



UNIVERSITY OF
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IFAS EXTENSION

Mineral Nutrition of Dairy Cattle¹

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Various mineral supplements are available and frequently used in formulating rations. A list of commonly used supplements is shown in Table 1.

MAJOR MINERALS AND VITAMINS

Considerable research has been done to establish the mineral needs of high producers and to define the role of minerals in nutritional biochemistry. Table 2 shows the current levels of the major or macro minerals recommended for dairy cattle rations.

TRACE MINERALS AND VITAMINS

The addition of trace minerals and certain vitamins to dairy cattle rations is usually considered to be good nutritional insurance. However, the question arises: which trace minerals to add and how much of each. The trace minerals deserving some consideration as possible additions to dairy rations are shown in Table 3.

Trace minerals are needed by the dairy animal in very small quantities (parts per million). For this reason, salt is commonly used as a carrier for all the trace minerals.

Trace minerals should not be added to dairy rations indiscriminately. Many rations will contain

adequate levels with or without their addition. If a trace mineral problem is suspected, examine the situation carefully and make appropriate adjustments in the mineral mixture. Too much of a particular mineral could further antagonize the situation.

Vitamins deserving consideration under Florida conditions are vitamins A, D and E. A 1400 lb cow consuming 40 lbs of dry matter daily needs about 65,000 USP units of vitamin A, 18,000 units of Vitamin D and 280 units of vitamin E. Dry cows should receive about 50 to 100,000 units or more of vitamin A per day when green forage is not available and 20,000 units or more per cow per day if green forage is available.

Certain stress factors, such as hot climate, nitrate in feeds, disease, and lactation may increase the vitamin A requirements of the animal. In order to avoid a vitamin A deficiency in reproduction, the dairy ration should provide from 40,000 to 80,000 USP units of vitamin A. Some dairymen feed little vitamin A during the green forage feeding period and about 100,000 to 150,000 units per cow during hot weather.

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Table 1. Mineral supplements and their mineral composition.

Supplement	Ca (%)	Phos (%)	K (%)	Mg (%)	S (%)	Na (%)
Calcium carbonate	38.0	---	---	---	---	---
Limestone, ground	33.0	---	---	---	---	---
Oyster shell flour	33.0	---	---	---	---	---
Tricalcium phosphate	38.0	18.0	---	---	---	---
Monocalcium phosphate	20.0	21.0	---	---	---	---
Deflourinated phosphate	32.0	18.0	---	---	---	---
Dicalcium phosphate	26.0	18.0	---	---	---	---
Disodium phosphate	---	21.6	---	---	---	---
Salt (NaCl)	---	---	---	---	---	39.3
Steamed bone meal	28.0	14.0	---	---	---	---
Sodium bicarbonate	---	---	---	---	---	27.4
Diammonium phosphate*	---	20.0	---	---	---	---
Monoammonium phosphate**	---	24.0	---	---	---	---
Monosodium phosphate	---	25.0	---	---	---	---
Sodium Tripoly phosphate	---	25.6	---	---	---	---
Biofos	18.0	21.0	---	---	---	---
Dyna-K	---	---	50.5	---	---	---
Dynafof***	22.0	18.5	---	---	---	---
Dynamate	---	---	18.5	11.6	22.3	---
Dufos (Diammonium phosphate)	---	20.0	---	---	---	---
Dikal 21***	19.0	21.0	---	---	---	---
Magnesium oxide	---	---	---	60.0	---	---
Potassium chloride	---	---	52.4	---	---	---

*Compound contains 18.0% nitrogen or 112.5 protein equivalent.

**Monoammonium phosphate (monofos) contains 68.75% protein equivalent (11% nitrogen).

***Trade names of products available in abundance in Florida.

Table 2. Major mineral and vitamin content recommended in ration for high producers (dry matter basis).

Mineral	Current Desirable in Rations (%)	NRC 1988 (%)
Calcium	0.65-0.80	.65
PHosphorus	0.42-0.50	.42
Magnesium	0.28-0.35	.25
Potassium*	1.00-1.50	1.00
Sulfur	0.20-0.25	.20
Sodium*	0.40-0.67	.18
Vitamin A	1400-2000 IU/lb	1450 IU/lb
Vitamin D	450-500 IU/lb	450 IU/lb
Vitamin E	7-10 IU/lb	7 IU/lb

*Recent studies at Florida showed an increased need for potassium (K) and sodium (Na) during hot weather or stress periods. The highest level of milk production was obtained when the total ration dry matter contained about 1.5% K and 0.67% Na.

Table 3. Suggested trace mineral content of rations (DM) for lactating dairy cattle (NRC-1988).

Mineral	Approx. Ration Concentration (Dry Basis)
Iron	50.0 ppm
Manganese	40.0 ppm
Copper	10.0 ppm
Zinc	40.0 ppm
Cobalt	0.1 ppm
Iodine	0.6 ppm
Selenium	0.3 ppm