

Liquid Supplements for Dairy Cattle

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Discovery of a practical feeding method that caused rumen by-pass of certain nutrients would be a useful tool in cattle nutrition. A by-pass method would enable feeding high-producing cows extra protein without degradation in the rumen. If oral by-pass feeding of sugars could be practiced the resulting increase in glucose supply for metabolism should have a preventive effect on ketosis. Likewise, the productive value of energy from glucose would be greater than when it is converted into organic acids.

Work in Australia with calves and heifers demonstrated that following glucose infusion into the abomasum blood glucose values rose but that infusions into the rumen did not cause a change in blood glucose values. In 1972, workers at Louisiana State University reported that lactating cows fed silage, hay and concentrate showed a significant increase in blood plasma glucose when given liquid supplement from a lick-wheel. Heifers fed sorghum silage plus liquid supplement from a lick-wheel had significantly higher average plasma glucose values than those fed a supplemental concentrate mixture. The data suggested that liquid supplement taken from the lick-wheel may have by-passed the rumen and absorbed sugars caused a rise in plasma glucose. Thus, research was initiated to determine the passage route into the stomach of liquid feeds taken from a lick-wheel feeder by cattle.

Heifers fitted with rumen and abomasal fistulas were placed on a control ration of silage and concentrate mixture fed at maintenance levels. In the first experiment, treatments were either one pound daily of molasses from a lick-wheel, one pound daily of liquid supplement from a lick-wheel or one pound daily of the liquid supplement infused directly into the rumen through the cannula. A water-soluble chromium chelate was dissolved into test rations of the liquid feeds as a marker so that the amount could be quantitated in the reticulorumen ingesta taken 30 minutes after feeding or infusion. Reticulorumen ingesta ammonia levels also were determined. Blood plasma glucose was assayed on samples taken four hours after supplementation.

Percentage of the chromium chelate administered that was recovered in the reticulorumen ingesta did not differ significantly for the three treatments. Reticulorumen ammonia levels were higher when the liquid supplement was infused into the rumen than when it was consumed from the lick-wheel. There were no significant differences in mean plasma glucose values at four hours after the different treatments. These data indicate there was little, if any, rumen by-pass of molasses or liquid supplement taken from the lick-wheel feeder.

In a second experiment, one pound of molasses, Pro-Lix or United States Sugar Corporation 20% crude protein liquid supplement was infused through the cannula into the abomasum and plasma glucose values determined at intervals during the ensuing four hours. Least square predicted values for plasma glucose were higher for the United States Sugar Corporation 20% crude protein liquid than for molasses infusion.

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