



INTRODUCTION



Supplementation with yeast (*Saccharomyces cerevisiae*, SC) plus organic sources of minerals instead of inorganic sources have positive impacts on milk yield (MY), reproduction and immune responses of the cow. The increase in MY has varied from 10.0 to 34.0 kg; while reducing mastitis, metritis or placental retention from 5.0 to 15.0%. Based on the above, the objective of this study was to determine the impact of the replacement of Selenium, Copper and Zinc organic instead of inorganic during the dry period on MY, incidence of ketosis, diarrhea, milk fever, mastitis, metritis, and placental retention of Holstein-Friesian cows in confinement.

MATERIALS AND METHODS

DATA USED

- 1171 Holstein-Friesian cows before the expected day of parturition (780 38 kg BW; more than one lactation and CC = 3.0; scale 1-5).
- Treatments:
 - 1) Total mixed ration (TMR; control)
 - 2) TMR +15.0 + 0.540 g of SC mg cow⁻¹ d⁻¹ of a mixture of Se, Cu and Zn organic supplied 10 d (TMR10)
 - 3) 15.0 g of TMR+ SC + 0.540 mg for 20 d (TMR20) and
 - 4) 15.0 g of TMR + 0.540 mg SC cow⁻¹ d⁻¹ for 30 d before the expected calving date (TMR30).

STATISTIC ANALYSIS

Data was analyzed using SAS (SAS, 2014) statistical package. Milk yield was determined weekly and analyzed using the Mixed procedure of SAS in a completely randomized design with repeated measurements over time.

STUDY VARIABLES

- Parturition type
- Milk yield
- Metabolic, syndromes and reproductive disorders: ketosis, diarrhea, hypocalcemia, displaced abomasum, hypocalcemia, mastitis, metritis, and placental retention.

RESULTS

Milk yield, kg animal⁻¹ d⁻¹ during weeks 1, 6, 10 and 1-15

| Item | Tratamiento ¹ | | | | EE | TRT | Week | TRT X Week |
|--------------------------|--------------------------|--------------------|--------------------|--------------------|------|----------|---------|------------|
| | TMR | TMR10 | TMR20 | TMR30 | | | | |
| Week 1 (n = 2475) | 22.01 ^c | 22.42 ^b | 23.68 ^a | 23.06 ^a | 0.33 | < 0.0001 | <0.0001 | <0.0001 |
| Week 6 (n = 2964) | 35.69 ^b | 32.54 ^c | 32.00 ^c | 38.02 ^a | 0.37 | <0.0001 | <0.0001 | <0.0001 |
| Week 10 (n = 1441) | 33.89 ^b | 35.66 ^a | 37.82 ^a | 34.40 ^b | 0.55 | <0.0008 | 0.050 | 0.050 |
| Weeks 1-15 (n =29166) | 32.60 ^c | 34.07 ^b | 34.55 ^b | 36.06 ^a | 0.21 | 0.020 | <0.0001 | <0.0001 |

Ordinary, premature and difficult births

| Item | Treatments ¹ | | | | EE | P |
|------------------------|-------------------------|--------------------|--------------------|--------------------|------|----------|
| | TMR | TMR10 | TMR20 | TMR30 | | |
| Parturition (n =12732) | | | | | | |
| Ordinary | 92.11 ^c | 94.92 ^b | 95.27 ^a | 94.52 ^b | 0.03 | < 0.0001 |
| Premature | 6.61 ^b | 4.74 ^a | 4.73 ^a | 5.48 ^b | 0.06 | <0.0001 |
| Difficult | 1.26 ^b | 0.34 ^a | 0.00 | 0.00 | 0.04 | < 0.0001 |

Metabolic, syndromes and reproductive disorders

| Item | Treatments ¹ | | | | EE | P |
|---------------------|-------------------------|-------------------|-------------------|-------------------|------|----------|
| | TMR | TMR10 | TMR20 | TMR30 | | |
| Ketosis | 5.20 ^b | 4.90 ^a | 7.86 ^c | 5.70 ^b | 0.03 | < 0.0001 |
| Diarrhea | 2.48 ^d | 1.04 ^b | 2.01 ^c | 0.00 ^a | 0.02 | <0.0001 |
| Milk fever | 3.27 ^d | 2.75 ^c | 0.97 ^b | 0.00 ^a | 0.03 | <0.0001 |
| Mastitis | 4.65 ^c | 2.65 ^a | 3.56 ^b | 7.32 ^d | 0.04 | < 0.0001 |
| Metritis | 6.98 ^b | 7.21 ^c | 7.86 ^c | 2.99 ^a | 0.03 | <0.0001 |
| Placental retention | 3.59 ^c | 2.75 ^b | 0.97 ^a | 0.00 | 0.03 | <0.0001 |

CONCLUSIONS

- Complementing 15.0 g animal⁻¹ d⁻¹ of *Saccharomyces cerevisiae* containing 0.540 g of Se, Cu and Zn during the period prior to parturition increased milk yield approximately 1.52 to 3.46 kg animal⁻¹ d⁻¹ at early lactation, reduces the incidence of diarrhea, hypocalcemia and retained placenta, and do not show a definite relation to ketosis, mastitis and metritis.