What is the Optimum Level of Crambe Meal in Range Cake?

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Supplementing protein when feeding low quality forage is known to increase digestion and subsequently cow performance. Grazing cattle are frequently offered cake that contains protein, minerals, vitamins, and energy. Crambe meal (CM) is the residual product when high erucic acid oil is extracted from crambe seed. Crambe meal has been proven to be an economically viable and biologically useful protein supplement in creep feed, feedlot diets, and cows fed totally mixed rations. However, crambe meal contains certain sulfurous compounds called glucosinolates that are known to elicit a strong or sharp flavor. Cows do not relish the flavor when it is offered separately or at high concentrations in a mixed feed. This new and relatively unknown protein source was included in 30% crude protein range cake formulations at 0, 25, 50, and 75% to test palatability, animal performance, and thyroid hormone effects. Two feeding trials were conducted at each of the NDSU Dickinson and Carrington Research Centers.

Dickinson trials observed palatability of the treatment supplements in grazing mature cows (n=24) and yearling heifers (n=19) fed supplements at 5 to 10 lbs/head daily. Both groups readily consumed the 25% CM supplement and the 50% CM supplement after a few days adaptation to the flavor, however, cows did not consume all of the 75% cake. Crambe meal appears to be palatable at up to 50% of the formulation of range cake.

Carrington trials tested the supplements for lactating cow performance, thyroid hormone levels, and effects on digestion. In one trial, crossbred lactating beef cows (n=71) were fed a totally mixed high forage diet top-dressed with treatment supplements. Cows fed the 25% and 50% crambe meal supplements gained more ($P<.05$) than those fed the 0% or 75%. The thyroid hormone $T_{4,}$ changed the most (decreased 1.75 ug/ml) in the 75% treatment but this was not outside biologically normal ranges.

In the second Carrington trial, four cows were used in a 4x4 Latin Square design to evaluate the effects of feeding different range cake formulations at limited amounts (4 lb/hd daily) on intake and digestibility of low quality forages. There were no significant differences ($P>.05$) in dry matter intake, crude protein digestibility, acid detergent fiber digestibility, neutral detergent fiber digestibility, or in-vitro dry matter digestibility. Without evidence of a linear or quadratic effect, crambe meal use in range cake seems practical at whatever level is palatable.

The Federal Drug Administration (FDA) currently restricts the use of crambe meal to a maximum of 4.2% of diet dry matter for only feedlot cattle. However, this trial provides further evidence that crambe meal can be used effectively at up to 50% of a protein supplement for beef cows without concern for palatability, digestion, performance or hormone effects.