Research Note

FODDER YEAST GROWN ON RUM DISTILLERY STILLAGE AS A PROTEIN SUPPLEMENT FOR LAYER HENS[1]

A preliminary nutritional evaluation of fodder yeast (*Candida utilis*), grown on rum distillery stillage medium was carried out at the Rum Pilot Plant of the University of Puerto Rico.[2] The yeast preparation was employed as a partial substitute for soybean meal and fishmeal in feeding individually caged layers at the Lajas Agricultural Research and Development Center. Sixteen 12- to 18-month-old hens of the Babcock 380 Line were divided at random into two equal groups for use in a 32-day feeding trial in April and early May 1984. The experimental design was a single reversal of treatments with two groups of animals and two periods.[3] Periods 1 and 2 were of 15 and 17 days duration, including 4 and 6 days for adjustment, respectively, followed by 11 days for comparison of treatments.

The experimental treatments consisted of two rations containing either 0 or 10% fodder yeast and designated A and B, respectively (formulas in table 1). The yeast-containing ration was generally similar to the one used by González[4] in Cuba; however, raw sugar, meat and bone meal and DL-methionine were eliminated, but soybean meal was added to the formula. Yeast was replaced in the control ration by an isonitrogeneous addition of soybean meal and fishmeal, combined in the same proportion as in ration B. Each hen was supplied daily an amount of ration adequate to permit ad libitum intake. Individual feed consumption was determined over each comparison period. Each hen was weighed at the start and at the end of periods 1 and 2. Weight of all eggs produced in the experiment was recorded.

Table 2 summarizes the principal results. The 8 hens that followed treatment sequence B-A were smaller (1.98 kg initial mean), but laid more eggs than those of the other group. Thus, in period 1 ration B (containing yeast) showed an advantage in laying frequency, mean egg weight and daily egg production in grams; in period 2 ration A (control) was better in these same three criteria. Hens following treatment se-

[1] Manuscript submitted to Editorial Board August 9, 1984.

[2] Ramírez, M. and González, I.M. 1980. Potential use of rum distillery slops as animal feed supplement. IV. Fodder yeast growth in slops, J. Agric. Univ. P.R. 64:148–63.

[3] Mather, R. E., 1958. Statistical Methods in Dairy Research. Mimeo notes. Dairy Sci. Dep., Rutgers Univ., Sussex, N. J.

[4] González, C. T., 1979. Effects of the ration size on the production of White Leghorn laying hens under subtropical conditions, Cuban J. Agric. Sci. 13:291–8.

quence A-B were bigger (2.24 kg initial mean) and consumed slightly more feed dry matter (DM) per bird, but not per 100 g of liveweight; their feed efficiencies, expressed as egg weight production/DM intake, were also lower than those of the other group. Slight losses of liveweight were registered during period 1, whereas the hens of both groups gained weight during period 2.

Combined data from both periods showed a 4.5% advantage in ration A for laying frequency and 2.5 g in daily weight of egg production, but a disadvantage of 0.6 g in mean egg weight. Very slightly more DM of ration B was consumed daily per bird (1 g) and per 100 g of liveweight (0.10 g). Ration A was better in gross efficiency of feed utilization for egg

TABLE 1.—*Formulas and composition of the experimental rations*

Ingredient or component	Ration A (control without yeast)	Ration B (with fodder yeast)
	%	%
Ground yellow corn	70.7	69.1
Tunafish meal	11.6	6.8
Soybean meal	8.6	5.0
Fodder yeast	—	10.0
Ground limestone	8.0	8.0
Dicalcium phosphate	0.5	0.5
Salt	0.3	0.3
Premix[1]	0.3	0.3
	100.0	100.0
Dry matter[2]	88.4	89.6
Calculated crude protein	16.1	16.1
Analyzed crude protein[3]	17.5	18.4

[1] Containing one-third each of trace minerals, vitamins and choline, generously supplied by Molinos Nacionales, Inc., Guánica, P. R.

[2] Oven drying at 80°C.

[3] Macro-Kjeldahl procedure.

production (difference 0.027) and in daily liveweight gain (difference 2.48 g). However, none of these differences between treatments approached significance ($P = 0.10$).

In general the ration containing 10% yeast was slightly inferior to the control without yeast, but not significant. Alvarez and Valdivie[5] studied rations for broilers containing soybean meal and fishmeal in addition to 0, 10, 20 and 30% fodder yeast. Inclusion of 10% yeast caused a slight (not significant) reduction in apparent nitrogen retention, whereas 20 and 30% levels of yeast did significantly affect this criterion. As possible causes of the adverse yeast effect they suggested its appreciable nucleic

[5] Alvarez, R. J. and M. Valdivie, 1980. Metabolizable energy and nitrogen retention in torula yeast diets for broilers, Cuban J. Agric. Sci. 14:57–61.

acid content and its relative deficiency in methionine. The latter, at least, could be readily corrected by ration formulation.

In spite of not being equal in nutritional value to the soybean meal-fishmeal combination, fodder yeast grown on stillage proved to be a useful ingredient, when included at 10% in a ration for layer hens. With improved ration formulation, its use could permit substantial savings of conventional protein supplements, with minimal effects on animal performance. The soybean meal and fishmeal used in this study contained 45 and 52.5% crude protein (CP), respectively. Valdivie and Fundora[6] reported that fodder yeast grown on cane molasses (the usual procedure) contains about 45% CP, but when grown on molasses derived from hydrolysis of sugarcane pith, it showed a 38% CP content, along with an elevated ash content. The latter composition is similar to that of the

TABLE 2.—*Mean egg production, feed consumption and liveweight response per treatment*

	Period 1		Period 2		Entire experiment	
	Ration A	Ration B	Ration A	Ration B	Ration A	Ration B
Laying frequency (%)	79.5	81.8	82.9	71.6	81.2	76.7
Mean egg weight (g)	63.8	65.4	65.8	65.4	64.8	65.4
Daily egg production (g)	50.6	53.5	54.5	46.7	52.6	50.1
Daily DM[1] intake (g)	125	122	117	122	121	122
Feed conversion efficiency (wt. egg/wt. DM intake)	0.411	0.445	0.469	0.382	0.440	0.413
Mean liveweight (g)	2229	1955	1989	2251	2109	2103
Daily DM intake as proportion of liveweight (%)	5.58	6.30	5.93	5.43	5.76	5.86
Daily liveweight change (g)	−1.24	−3.08	6.74	3.70	3.00	.52

[1] Dry matter.

preparation cultured on rum stillage (41% CP and 15% ash). With adjustment of the soybean meal level in the test rations, fodder yeast grown on the pith molasses was equal to the conventional type, when used at the 10% level in broiler rations[6]. Use of rum distillery stillage as a growth medium for fodder yeast appears promising, and if applied on a large scale, it would provide the additional benefit of reducing the quantity of distillery residues requiring disposal which at present constitute an environmental contaminant.

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[6] Valdivie, M. and O. Fundora, 1982. Yeast growing on sugar cane pith hydrolytic molasses for broilers, Cuban J. Agric. Sci. 16:263–6.