counts.

### RESULTS

- Fecal *Clostridium* counts were similar for all pigs regardless of dietary treatment just prior to the *Clostridium perfringens* Type A challenge (Baseline).
- CERTILLUS 1999 reduced ($P<0.05$) fecal *Clostridium* counts following challenge compared to pigs fed the control diet.
- CERTILLUS 747 and 1781 did not significantly reduce fecal *Clostridium* counts following challenge when fed individually compared to control pigs, but resulted in the greatest reduction ($P<0.05$) in fecal *Clostridium* counts when combined as the CERTILLUS treatment compared to control pigs.

TABLE 1. FECAL *CLOSTRIDIUM* COUNTS MEASURED IN NURSERY PIGS JUST PRIOR TO AN ORAL *CLOSTRIDIUM* CHALLENGE (BASELINE) AND TWO DAYS POST-*CLOSTRIDIUM* CHALLENGE.

| TREATMENT | BASELINE | POST-CHALLENGE |
|---|---|---|
| **Control** | 7.62 | 6.04[a] |
| **CERTILLUS 747** | 7.17 | 5.44[a,b] |
| **CERTILLUS 1781** | 7.05 | 5.99[a] |
| **CERTILLUS 1999** | 7.48 | 5.06[b,c] |
| **CERTILLUS 747 and 1781** | 7.19 | 4.44[c] |
| **SE** | 0.33 | 0.31 |
| ***P*-value** | 0.644 | <0.01 |

[a,b,c] Means differ; $P<0.05$

## CONCLUSION

- Although weaned pigs harbor *Clostridium* in their gastrointestinal tracts, it rarely causes disease after the neonatal period; however, this *Clostridium* challenge study demonstrates the efficacy of CERTILLUS™ *Bacillus* strains to control *Clostridium* populations in the pig's gastrointestinal tract.

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1 Sinn S, Beckler D. Evaluation of feeding multiple strains of Direct-Fed Microbial (DFM) on growth performance, immune and health status of weanling pigs artificially challenged with *Clostridium perfringens*. 2017. NutriQuest Modeling Center.