

# Effect of Different Levels of Sugarcane Molasses on Egg Production<sup>1</sup>

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## ABSTRACT

Different levels of molasses in practical diets for layers were compared in three studies with Leghorn hens, where laying intensity and feed conversion were used as criteria for comparison. In all three studies, levels as high as 20% were as good or better than the zero molasses control.

Practical managerial considerations are discussed in regard to limiting the level of molasses to 15% to avoid "caking" (wet-compact litter). Up to the 15% level, the factor that may limit its use is its cost when compared to corn or any other suitable substitute.

## INTRODUCTION

Soldevila et al.<sup>3</sup> reported that cane molasses levels as high as 20% of the diet could be effectively used by broiler and laying strain chicks during their growing period. These results confirmed those of Rosenberg and Palafox<sup>4</sup>, who concluded that high levels of molasses could be used in practical-type growing diets.

The objective of the three studies reported herein was to determine the maximum levels of cane molasses that may be used in commercial laying diets using egg production and feed conversion as criteria for comparison.

## MATERIALS AND METHODS

Diets containing different levels of molasses were evaluated in three nutritional studies conducted at the Lajas Substation with Leghorn hens. Egg production (laying intensity) and efficiency of feed conversion were used as criteria for comparison.

Studies 1 and 2 were conducted in 1966 and 1967, and study 3 in 1968-69. In all of them individual wire cages over water pits were used.

In the first study, a balanced incomplete block design with five treat-

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<sup>3</sup> Soldevila, M., Carlo, I., and Pérez, R., Rate of gain and utilization of feed as affected by different levels of sugarcane molasses in starting, growing and fattening diets for birds of laying and broiler stock, *J. Agr. Univ. P.R.* 54(1): 161-9, 1970.

<sup>4</sup> Rosenberg, M. M., and Palafox, A. L., Response of growing and mature pullets to continuous feeding of cane final molasses, *Poultry Sci.* 35: 292-303, 1956.

ments replicated 16 times was used. Each replicate consisted of two hens in an individual wire cage. In the second study, a complete block design with five treatments replicated 12 times was used. Each replicate consisted of one hen housed in an individual wire cage.

In the third study, based on the results of studies 1 and 2, a partially balanced incomplete block design (regular group divisible) with 16 treatments replicated six times was used. Each replicate consisted of one hen housed in an individual wire cage.

The diets used in these studies are described in table 1. Feed and water were offered free choice.

TABLE 1.—*Composition of the basal diets during the laying studies*

Ingredient	Study 1	Study 2	Study 3
	%	%	%
Corn, dent No. 2, ground	64.8-76.8	64.2-76.2	76.1-48.3
Molasses, cane <sup>1</sup>	0-12.0	0-12.0	0-20.0
Soybean meal	9.0	9.0	9.1-11.2
Tuna fishmeal	6.0	9.0	9.1-11.2
Meat meal with bone	3.0	0	0
Dicalcium phosphate	0.5	1.0	1.0-0.8
Limestone, ground	4.0	4.1	4.0-3.4
Tallow, stabilized	0	0	0-4.4
NaCl	0.5	0.5	0.5
Premix <sup>2</sup>	0.2	0.2	0.2
Crude protein, calculated	15.11	15.77	15.06
Calcium, calculated	2.36	2.34	2.53
Phosphorus, calculated	0.52	0.53	0.78

<sup>1</sup> The average percentage composition of the cane molasses used, besides carbohydrates, was: moisture 20.38; crude protein 3.26; ash 5.45 (K, 1.71; Ca, 0.53; Mg, 0.42; Na, 0.18; and P, 0.04).

<sup>2</sup> Contains 0.0009 vitamins A/D<sub>3</sub> (500,000/100,000 IU/g); 0.0002 riboflavin; 0.0006 niacin; 0.0250 manganese sulfate (75%); 0.0780 terramycin (6.5 g oxytetracycline, and 6.5 mg vitamin B<sub>12</sub>/kg).

## RESULTS AND DISCUSSION

No significant effects of rate of molasses in the diets were observed on either production or feed utilization up to the 12% level (table 2). In study 3, when isocaloric-isonitrogenous diets were used, levels as high as 20% were as satisfactory or better, with statistically significant differences (table 2) from the zero level control.

The studies were restricted to a molasses level of 20% of the diet because of the caked litter. This condition limits the litter absorption capacity for excrement material and creates problems with off-odors and fly control observed in previous studies in which higher percentages were

TABLE 2.—Average egg production and feed utilization for laying studies conducted at the Lajas Substation

Diet	Molasses in the diet	Production	Feed conversion
No.	%	Laying rate <sup>1</sup>	Lb feed/doz eggs
<i>Study 1—From July to November 1966</i>			
1	0	51.1 a <sup>2</sup>	4.30 a
2	4	49.9 a	4.33 a
3	8	50.6 a	4.35 a
4	12	44.4 a	4.84 a
5 (Commercial diet)	Unknown	42.3 a	5.26 a
<i>Study 2—From February to June 1967</i>			
1	0	69.3 a	3.32 a
2	4	74.4 a	3.35 a
3	8	72.4 a	3.34 a
4	12	75.1 a	3.56 a
<i>Study 3—From May to October 1968</i>			
1	0.00	53.1 b	4.52 b
2	1.33	70.2 ab	3.34 a
3	2.66	63.1 ab	3.70 ab
4	4.00	68.2 a	3.24 a
5	5.33	76.1 a	3.18 a
6	6.66	74.1 a	3.19 a
7	8.00	70.5 a	3.11 a
8	9.33	66.0 a	3.29 a
9	10.66	72.1 a	3.34 a
10	12.00	74.9 a	3.02 a
11	13.33	66.3 a	3.56 a
12	14.66	71.9 a	3.44 a
13	16.00	71.9 a	3.19 a
14	17.33	72.7 a	3.44 a
15	18.66	67.0 ab	3.66 a
16	20.00	62.7 ab	3.84 ab

<sup>1</sup> Percent laid during the experimental period expressed as 2-oz eggs.

<sup>2</sup> Means followed by the same letter or letters were not significantly different at the P = .05 level.

used (3). These results corroborated in general the finding of Rosenberg<sup>5</sup>. In the present studies, with cages located over water pits, caked litter was not a problem. As reflected by the feed utilization data, no apparent poor absorption of feed ingredients was observed with the moderate levels of molasses used in the diets.

The results of these studies show that levels as high as 20% molasses can be used under wire cage management as described herein. Since the average poultryman in Puerto Rico has his flocks under floor management, a level of 15% should not be surpassed in order to avoid cake litter.

<sup>5</sup> Rosenberg, M. M., Effect of certain cations in cane final molasses on fecal moisture of chicks, Poultry Sci. 35: 682-6, 1956.

Besides the caking problem observed in other litter management experiments, the only factor that may limit the use of locally produced cane molasses in commercial laying diets is its cost compared to that of corn or other suitable substitutes.

#### RESUMEN

Durante la época de postura se hicieron tres estudios en los que se evaluaron diferentes niveles de melaza de caña en dietas para gallinas, usando la intensidad de la postura y la conversión del alimento como criterios de evaluación. En estos estudios se evaluaron niveles de melaza hasta de un 20%, en los cuales no se observaron efectos detrimentales.

Se discuten las implicaciones prácticas de limitar el uso de melaza a un nivel de 15% en la dieta para así evitar el "agalletamiento", o sea, la formación de una camada húmeda compacta que disminuye la capacidad de la camada para absorber excrementos, lo cual crea un problema de mal olor y un hervidero de insectos, sobre todo moscas. Hasta el nivel de 15%, la cantidad de melaza a usarse en una dieta para gallinas ponedoras lo determinará su costo al compararlo con el del maíz o un sustituto adecuado.