Antimicrobial resistance in bacteria of dairy cattle exposed to intramammary pirlimycin hydrochloride

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BACKGROUND
- Mastitis is a very common and costly disease in dairy cattle
- Pirlimycin hydrochloride is an antimicrobial that is commonly used to treat mastitis in dairy cattle
- Use of intramammary pirlimycin alters the fecal microbiome in dairy cows
- There is little data on the unintended effects of intramammary antimicrobials on resistance profiles of microbes originating from the GI tract

HYPOTHESIS
Heifers treated with intramammary pirlimycin will have a higher proportion of antimicrobial resistant bacteria in their feces than those that were not treated.

METHODS
Feces were thawed at room temperature for 1 hour and then diluted at 1:100 with sterile saline.

100μL of the dilution was spread on to Mannitol Salt Agar, Columbia CNA agar, KF Streptococcus Agar and Streptococcus selection agar. 50 μL of the dilution was spread onto Columbia blood agar. All media were incubated at 37°C, 10% CO₂ and evaluated for growth at 24 and 48 hours.

Staphylococcus and Streptococcus-like organisms (Streplococcus species, Enterococcus species, Lactococcus species, Aerococcus species) were selected and isolated on Columbia blood agar.

MALDI-TOF was used to speciate each isolate.

PRELIMINARY RESULTS
- Fecal samples originated from University of Missouri Foremost Dairy heifers (n=24) that were enrolled in three groups: Control (n= 8) who did not receive pirlimycin treatment, Treatment group 1 (n= 10) received intramammary pirlimycin in one infected quarter once daily for two days at 24-hour intervals, and Treatment group 2 (n= 6) who received intramammary pirlimycin in one infected quarter once daily for eight days at 24-hour intervals.
- Fecal samples were collected once per day on day 0 (D0), D2, D7, D14, D21, and D28 and stored at -20°C until further analysis.

CONCLUSIONS
- The most common bacteria isolated from both the treatment and the control group was Enterococcus hirae
- 75% of isolates identified to date are Enterococcus species and only 25% are Staphylococcus species.
- Based on current data, it appears as though species richness is consistent on D0, D2, and D7 but decreased on D14

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