
Alternative Feed Substitution for Blackbelly Sheep in Barbados:

Reducing Dependency of Concentrate for Farmers

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The blackbelly sheep, a native species to the island of Barbados, is an important livestock animal whose production is mainly intended for consumption. The production of these sheep is costly for farmers as it involves high inputs of commercial concentrate feed due to the reduced availability and quality of forage during the dry seasons (Macias-Cruz et al., 2010). There is currently only one source of commercial livestock concentrate available in Barbados. Since 2008, the increase in the cost of raw materials used to produce the commercial feed has caused an increase in the price of the concentrate, which makes it impractical in the long term for farmers to continue livestock farming (Fair Trading Commission, 2009). Farmers need an alternative to this expensive concentrate that would allow the sheep to have similar growth rates while minimizing the cost of feed.

Objectives

The overall purpose of this study was to examine the possibility of using a feed based upon local by-products as a substitute for the expensive concentrate that is conventionally used for blackbelly sheep on the island. The availability of a less costly, local ingredient-based feed would alleviate the economic stress that the small scale livestock industry in Barbados faces. By purchasing local by-product ingredients, sheep farmers could in turn support the local Caribbean economy. To achieve this goal, we conducted a feeding trial by examining the growth effects of by-product feed on blackbelly sheep. The by-product ingredients consisting of wheat middling, rice bran, soybean meal and molasses.

Materials and Methods

By-products Feed	Percentage (%)
Wheat Middling	55.0
Rice Bran	18.0
Soy Meal	12.0
Molasses	15.0

Table 1. The percentage of each ingredient in the by-product mix.

The experimental design was based on the study done by Heater et al. (2013) and included several modifications. The trial consisted of 55 sheep separated into three treatment groups; treatment group A (100% concentrate), 19 sheep; treatment group B (50% concentrate: 50% by-product) 18 sheep; and treatment group C (100% by-product), 18 sheep. For each treatment group, there were three replicates of 6 or 7 sheep. The sheep were weighed weekly to assess their growth. The recipe used by Heater et al. (2013) was modified to increase its palatability. The amount of molasses previously used was 5% of the total by-product weight. For this experiment, the ratio was increased to 15%.

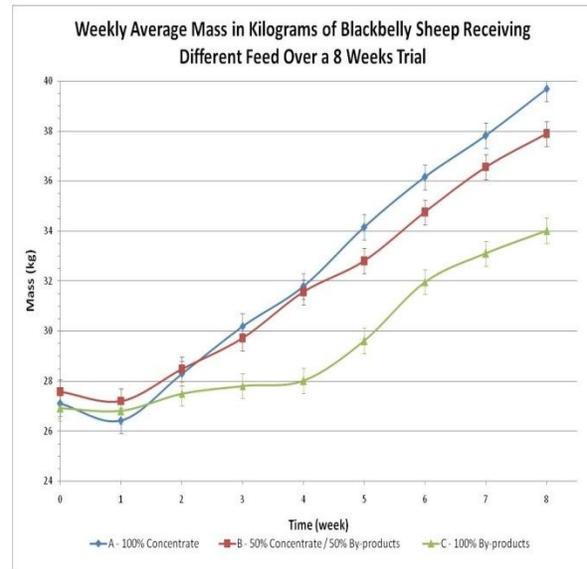
Choice of components and formulation of the new feed

Ideally, the new by-product recipe would be cheaper than the concentrate, because the ingredients are locally produced, and contain a similar nutritional value with the same amount of protein. This could ensure that small blackbelly sheep farmers are able to feed their sheep high quality food at an affordable cost. The concentrate contains a minimum guaranteed crude protein level of 16%, crude fiber level of 12% and costs \$1.33 per kilogram.

Feed sampling and Analysis

All 3 samples of the feed, concentrate, by-product, and 50% by-product, and 50% concentrate, were

analyzed by Dr. Ari Mustafa of McGill University.



Graph 1. Illustrates the average weekly mass of sheep in the three different treatments over the 8-week feeding interval.

Results

Treatment group A (100% concentrate) and B (50% concentrate/50% by-products) grew significantly faster than treatment group C (100% by-products). Treatment group B (50% concentrate: 50% by-product) increased positively and steadily like group A, from week 1 to week 5, and then their growth rate slowed down in comparison to A. Treatment group C, did not steadily increase in weight until week 4, and from week 4 to 6, their weight increased linearly, but slowed from week 6 to 8. By week 8, treatment A (100% concentrate) reached a total average mass of 39.7 ± 0.1 Kg, which is significantly greater in comparison to treatment B (50% concentrate/50% by-products) at 37.9 ± 0.1 Kg and treatment

C (100% by-products) at 34.0 ± 0.1 Kg. The highest level of profit can be achieved with treatment A (\$521.07BDS/sheep followed by treatment B (\$382.97 BDS/sheep) and treatment C (\$212.34 BDS/sheep)

Discussion

The cost analysis shows that over an 8 week trial, the most profitable option is the 100% concentrate (treatment A) followed by the 50% concentrate/50% by-product mixture (treatment B) and finally the 100% by-product (treatment C). The difference in profit between treatment A and B is of $\$138.19 \pm 1.54$ BDS per sheep. While the cost of the by-product feed is less expensive than the commercial concentrate it needs to be mixed, and a mineral block supplement offered the sheep. The commercial concentrate is more profitable mainly because this feed caused the greatest weekly gain in sheep mass and the heavier sheep can be sold at a greater price.

Conclusion

The increased molasses improved the palatability of the feed, as the amount of leftovers in their pens was very little to nothing. A mineral supplement offered the sheep in treatment B and C at week 4 strongly promoted weight gain. For future feed trials, it is recommended that minerals should be added to the by-product mix or mineral blocks put into each pen at the start of the trial.

Acknowledgements

Many thanks to our mentors John Vaughan, Greg Welch, Christian Molgat, Arif Mustafa and the staff at Greenland. To Mr. John Vaughan, you were an amazing mentor and we are very appreciative of your guidance and support, without which this trial could have been carried out. To Mr. Greg Welch and all the staff at Greenland, thank you for teaching us everything you know about the sheep and allowing us to use all your facilities. To Dr. Arif Mustafa and his lab, thank you for analyzing the ingredients for the feed. To Christian Molgat, thanks your support and guidance throughout the entire project. To Danielle Donnelly, thank you for providing us with all the necessary resources to do our project. To all our mentors, your help has been invaluable.

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