Steam Pelleted Supplements for Beef Cows made using Field Peas, Barley Malt Sprouts (BMS), and Distiller's Dried Grains with Solubles (DDGS)

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Introduction

Field pea is an excellent source of protein and energy and has been shown to have "strong" binding attributes when used in steam pelleted feeds. It is hypothesized that combinations of Field Pea, barley malt sprouts (BMS) and distiller's dried grains with solubles (DDGS) can be found that will demonstrate excellent physical pellet quality while decreasing production costs.

The nutrient profiles and relative attractive costs of by-products from barley malting and corn ethanol production make them attractive feed ingredients for beef producers. However, BMS and DDGS pose challenges to feed manufacturers. Previous research has shown that BMS can be used as a scouring agent to remove the sticky residue formed on the interior walls of pellet die holes when DDGS are pelleted resulting in decreased electrical energy use and improved pellet quality. However, anecdotal stories continue to claim that DDGS cannot be made into quality pellets. It is our intent to show that by using combinatorial practices we can produce a cost effective, quality pellet for use by beef cows.

Materials and Methods

The experimental feed was prepared using a CPM Hyflo Pellet Mill equipped with a 37.5 Kw main drive motor. The die used for the experiment was ¼" x 2 1/2" (6.4 mm x 63.5 mm). This die has a standard relief ratio of 10:1. Three test trials were conducted and the percentage of ingredients used in each test run are shown in Table 1. We chose to maintain DDGS inclusion at a constant rate of 60% and to vary the inclusion of Field Pea and BMS at levels of 10, 20 and 30%; yielding three treatments: 10% Field Pea, 30% BMS, 60% DDGS; 20% Field Pea, 20% BMS, 60% DDGS; 30% Field Pea, 10% BMS, 60% DDGS. The materials used were all hammer mill ground through a 3.2 mm screen prior to proportioning, mixing and pelleting. Each treatment was processed under nearly identical conditions; with slight differences in production rate caused by density variations between the treatments.

Results and Discussion

Results for the three pelleting tests have been summarized in Table 2. Results show that the incremental increases of Field Pea and decreases of BMS brought about a reduction in electrical energy consumption, measured as kwh/mt, resulting in a $.05 per ton savings; with pellet quality increasing to about 95%. We believe that any of the three treatments satisfy the hypothesis, with the 30% Field Pea, 10% BMS and 60% DDGS product showing the greatest advantage. Some of our success is attributed to the design of the pellet die that was used, L/d ratio of 10:1. Remaining work needs to be done using dies with lower ratios; 7:1 is a ratio often seen in "cubing" dies to see if our results can be transferred, or if we need to modify our combinatorial mixes.

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Table 1. Percentage of Ingredients Used in Each Trial.

	Field Peas	Barley Malt Sprouts	Dried Distiller's Grain
Trial #1, %	10.0	30.0	60.0
Trial #2, %	20.0	20.0	60.0
Trial #3, %	30.0	10.0	60.0

Table 2. Differences in Production Rates.

	Trial 1	**Trial 2**	**Trial 3**
Voltage	519.67	517.50	515.50
Amperage	26.47	25.75	24.33
Kw	20.00	18.50	17.50
Power Factor	0.82	0.80	0.79
Prod. Rate (MT/hr)	1.21	1.23	1.24
Kwh/MT (main Drive Motor)	15.32	14.24	13.09
$/MT ($0.0213/kwh	$0.33	$0.30	$0.28
Pellet Durability Index (%)	93.9	94.3	94.9

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