(P=0.0001), urea (P=0.0001), and cholesterol (P=0.08). Monensin had no effect on serum calcium or insulin. The effect size estimates for monensin on BHB, acetoacetate, and cholesterol were heterogenous; thus random effects models were utilized for these analytes. Effect size estimates of monensin for BHB and NEFA were positively correlated, but were negatively correlated to glucose. A consistent delivery of monensin via topdress or in a controlled release capsule gave a slightly smaller but more consistent reduction in BHB. Topdress delivery and increasing dose increased glucose response. NEFA, BHB and glucose effects were modified by stage of lactation. Larger effects for BHB and NEFA were observed in the transition period than later in lactation. Glucose response was greater in cows after calving than before calving.

Significance

Monensin clearly has profound effects on energy metabolism which are marked by decreases in NEFA, BHB and acetoacetate and increases in glucose and cholesterol. The effect on increasing urea is likely a reflection of reduced protein degradation in the rumen and subsequent deamination of absorbed amino acids. Maximum benefit from monensin for improved energy metabolism will be obtained by ensuring a consistent daily dose and targeting the transition dairy cow.

A Meta-analysis of the Production Impacts of Monensin in Lactating Dairy Cattle.

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Introduction

Monensin increases propionic acid production through effects on rumen microbial populations. Recently, approvals for use on monensin have been obtained in Canada and the United States, while the product has been available for dairy cattle in many other countries such as Mexico, Australia and New Zealand for many years. The impact of monensin on production, especially on milk fat content have been inconsistent. Meta-analysis is a useful tool that can be employed to both summarize effects across studies and to investigate factors explaining potential heterogeneity of response.

Materials and Methods

An intensive literature search and screening process yielded a total of 59 papers, abstracts, and trial reports containing useable data on monensin in dairy cows. Of these, there were 37 papers that contained production data. All trials included were randomized controlled designs but were not necessarily blinded. Data from each trial contained in the papers were extracted to a database including the number of animals, mean, and standard error for each of the monensin and control groups. Other relevant data that was common to most studies such as dose, stage of lactation, dose delivery method, and diet type (pasture, forage, component-fed) were also extracted. Meta-analysis was conducted in STATA for monensin effects on milk yield, dry matter intake, milk production efficiency, milk components (percent and yield), body condition score, and body weight change. A subset of trials contained dietary information. This information was used to estimate ration parameters in CPM and then these parameters were screened in meta-regression to evaluate impact on monensin treatment on milk components.

Results

There were a total of 37 papers containing 70 trials with monensin and production outcomes. Some studies contained a summary of one trial conducted on multiple trial sites whereas other studies reported multiple trials conducted at a single trial site. Over all the trials analyzed, monensin increased milk production (P=0.0001), milk protein yield (P=0.002), milk production efficiency (P=0.01) and body condition score (P=0.002). Monensin also decreased dry matter intake (P=0.001) milk fat percent (P=0.0001), milk fat yield (P=0.06), milk protein percent (P=0.0001), and body weight loss (P=0.0001). The effect size estimates for monensin on milk fat percent, milk fat yield, milk protein percent and milk protein yield were heterogenous and random effects models were utilized for these variables. Weighted means of the difference for milk production and dry matter intake suggested a 0.7 kg/day increase and a 0.4 kg/day decrease respectively. Meta-regression indicated that stage of lactation and topdress delivery of monensin influenced response. However, dietary factors were likely the primary explanation for heterogeneity in milk component responses since both pasture-based studies and studies with only one trial site (versus multiple sites) were significant in all models. More heterogeneity existed in single-based versus multi-based studies. Analysis of the subset ration data indicated that increasing days in milk at start of treatment, and increasing concentration of unsaturated fatty acids were associated with a greater effect of monensin on decreasing milk fat yield. The effect of monensin on milk protein yield was improved with increasing peptide balance.

Significance

Milk production is increased and dry matter intake decreased with monensin. This is a consistent response from study to study and the reason for an improved milk production efficiency. However, the impact of monensin on milk component yields are highly dependent on diet. Maximum benefit of monensin is achieved by being aware of the potential interactions of higher dietary levels of unsaturated fats, while ensuring a good rumen peptide balance.

Evaluation and Use of an Automated Human ß-hydroxybuturate (BHBA) Test for Cowside Detection of Subclinical Ketosis in Dairy Cattle

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Introduction

Prevalence of subclinical ketosis in dairy herds ranges from 6.9% to 34%. Subclinical ketosis can lead to decreased milk production and reproductive performance, increased risk of displaced abomasum and clinical ketosis. The gold standard diagnostic test for subclinical ketosis is the measurement of BHBA in serum or plasma. Thresholds to distinguish between normal and ketotic cows range from 1000 to 1600 ºmol/l of blood BHBA. Serum BHBA measurement is useful for examining individual cows and evaluating herd health. However, it is not convenient and is expensive for use as a routine cowside diagnostic test for the early detection of subclinical ketosis. Cowside diagnostic tests for ketosis (dipsticks or tablets)are based on the degree of color change. These tests can be used semi-quantitatively because the color change is more intense in the presence of higher levels of ketone bodies. Accuracy of the tests vary from test to test and from study to study. In human medicine electronic handheld blood glucose and ketone systems are used for diabetes monitoring. The objective of this study was to evaluate the precision and accuracy of an electronic BHBA measuring system (Abbot, Wiesbaden) for the use in dairy cattle.

Materials and Methods

A total of 244 dairy cows between 4 and 40 days after calving were used for the study. Blood, milk and