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Feed additives

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FEED ADDITIVES

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Background

Feed additives are ration ingredients used in relatively small amounts to fortify certain nutrients or to affect a specific physiological function. The decision to include any additive should be based upon the economic response expected. The following guidelines are designed to help identify situations where additives may be considered.

Minerals

Calcium and phosphorus supplements are required in almost all rations because of the demand for milk production. The basis for selecting calcium and phosphorus supplements depends on the content of these elements in the supplement in relation to requirements for supplementation.

Magnesium may need to be supplemented at the rate of 0.5% magnesium oxide in the grain mix in certain rations containing mostly grass-type forages.

Potassium chloride fed at the rate of 0.5% of the grain mix may be beneficial during hot weather, when most of the forage is corn silage.

Salt added to the grain mix at the rate of 0.5% will provide adequate amounts of sodium and chlorine.

Trace Minerals

Most feeds grown in Kansas contain adequate amounts of trace minerals. However, a trace mineral premix or trace mineralized salt is recommended to ensure adequate levels. Most commercial mineral supplements are fortified with trace minerals.

Selenium supplements have received considerable attention in the Great Lakes region, but Kansas-grown feeds are believed to contain more than adequate amounts of selenium.

Vitamins

Vitamins A and D should be supplemented in grain mixes at the rate of 2,000 I.U. and 1,000 I.U., respectively, per pound of grain mix. The recommended rate for calf starters is 1000 I.U. A and 140 I.U. D, respectively.

Vitamin E is recommended in calf starters at the rate of 25 mg (I.U.)/lb.

Beta Carotene, a precursor of vitamin A, is not a recommended additive when vitamin A is supplemented adequately.

Niacin supplemented at the rate of 12 gm/day has been shown to be beneficial for ketotic-prone cows. However, feeding trials have not demonstrated a consistent production response when niacin was supplemented at the rate of 6 gm/day with adequate feeding programs.

B-Complex vitamins may be beneficial for cows recovering from digestive disturbances.

Amino Acids

Methionine Hydroxy Analogue (MHA) may be beneficial when supplemented at the rate of 25 to 35 gm/day in milk-fat-depressing rations. Response is most likely when rations are composed of more than 50% grain and less than 17% acid detergent fiber. Other measures to correct a depressed milk-fat test would probably be more practical.

Fats

Fats are a concentrated source of energy, which may be beneficial to high-producing cows. However, adding more that 5% fat to the grain mix may depress digestibility of fiber. Feeding 5 to 6 lb/day of ground soybeans or whole cotton seeds may be the most economical means of supplementing fat, provided the supplemental protein is needed.

Buffers

Sodium bicarbonate (bicarb) or sodium sesquicarbonate (s-carb) should be supplemented at the rate of 1.5% of the grain mix when the ration contains 50% or more grain mix. Feed intake can be improved when high energy rations are properly buffered to prevent low rumen pH (acidosis).

Magnesium oxide fed at the rate of 0.75% of the grain mix in combination with the normal amount of bicarb or s-carb is recommended for maintaining milk-fat tests.

Medications

Antibiotics fed at the rate of 20-40 ppm on a day basis in milk replacers are beneficial for improved growth of baby calves. Considering the low level of antibiotics permissible in lactating cow rations (75 mg/day), it is doubtful that cows will respond to feeding antibiotics.

Zinc methionine supplemented at 4.5 gm/day may be beneficial in herds experiencing foot problems associated with concrete.

Organic iodine (EDDI) has been fed to prevent foot rot. However, it is no longer permissible to feed EDDI as a medication. Feeding EDDI at the rate of 10 mg/head/day is permissible as a source of iodine.

Rumen Stimulants

Isoacids fed at the rate of 1.5 oz/day, 2 wk prepartum and 3 oz/day during the first 225 days of lactation may produce an economical return through improved feed efficiency. Heifers are less responsive than second lactation and older cows.

Monensin supplemented at the rate of 150 to 200 mg/day to growing heifers larger than 400 lb on high forage rations can improve daily gains and feed efficiency. Monensin is not approved or recommended for lactating cows.

Yeast may be a beneficial additive to rations of stressed or sick animals, but research evidence has not substantiated its value.

Enzyme additives will likely be destroyed by rumen fermentation, which will negate any benefit.

Aspergillus oxyzae may be beneficial if added to rations at 3 gm/day when temperatures exceed 90°F. Improved feed intake, higher milk production, and lower body temperatures have been reported during periods of high temperatures.

Table 1. Summary of recommended additives

Additive	Amount	Comments
Calcium	0.60% calcuim in total ration	Most rations require supplementation
Phosphorus	0.40% phosphorus in total ration	Most rations require supplementation
Magnesium Oxide	0.5% in grain mix	Recommended when feeding grass forages in eastern Kansas
	0.75% in grain mix	In combination with bicarb or s-carb for milk-fat test
Potassium Chloride	0.5% in grain mix	Recommended during hot weather, when no alfalfa is fed
Salt	0.5% in grain mix	Recommend trace mineralized salt, if other sources of trace minerals are not fed.

Table 1. Summary of recommended additives (continued)

Trace Minerals	Trace mineral premix or 0.5% trace mineralized salt	Most commercial minerals are adequately fortified.
Vitamin A	2000 I.U./lb grain mix	For lactating and dry cows
	1000 I.U./lb grain mix	For calves and heifers
Vitamin D	1000 I.U./lb grain mix	For lactating and dry cows
	140 I.U./lb grain mix	For calves and heifers
Vitamin E	25 mg(I.U.)/lb grain mix	For calves and heifers
Niacin	12 gm/day	For ketotic-prone cows
MHA	25 to 35 gm/day	Maintains milk-fat test when ration contains more than 50% grain
Fats	<5% of grain mix, 5-6 lb/day ground soybean or whole cotton seeds	High producing cows may benefit from additional energy
Sodium bicarbonate	1.5% of grain mix	For cows fed more than 25 lb grain/day
S-carb	1.5% of grain mix	For cows fed more than 25 lb grain/day
Antibiotics	20-40 ppm in milk replacer	Improves growth
Zinc methionine	4.5 gm/day	For foot problems associated with concrete
Isoacids	3 oz/day	For fresh cows through 225 days in milk
Monensin	150 to 200 mg/day	For heifers larger than 400 lbs