

PUBLIC HEALTHWORKER SAFETY

Title: Comparison of antibiotic treatment regimens for naturally occurring, multi-etiology disease challenges in commercial wean-to-finish swine facilities. – **NPB #19-048**

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Scientific Abstract:

Objectives of this study were two-fold. First, to compare the efficacy of current water-soluble and injectable antibiotic treatment regimens during naturally occurring, multi-etiological swine disease challenges (“coinfections”) in growing pigs raised under commercial conditions. Second to produce a validated research protocol that can be applied by veterinarians and producers to test the value of antimicrobial treatment options under the specific conditions of their pig flows and health statuses.

To meet these objectives, three rooms of a hotel-style commercial nursery were modified to allow for treatment randomization. Four antibiotic treatment regimens were selected prior to study initiation for comparison: 1) Whole population water 2) Whole population injection 3) Targeted injection (i.e. spot treatment) 4) Baseline (combination of population water and targeted injection). Two studies were carried out within the three rooms. Production outcome variables included average daily gain, total mortality, 7 days post-treatment mortality, total removals, 7 days post-treatment removals, total first re-treatments, 7 days post-treatment first re-treatments, total second re-treatments, and 7 days post-treatment second re-treatments.

Overall, there were no statistical differences between treatments regarding the production parameters of average daily gain, total mortality or 7 days post-treatment mortality. In one or both studies, the whole population injection treatment resulted in the lowest and statistically significant percentages of total removals, 7 days post-treatment removals, total first re-treatments, 7 days post-treatment first re-treatments, total second re-treatments, and 7 days post-treatment second re-treatments.

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

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Clinical outcome variables were also collected, but ultimately not reported given the addition of IAV-S in both studies. IAV-S causes elevated rectal temperatures, which led to the classification of a majority of pigs as treatment failures, despite meeting all other FDA GFI #178 treatment success criteria (Table 6). More work needs to be done to determine the best utilization and interpretation of this criteria when considering natural disease outbreaks under commercial conditions, where multi-etiology challenges will impact the treatment outcome.

In one or both studies, the whole population (pen) injection treatment resulted in the lowest and statistically significant percentages of total removals, post-treatment removals with 7 days of treatment, and the frequency of re-treatments. Overall, there were no statistical differences between treatments regarding the rest of the production parameters of average daily gain, total mortality or 7 days post-treatment mortality.

Clinical outcome variables were also collected, but ultimately not reported given the clinical impact of IAV-S in both studies. IAV-S causes elevated rectal temperatures, which led to the classification of a majority of pigs as treatment failures, despite meeting all other criteria.

There are three key findings for industry: 1) it is expensive (both in direct cost and labor) to collect accurate data in the field regarding antimicrobial treatment efficacy, 2) virus exposure and the resulting clinical impact can mask the clinical efficacy of antimicrobial treatment, and 3) mass injection of a pen at a specific time point was superior to the other treatment regimens available in this study.