

Dried Condensed Molasses Solubles in Complete-Type Diets for Growing Beef Heifers¹

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ABSTRACT

The nutritive value of dried condensed molasses solubles (CMS) was evaluated in 16% CP complete-type diets for growing Charbray heifers in two studies. The diet contained 50% ground hay of tropical grasses, 15% tuna fish meal, 10% cane molasses and different ratios of ground corn and CMS. In both studies, rate of gain, feed efficiency and general health were used as comparison criteria.

In both studies, CMS levels higher than 6% reduced the gains; CMS levels higher than 9% reduced gains more markedly. Feed conversion was decreased at CMS levels higher than 12%. No animal used in both studies, even those fed 21% dried CMS, exhibited diarrhea, as had previously occurred with broilers, laying hens, guinea hens and growing pigs when fed dried CMS levels as low as 10-15%. The general health of all animals remained excellent.

The animals used the diets less efficiently as they became heavier, although the overall gains and conversion were reasonable for a feedlot operation under the climatic conditions in the arid Lajas Valley of Puerto Rico. Increasing the caloric density of diets as animals become heavier appears to be a necessity if improved utilization of feed is expected.

INTRODUCTION

Condensed molasses solubles (CMS) have been evaluated in diets for different species (4, 5, 6, 12, 13, 14). Precise data on their utilization by cattle are lacking. Cattle are potentially the largest consumer of this by-product; in the dried form it contains about 10% crude protein (CP) and about 2,400 kilocalories (Kcal) (3) of matabolizable energy (ME) per kg (6% CP and 2,500 Kcal ME for cane molasses, dry basis) (7). For this reason, a thorough evaluation to establish the maximum and optimal levels of usage in complete-type diets for cattle (10) is essential.

MATERIALS AND METHODS

In a first study, a screening-type 64-day evaluation with five levels (0, 3, 6, 9, 12%) of dried CMS in a complete-type diet containing approximately 16% CP (1, 8, 9, 11) based on 50% ground hay of tropical grasses, 15% tuna fish meal, 10% cane molasses and different proportions of yellow corn and CMS, was replicated three times (2). Each replicate consisted of one Charbray heifer, initially weighing approximately 190 kg. Three animals (each treatment) were kept in 4 × 10 m feedlot pens with automatic waterers and fed the different diets ad libitum.

Originally groups receiving 15, 18 and 21% CMS were included and

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later eliminated. Their overall performance was poor, and some of the heifers were diagnosed as pregnant at such an early age.

In a second (84-day) study, four levels (0, 8, 12 and 16%) of dried CMS in complete-type diets, equivalent to the ones used in the first study, were replicated six times. Each replicate consisted of one Charbray heifer, initially weighing approximately 280 kg. Animals were managed as in the first evaluation.

Individual weight gains, replicate (treatment) efficiency of feed utilization and general health were used as comparison criteria in both studies.

RESULTS AND DISCUSSION

In study 1, CMS levels higher than 6% decreased the daily animal gain. In the second study, with larger animals, there were smaller gains with increased levels of CMS, becoming more marked at the two highest levels. This investigation basically confirms the results obtained in the first evaluation. In the second study, feed efficiency decreased markedly when CMS levels higher than 12% were used.

The data of growth and feed conversion for the first study:

% CMS	Net gain/animal, kg		Feed consumed/net gain
	56 d. ³	Daily ³	
0	35.8 a	0.64 a	5.9
3	44.6 a	0.80 a	6.5
6	48.6 a	0.87 a	6.3
9	39.1 a	0.70 a	7.1
12	32.3 a	0.58 a	6.6

The tabulation of growth and feed conversion data for the second study:

% CMS	Net gain/animal, kg		Feed consumed/net gain
	84 d. ³	Daily ³	
0	71.5 a	0.85 a	10.7
8	70.1 a	0.83 a	11.3
12	64.9 a	0.77 a	11.8
16	42.7 b	0.51 b	18.5

No animal in these tests, even at the 21% dried CMS level, exhibited diarrhea, as had occurred in previous studies with broilers, laying hens, guinea hens and growing pigs, when they consumed diets with dried CMS levels as low as 10 to 15%. The general health of all animals remaining throughout the second evaluation was excellent during both studies.

The growth rate of animals receiving basically identical diets decreased as the animals became heavier (comparing the data from study 1 vs.

³ Means in the same column followed by different letters differ at $P = .05$.

study 2) and the feed was utilized in a less efficient manner. Nevertheless, complete-type diets like the ones evaluated, including moderate levels of CMS, promoted a reasonable rate of gain for a feedlot operation under the Puerto Rican arid climatic conditions. Rate and efficiency of utilization may be improved in future studies, if the caloric density of the diets is increased as the animals become larger.

RESUMEN

En dos pruebas realizadas en el Valle de Lajas se evaluó el potencial nutritivo del mosto de melaza deshidratado al incluirse en dietas completas para novillas Charbray en crecimiento con aproximadamente 16% de proteína bruta (CP), que contenían 50% de heno de yerbas tropicales molido, 15% de harina de atún, 10% de melaza y diferentes proporciones de maíz amarillo y mosto. En las dos pruebas, se usó el ritmo de crecimiento, la eficiencia de utilización de alimento y la salud general de los animales como criterios comparativos.

En la primera se les suplió cinco niveles de mosto deshidratado (0, 3, 6, 9 y 12%) por 64 días, a cinco grupos diferentes de tres novillas cada uno, cuyo peso inicial aproximado era 190 kg. Los grupos originalmente incluidos que recibían 15, 18 y 21% de mosto deshidratado, fueron eliminados por la falta de crecimiento o crecimiento lento, y porque algunas de las novillas fueron certificadas como preñadas.

En el segundo estudio se compararon cuatro niveles de mosto deshidratado (0, 8, 12 y 16%) en dietas idénticas a las usadas en el primer estudio, en novillas de peso inicial aproximado de 280 kg, que se alimentaron por 84 días dentro de las mismas condiciones del primer estudio.

En ambas pruebas, niveles de mosto superiores al 6% de la dieta disminuyeron la tasa de crecimiento de los animales, pero más marcadamente a partir del 9%. La utilización del alimento fue menos eficiente cuando se usaron niveles de mosto más altos del 12% de la dieta.

Ningún animal, ni aun los que recibieron dietas con 21% de mosto deshidratado, padecieron de diarrea, como ocurrió en estudios anteriores con pollos, gallinas ponedoras, cerdos en crecimiento y guineas, al usarse dietas con niveles de mosto deshidratado entre el 10 y el 15%. La salud de todos los animales que se usaron en ambas evaluaciones fue excelente.

El ritmo de crecimiento y la eficiencia de utilización del alimento de los animales disminuyó según estos aumentaron de peso (al comparar datos del estudio 1 contra el 2). No obstante, dietas completas de este tipo que contenían niveles moderados de mosto, promovieron un crecimiento muy bueno para las condiciones semiáridas del valle de Lajas y el sur de Puerto Rico en un sistema de corral de ceba, una tasa de y crecimiento

y una eficiencia de conversión que se podría superar aún más en futuros estudios si se aumentase la densidad calórica de la dieta según los animales aumentasen de peso.

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