fungicides were drenched in as it was when they were mixed in the soil prior to planting. Also, applications of single fungicides were observed to sometimes increase disease severity in the two experiments mentioned. This result probably occurred because a fungicide which is effective against only one fungus (in a disease complex), by controlling it, will remove some of the competition, thus allowing another organism to build up and cause more damage.

Because the disease-producing organisms were at low levels in the soil used in the drenching experiment, another experiment was started at the U. C. greenhouse in Berkeley. Plants of seven varieties of poinsettias, furnished by Paul Ecke, Encinitas, were grown in 5-inch pots. The plants were drenched with fungicide mixes three times, the second drench 20 days after the first and the third drench 29 days after the second. All fungicides were used at the rate of 100 ppm and 200 ml (½ pint) were added to each pot. Four days after each drench, heavy suspensions of *Pythium*, *Rhizoctonia* and *Thielaviopsis* were added to each pot. Only disease ratings were taken and these are given in table 3.

TABLE 3. FUNGICIDAL CONTROL IN POINSETTIA PLANTS INOCULATED WITH THREE ROOT ROT FUNGI

Variety	Check no treatment	Diseased Roots	
		Benlate + Dexon	Benlate + Terrazole
	%	%	%
Eckespoint	82	18	6
Paul Mikkelson	58	3	7
Barbara Ecke Supreme	38.5	4.3	5.7
C-64	83	7	7
Elisabeth Ecke	45	4.4	3.3
B-28	83.3	16.7	16.7
B-7	75	15	1.0
Average for all varieties	59.4	7.22	6.43

Under conditions where large amounts of the root-rotting fungi were added to the soil, mixtures of Benlate and Dexon or Benlate and Terrazole proved to be extremely effective in giving control. The amount of control is even more convincing when one observes the root systems of treated and non-treated plants (photo).

Of the fungicides mentioned, only Dexon presently is available for use on poinsettias. Benlate, Mertect and Terrazole should be cleared for use for the next growing season. In the meantime, additional studies are underway to determine which combinations and concentrations are most effective.

Robert D. Raabe is Professor and Joseph H. Hurlimann is Laboratory Technician II, Department of Plant Pathology, University of California, Berkeley.

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HOW TO PRODUCE MILK with a normal milk fat percentage is a major problem for California dairymen during the period from May to October each year. There are indications that high temperatures (85° F and up) plus the feeding of large amounts of green chop forages, which reduce fiber intake, both depress the fat composition of milk. There are a few feedstuffs and additives which, when added to the ration, will partially counteract this seasonal depression in the percentage of fat in milk; however, cost and/or low palatability makes it impractical to use most of these in a commercial dairy operation. An additive that has been suggested as promising is dried whey—a by-product of the processing of butter and cheese. Dried whey product is highly palatable and, when fed at the rate of 10 per cent of the ration, has been successfully used to maintain a normal fat test under conditions of high temperature and low fiber rations. When dried whey product is incorporated into pelleted concentrates at this level, however, mechanical difficulties develop in the pelleting process. Reduction of the level to 5 per cent of the pelleted concentrate has overcome this problem but the effect on fat percentage at this level has not been tested.

This feeding trial was conducted at the Loma Linda University Dairy, Riverside County, to evaluate the commercial application of feeding dried whey product as 5 per cent of the pelleted concentrate. The total concentrate mix was composed of rolled barley and whole cottonseed with the remainder of the ingredients, as shown in table 1, combined into a pellet. Therefore, the dried whey product made up 3.7 per cent of the total concentrate mix.

The 400 milking cows on the dairy were divided randomly into two separate herds with 40 cows from each herd paired according to: (1) Previous DHIA production or, in the case of first calf heifers, predicted production from previous DHIA test-day data; (2) Number of previous lactations; and (3) Number of days elapsed in the present lactation. One member of each pair was allotted to one of two treatment groups and her pair-mate was allotted to the other treatment group. Both groups remained in separate corrals for the duration of the trial. Average past or predicted milk production, days in milk, and lactation number for the two groups are shown in table 2.

Double reversal

A double-reversal design with three periods, each six weeks in length, was used for the trial. This design eliminates the possibility of higher producing cows being on only one treatment because all cows go through both treatments. The first week of each period was used as a change-over period and data from these weeks were not used in evaluation of the results. Individual milk weights were recorded and milk samples taken for analysis of milk fat on the same day every week. One cow in the experiment died, so her data and that of her pair-mate were eliminated from the results. The trial started on May 28, 1968 and ended on October 1, 1968.

When cows were on the control treatment, they received a 14.5 per cent crude protein concentrate mix which had been fed regularly at the dairy prior to initiation of the trial. When on the test treatment they were fed the same concentrate mix plus 3.7 per cent dried whey product incorporated into the concentrate mix (table 1). Cows in each of the corrals were fed approximately 5 lbs of concentrate mix daily as a top dressing on the green-chop in outside mangers and the remainder was fed in an elevated, tandem-stall milking parlor. The parlor was divided into two parts, each with four stalls. All of the cows in the herd fed the

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ilk fat production of dairy cows

control concentrate mix were milked on one side of the barn and those on the test feed were milked on the other side. Type of concentrate mix was changed from one side to the other at six-week intervals. Concentrates were fed free choice while cows were in the milking parlor.

Both herds received identical forage allowances. Alfalfa hay and oat silage were fed throughout the trial and alfalfa and sorghum green-chop were fed when available. Alfalfa hay amounts were varied according to the amount of silage and green-chop available. Core samples of hay and grab samples of silage, green-chop and both concentrate mixes were taken weekly for proximate analyses as shown in table 3. Silage and green chop amounts fed to each pen were weighed and recorded daily. Alfalfa hay intake was estimated by weighing a representative number of bales each week to establish an average bale weight and by recording the number of bales fed in each pen at each feeding. Average concentrate intake was estimated from the total amount of each mix fed during the trial, divided by the number of cows in each herd.

Milk production, milk fat percentage, and feed intake data were subjected to analyses of variance. Milk production data are shown in table 4. When cows were fed the concentrate mix with 3.7 per cent dried whey product, they produced 1.1 lbs less milk, with a 0.05 per cent higher milk fat test, with 0.02 lb less milk fat, and with 0.71 lb less fat-corrected-milk (FCM) per day. All of the differences except pounds of fat were statistically significant at the 5 per cent level of probability. Although the whey concentrate mix resulted in an increased fat percentage, the decrease in milk production resulted in a total of less than 4 per cent FCM. This is consistent with previous observations of other researchers that products commonly used to increase fat test usually result in a decrease in amount of milk produced.

TABLE 1. INGREDIENTS AND AVERAGE ANALYSES OF DAIRY CONCENTRATE MIXES

	Control mix	Dried whey product mix
	%	%
Wheat mixed feed	24.2	23.3
Barley	21.7	20.9
Milo	21.7	20.9
Dried bakery waste	9.7	9.3
Cane molasses	7.7	7.4
Whole cottonseed	7.2	7.0
Cottonseed hulls	3.9	3.7
Cottonseed meal	1.2	1.2
Corn fermentation solubles	1.0	0.9
Salt	1.0	0.9
Minerals & vitamins	0.7	0.7
Dried whey product	.....	3.7
% Crude protein (90% DM)	14.5	14.5
% Crude fat (90% DM)	5.8	5.5
% Crude fiber (90% DM)	8.1	7.8
% TDN (calculated)	74.5	74.6
Price per ton	$58.00	$58.00

Roughage dry matter

During the trial, cows on the dried whey product treatment were fed an average of 1 lb of roughage dry matter and 0.5 lb more of concentrate dry matter per day than the control group (see table 5). Differences in concentrate dry matter and total dry matter fed were statistically significant at the 1 per cent and 10 per cent levels, respectively, while the difference in roughage dry matter fed was not statistically significant at the 10 per cent level of probability.

Under the conditions of this trial, dried whey did appear to have a slight positive effect on milk fat percentage and added to the palatability of the concentrate mix, as indicated by the extra 0.5 lb of the concentrate mix fed per day. However, in spite of the extra energy available as a result of increased dry matter fed, there was a decrease in total milk production.

The level of milk fat percentage (table 4) indicates that there was no abnormal depression due to the kind of ration fed, or from the heat factor, during the period of this trial. It would appear, therefore, that there was very little opportunity to demonstrate any measurable practical effect of the dried whey product, especially when fed at this low level. Therefore, under the conditions of this trial, dried whey product had no beneficial effect on milk or milk fat production.

S. E. Bishop is Farm Advisor, Riverside County; and D. L. Bath is Extension Dairy Nutritionist, University of California, Davis. *Dr. M. R. Lambert of Foremost Foods Co. supplied the dried whey product and funds for extra milk testing. Herald Habenicht and the staff of the Loma Linda University Dairy assisted in conducting the trial.*

TABLE 2. COMPOSITION OF TWO DAIRY COW GROUPS AT BEGINNING OF EXPERIMENT

Group	Past or predicted production (3.5% FCM) lbs	Days in milk	Lactation number
Corral 2	14,482	75.9	2.3
Corral 8	14,120	75.8	2.3
Difference	362	0.1	–0–

TABLE 3. AVERAGE COMPOSITION OF FORAGES (AS FED)

	Dry matter	Crude protein	Crude fat	Crude fiber
	%	%	%	%
Alfalfa hay	90.9	20.0	2.8	21.2
Alfalfa green chop	27.8	5.9	1.0	7.0
Sorghum green chop	22.9	3.5	0.9	6.1
Oat silage	41.2	5.0	2.2	12.6

TABLE 4. AVERAGE DAILY MILK PRODUCTION

	Control	Dried whey product
Milk (lb/day)	48.65[a]	47.55[b]
Fat (%)	3.57[a]	3.62[b]
Fat (lb./day)	1.73[a]	1.71[a]
4% FCM (lb/day)	45.46[a]	44.75[b]

[a,b] Values with different superscripts are significantly different ($P<0.05$).

TABLE 5. AVERAGE DAILY DRY MILK FED

	Control	Dried whey product
Roughage DM (lb/day)	27.10	28.10
Concentrate DM (lb/day)	14.45[a]	14.95[b]
Total DM (lb/day)	41.55[c]	43.05[d]

[a,b] Values with different superscripts are significantly different ($P<.01$).

[c,d] Values with different superscripts are significantly different ($P<0.10$).