TABLE 1. COMPOSITION OF RATIONS

Ingredient	LPS	Control
	lb. per day	
Alfalfa cubes	16	16
Corn silage	30	30
Concentrate mix*	20	22
Pro-Lix	2	—

TABLE 2. ANALYSES OF INGREDIENTS AS FED

Ingredient	Dry Matter	Crude Protein	Crude Fiber
	%		
Alfalfa cubes	90.6	20.5	19.5
Corn silage	36.0	3.0	—
Concentrate mix	—	14.5*	13.2
Pro-Lix	—	35.0**	0

*3.15% crude protein equivalent from nonprotein nitrogen.
** 27% crude protein equivalent from nonprotein nitrogen.

Liquid Protein Supplement

Liquid protein supplement being added to corn silage.

Liquid protein supplements (LPS) are available commercially for feeding to dairy and beef cattle. They are easy to handle and mix with other ingredients, but liquid nutrients are usually more expensive than dry nutrients. Ingredients and nutrient content vary among products, but most are combinations of molasses, urea, phosphoric acid, and small amounts of other minerals and vitamins. The liquid protein supplement Pro-Lix also includes fish solubles, fermentation solubles, and brewers yeast. It contains 35 percent crude protein of which 17 percent is derived from nonprotein nitrogen.

This trial was designed to test the value of Pro-Lix under dairy feeding conditions typical of California. Feeding trials in Georgia resulted in more milk production and more profit from cows fed this LPS in addition to corn silage and grain concentrates, or in addition to a complete (all-in-one) ration based on cottonseed hulls, corn grain, and citrus pulp, than these rations without the LPS. In California, however, high protein alfalfa hay usually makes up part or all of the roughage portion of dairy cow rations. Also, California's average milk production is the highest in the United States, indicating better management and feeding practices by dairymen in this state than in most areas. Therefore, beneficial results from this product in other areas might not be applicable under California conditions.

TABLE 3. MONTHLY DHIA TEST DATA

Month	LPS		Control	
	Milk	Milk Fat	Milk	Milk Fat
	(lb./day)	(%)	(lb./day)	(%)
April	67.4	3.6	67.2	3.8
May	62.4	3.5	63.2	3.8
June	61.0	3.4	61.7	3.4
July	52.6	3.6	54.3	3.6
August	47.5	3.6	48.7	3.6
September	42.5	3.8	44.5	3.7

TABLE 4. AVERAGE DAILY MILK PRODUCTION AND COMPOSITION

	LPS	Control	
Milk (lb.)	56.4	57.7	(n.s.)*
Milk fat (%)	3.6	3.7	(n.s.)*
Milk fat (lb.)	2.0	2.1	(n.s.)*
3.5% FCM (lb.)	57.1	59.2	(n.s.)*

*n.s. = Difference not statistically significant at the 5% level of probability.

in Dairy Cattle Rations

GALE G. GURTLE • D.L. BATH

Trial design

Ninety-six cows in their second or later lactations were paired within age groups according to previous milk production and date of calving. One cow from each pair was randomly assigned to the group fed the LPS and its pair mate was assigned to the control group. Cows in the LPS group had an average production of 16,256 pounds of milk during their previous lactation compared with 16,145 for the control group. Average days in milk at the start of the trial also were close: 77 days for the LPS group and 72 days for the controls.

Rations fed to the two groups are shown in table 1 and chemical analyses of the ration ingredients are shown in table 2. Both groups were fed the same roughages, which consisted of 16 pounds of alfalfa cubes in the morning and 30 pounds of corn silage in the evening. Two pounds of Pro-Lix were added to the silage of the LPS group at the time of feeding through a perforated pipe installed above the self-unloader of the feeding truck. The LPS was pumped from a 45-gallon tank installed on the side of the feeding truck.

Both groups were fed a 14 percent crude protein grain-concentrate mixture each day in the milking barn. Control cows were fed an average of 22 pounds per day. The LPS cows were fed 20 pounds per day—two pounds less than the control group—in order to test the value of two pounds of LPS in replacing two pounds of the grain concentrate. The feeding trial lasted six months, at which time many of the cows were approaching their dry periods. Milk production and milk fat content were measured monthly by regular Tulare County Dairy Herd Improvement Association cow testers.

Results

Average daily production of milk and percentage of milk fat for both groups by months from April through September are shown in table 3, and average milk, milk fat, fat test, and 3.5 percent fat-corrected milk (FCM) values for the entire trial are shown in table 4. From table 3, it can be seen that production of the groups was very similar for the entire six months. Control cows produced daily an average of 57.7 pounds of milk versus 56.4 from the LPS-fed cows. Milk fat test for the control cows was 3.7 percent versus 3.6 percent for the LPS group. Similar small differences in favor of the control group existed for pounds of milk fat and for 3.5 percent FCM (table 4). Although production was slightly higher from the control group, statistical analyses revealed no significant differences in any of the measurements.

The LPS tested in this feeding trial was approximately equal in value at two pounds per cow daily to an equivalent amount by weight of the 14 percent crude protein grain-concentrate mix normally fed on the cooperating dairy farm. Inclusion of high-protein alfalfa hay in the ration, and feeding a relatively high level of grain concentrates (22 pounds per cow daily) probably negated the need for additional protein and other nutrients from the LPS. These nutrients are more likely to be deficient when nonlegume forages, such as corn silage, are fed as the only roughage.

In this trial, the form in which the nutrients were offered (liquid or dry) did not seem to affect milk production, since two pounds of the LPS approximately replaced two pounds of the grain-concentrates. Therefore, the LPS could be fed profitably only if it were priced less than the grain-concentrate mix.

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