



balchem®

***ReaShure***®

Precision Release Choline

## Balchem Research Summary

Effects of supplementation with ruminally-protected choline on performance of multiparous Holstein cows did not depend upon prepartum intake of calories

## Introduction

Choline is an essential nutrient that enables cows to utilize the fat (NEFA) mobilized from body stores. The production of NEFA is the cows' natural way of managing negative energy balance during the early stages of lactation and is a primary source of energy for many functions. A healthy and properly functioning liver allows cows to transition smoothly, resulting in elevated peak milk and a more persistent lactation curve for maximum productivity. Issues occur when the cow's liver cannot effectively process all the NEFA being mobilized. This can adversely affect liver function, leading to increased ketones in the blood (ketosis). Ketosis can negatively affect feed intake and further exacerbate negative energy balance, leading to even more NEFA mobilization.

One aspect of this University of Florida study evaluated the impact of feeding ReaShure® Precision Release Choline to cows during the transition period on milk production over the entire lactation. The study also tracked cow health, reproduction, calf performance and colostrum quality.

## Experimental Design

Ninety-three multiparous Holstein cows were assigned to one of four treatments at dry off. Treatments were dry cow diets that were formulated for either maintenance energy (0.64 Mcal NEL/lb) or high energy (0.74 Mcal NEL/lb) and then either with or without 60 grams of

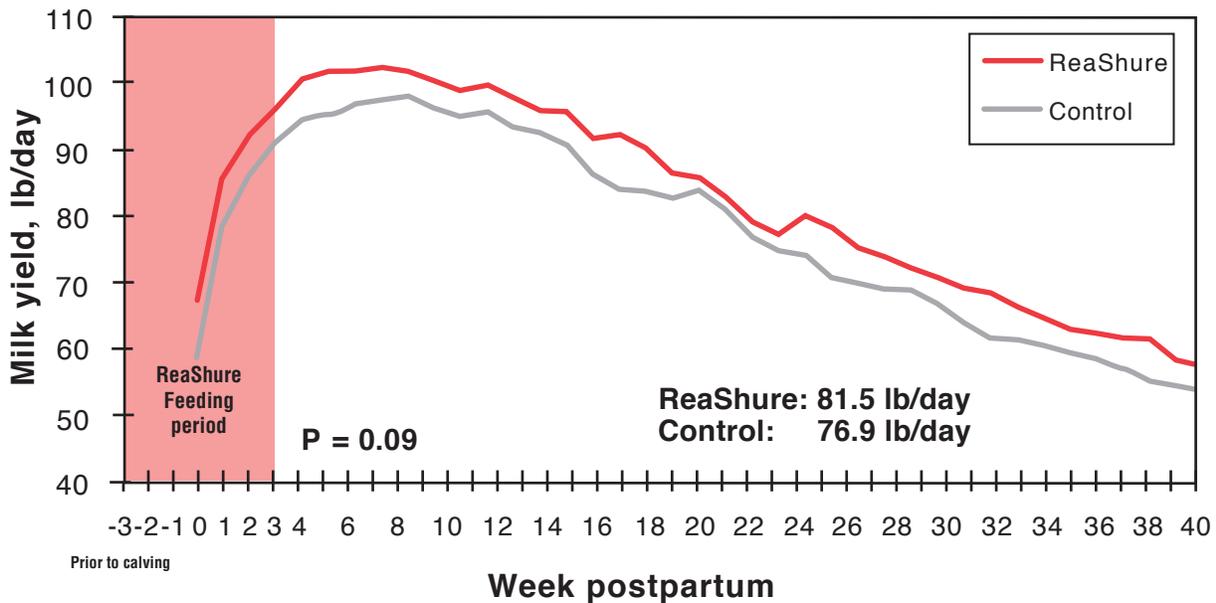
ReaShure for approximately 21 days prepartum through 21 days postpartum. After calving all cows received the same lactation diet and individual dry matter intakes and milk production was measured through 15 weeks of lactation.

## Results

### Increased Milk and Components over the 40-Week Lactation.

Cows fed ReaShure during the transition period produced an average of 4.6 lbs more milk per day ( $P = 0.09$ ) over the first 40-weeks postpartum (Figure 1). This calculates to an additional 1,288 lbs during the first 40 weeks of lactation. If we extrapolate these results over a 305-day lactation, the outcome would be an additional 1,403 lbs of milk per cow per year. Percent fat and protein were not statistically impacted for the ReaShure-fed cows. But both fat, 3.43 vs. 3.61 lbs/day ( $P = 0.09$ ) and protein, 2.66 vs. 2.79 lbs/day ( $P = 0.07$ ) yield increased as a result of the increased milk production seen in the ReaShure-fed cows. It is also of interest to note that cows ( $n = 76$ ) considered to have non-excessive body condition at calving ( $BCS \leq 3.5$ ) produced on average 6.0 lbs more milk per day ( $P = 0.09$ ) when fed ReaShure. This simply shows that cows of normal body condition respond quite well to ReaShure.

Figure 1 Effect of Feeding ReaShure During Transition on Milk Production Over 40 Weeks



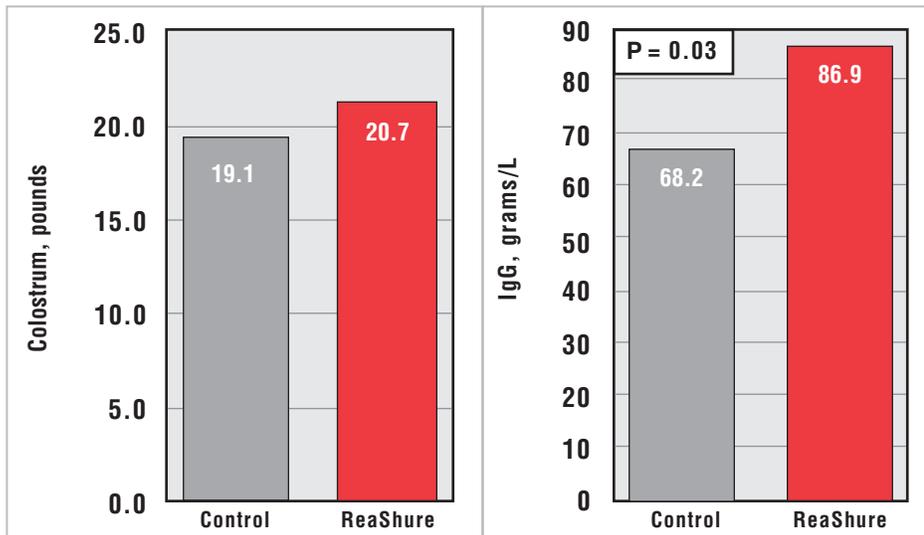
### ReaShure and Health

The authors noted in this study that there were not enough animals to effectively evaluate the effect of ReaShure on the incidence of diseases. Previous studies showed significant differences in clinical and subclinical ketosis but no differences were seen in this study. One very interesting and unexpected outcome in this study was a reduction ( $P < 0.01$ ) in the prevalence of subclinical hypocalcemia (25.5 and 10.5%) as determined by total plasma calcium levels below 8.0 mg/100 ml at 0, 1, 3 or 7 days-in-milk. The mode of action for this is unclear at this time and will be studied in subsequent research trials.

### Higher Quality Colostrum

Colostrum volumes were statistically the same (19.1 vs. 20.7 pounds for the control and ReaShure fed cows, respectively). However, the ReaShure fed cows produced significantly ( $P = 0.03$ ) more Immunoglobulin G per liter of colostrum (68.2 vs. 86.9 g/L, Figure 2). This could have practical implications for calf health.

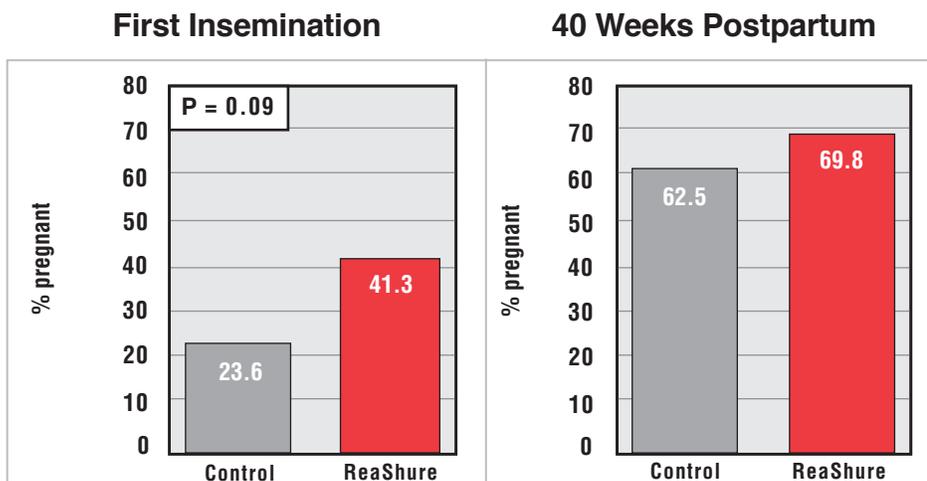
Figure 2 Effect of Feeding ReaShure Prepartum on Colostrum Quantity and Quality



### Improved Reproduction

Pregnancies from first service were higher ( $P = 0.09$ ) for cows fed ReaShure as compared to cows that were not (41.3 vs. 23.6%, Figure 3). While the ReaShure cows become pregnant more quickly, there was no significant difference in pregnancy rate by 40 weeks.

Figure 3 Effect of Feeding ReaShure During Transition on Reproduction



### **Calf Performance**

Researchers in this study followed the performance of heifer calves out to one year of age. Heifers born to the cows receiving ReaShure during the close-up dry period tended to be slightly smaller at birth than calves from control cows (Table 1). However, by 50 weeks of age heifers from cows fed ReaShure were significantly larger ( $P = 0.05$ ) than those from cows not fed ReaShure during the close-up dry period. Average daily gain of heifers whose dam was fed ReaShure during the close-up dry period was 1.86 pounds per day which was 0.09 pounds per day faster than heifers from dams not fed ReaShure ( $P = 0.06$ ).

### **Summary**

This study is consistent with previous peer-reviewed ReaShure research that demonstrated improvements in health and production parameters during and immediately following the transition period. However, this is the first study to measure the impact of feeding ReaShure on milk production over the entire lactation.

Cows receiving ReaShure during the transition period (21 days prepartum to 21 days postpartum) produced more milk per day over the 40-week lactation, had a lower prevalence of subclinical milk fever, showed improvements in first service conception rates, produced more immunoglobulin G in the colostrum and their heifer calves grew significantly faster through one year of age.

*Table 1* Effect of In Utero Exposure to ReaShure on Calf Performance

<b>Variable</b>	<b>Control</b>	<b>ReaShure</b>	<b>P Value</b>
<b>Body Weight, lb</b>			
Calving	89.0	84.4	0.07
Weaning	168.8	170.2	0.80
50 wk of age	710.0	738.0	0.05
<b>ADG (lb/d)</b>			
From calving to weaning	1.34	1.38	0.67
From weaning to 50 weeks	1.87	1.96	0.05
From calving to 50 weeks	1.77	1.86	0.06

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