

Introduction

Due to cold temperatures in Montana, calves born in early spring are subject to ear frostbite, causing them to lose their pinnae. This results in reduced animal performance and economic damage as calves cannot receive ear identification tags.

To prevent this issue, producers often use knitted or crocheted ear wrap coverings. However, cows typically remove and ingest these coverings from their young, potentially causing digestive problems.

Objective

This project evaluates the degradation of different yarn materials, including cotton, acrylic, hemp, and wool, in the rumen to minimize digestive harm for cows ingesting these coverings.

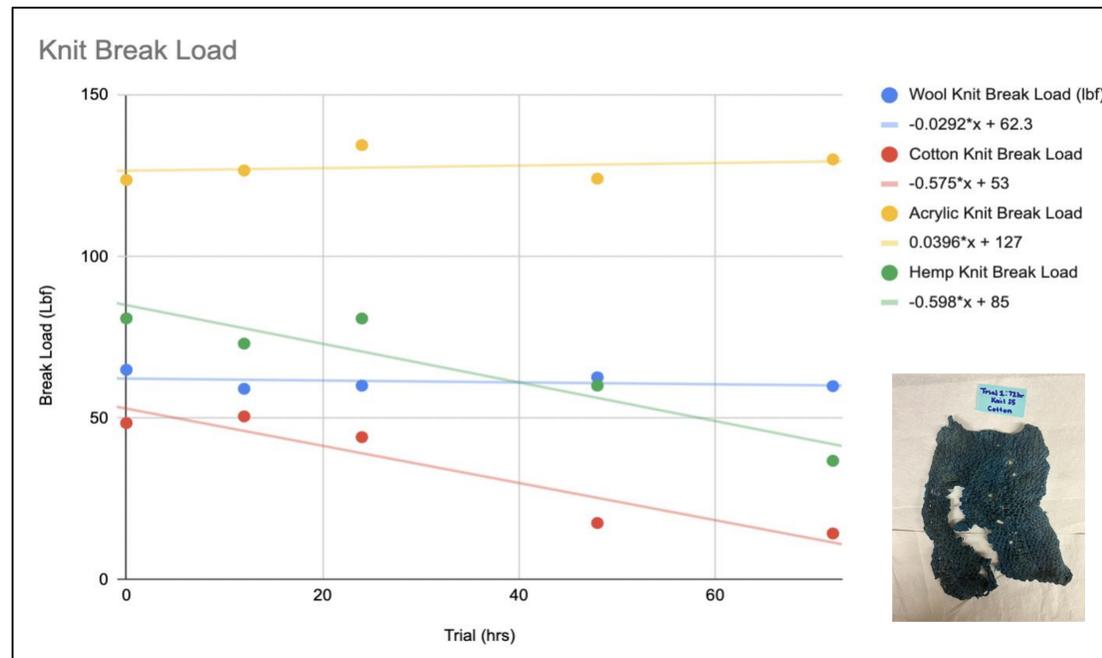
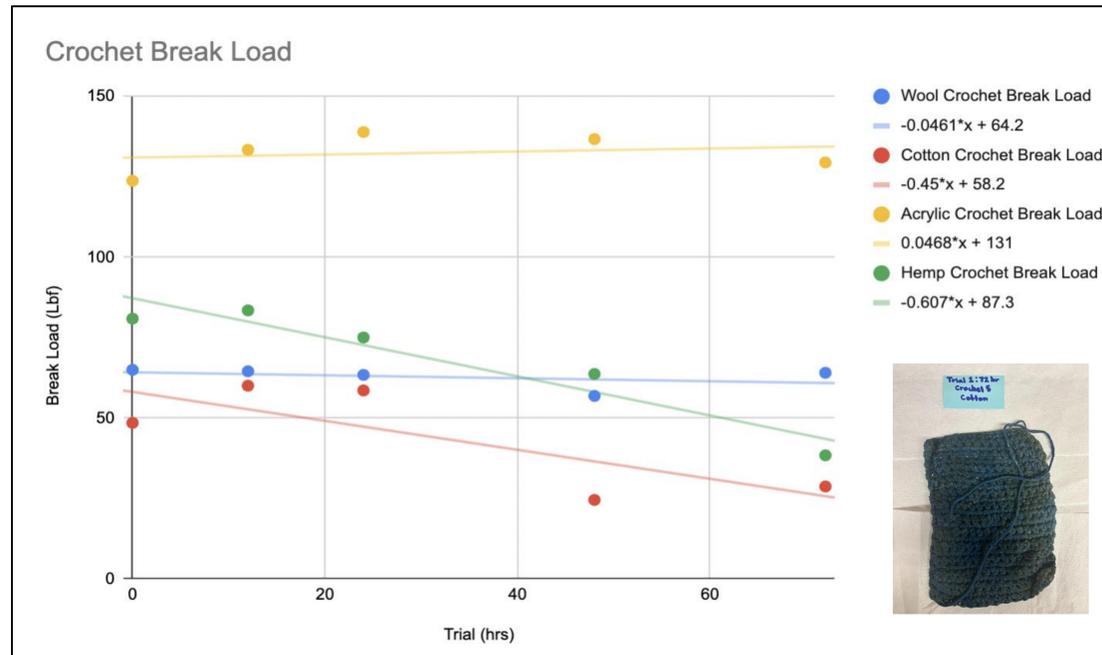
Materials and Methods

Insertions: For each of three experimental trials, two squares of each material, one knit and one crochet, were used. The squares were inserted via nylon mesh bags connected to nylon ropes for retrieval into the rumen of a fistulated cow for 12, 24, 48, and 72 hours. A control trial of 0 hours was also conducted. After this period, the samples were rinsed and dried before degradation was evaluated with the use of a tensile tension machine.



Tension Tests: Each square was unraveled and braids consisting of 6 strands were constructed. A minimum of three braids was used to conduct tension tests and an average break load was recorded.

Results



Summary and Conclusions

- Cotton and hemp degraded the fastest as these materials had the two highest absolute slope values.
- Knitted cotton had the lowest break load after 72 hours, 14.35lbf compared to hemp's 36.85lbf.
- Evidence from this study suggests that knitted cotton is the safest material to construct ear coverings, as it degrades quickly, thus causing minimal digestive problems.

Future Work

Temperature holding capacity of each material, both knit and crochet, should be evaluated to determine which material is the best choice for preventing calf frostbite.

References Cited

Thomas, H. S. (2021, March 4). *Preventing and Treating Frostbite in Baby Calves*. Tri-State Livestock News. <https://www.tsln.com/news/preventing-and-treating-frostbite-in-baby-calves/>

Discussion

- Negative relationship between break load and amount of time the material spent in the rumen.
- Materials with a higher absolute "m" value degraded the fastest in the rumen over 72 hours.
- For all materials, the knit break load was lower than crochet.

Acknowledgments

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