



Strategic trace mineral injection during the dry period association with post-partum health traits and reproductive performance in dairy cows

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BACKGROUND

- Trace minerals play a critical role for immunity and fertility, as they are key components of the antioxidant system.
- Several studies have shown how, even in adequately supplemented dairy cattle, strategic injection of trace minerals can reduce stillbirths, reduce post partum disease occurrence and improve udder health.

STUDY AIM

To identify potential benefits of trace mineral injections during the dry period on post-partum health traits and reproductive outcome in confined dairy cows.

MATERIAL AND METHODS

- 3 confined dairy herds located in the North of Italy.
- 1271 predominantly Holstein cows (n=449 LACT=1; n=360 LACT=2; n=462 LACT=3+).
- All herds were fed a TMR during the dry period and lactation.
- Randomized blocked treatment groups: ITM (n=597) and CON (n=674).
- 2 injections of injectable trace minerals (ITM) at dry-off for cows and 60 days pre-calving for heifers (58±8 days pre-calving) and around 30 days pre-calving (30±6 days pre-calving).
- Disease occurrence was observed during the first 30 DIM.
- All herds had a voluntary waiting period of 70 days post-partum and inseminated all cows after a Double-Ovsynch programme. Reproductive performance was monitored for the first 150 DIM.

Treatment (ITM)

Zinc: 60 mg/ml

Manganese: 10 mg/ml

Multimin[®], Axiota Animal Health — 1 mL/100 kg BW, SC

Copper: 15 mg/ml

Selenium: 5 mg/ml



Dietary trace mineral supplementation by farm				
Phase	Mineral	Farm 1	Farm 2	Farm 3
Far-off	Cu mg/kg	11.4	14.4	5.49
	Mn mg/kg	87.8	87.1	23.9
	Se mg/kg	0.457	0.647	0.591
	Zn mg/kg	71.8	256	24.1
Close-up	Cu mg/kg	11.4	16.9	5.93
	Mn mg/kg	87.4	102	26.3
	Se mg/kg	0.455	0.76	0.659
	Zn mg/kg	71.5	300	26.5

STATISTICAL ANALYSIS: Treatment group differences for post-partum disease occurrence were assessed using chi-square test. Association between treatment and time to conception and conception risk were assessed using Kaplan-Meier curves and a Cox's proportional hazard model, respectively, with censoring at 150 DIM. Statistical analysis was performed with JMP 19[®] (SAS) and significant differences and tendencies were set for p<0.05 and p<0.10.

RESULTS

All animals calved between December 2023 and June 2024.

Treatment groups did not differ for parity distribution (p=0.97), previous gestation length (p=0.77), age at first calving (p=0.53), previous days dry (p=0.39), previous lactation 305d ME milk production (p=0.89) and previous days open (p=0.55).

ITM 77 d vs CON 96 d

Median time to conception was significantly lower for ITM compared to CON (p=0.03).

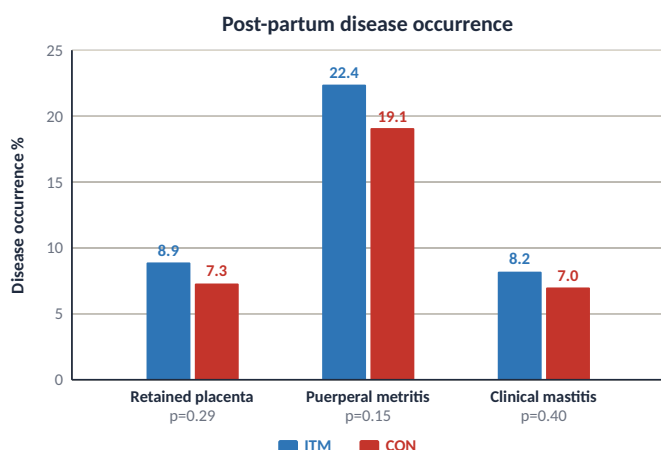


Figure 1. No significant differences were detected between treatment groups for health traits.

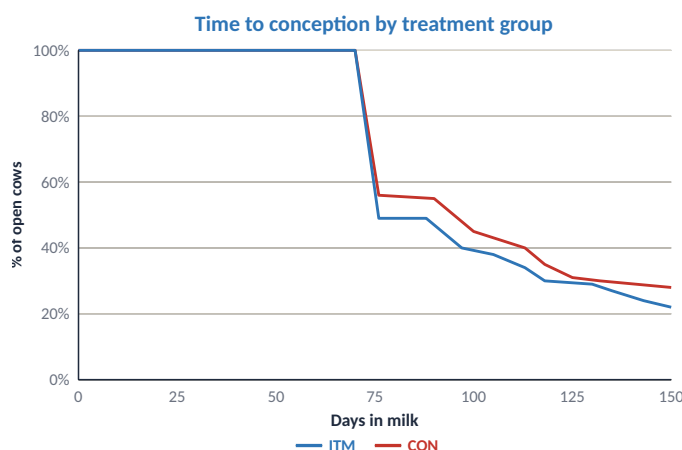


Figure 2. Time to conception by treatment group (Kaplan-Meier). Curves remain separate through 150 DIM.

REPRODUCTIVE PERFORMANCE: hazard ratios for pregnancy, ITM vs CON (95% CI).

Greater risk for pregnancy in ITM cows, driven by multiparous animals. Treatment × farm interaction not significant (p=0.74); treatment × parity tended to significance (p=0.06).

ALL COWS
1.15×
HR 1.00-1.32 · p=0.04

MULTIPAROUS
1.25×
HR 1.04-1.50 · p=0.01

PRIMIPAROUS
n.s.
No association · p=0.56

CONCLUSIONS

In the current study, trace mineral strategic injection at dry-off and pre-calving significantly reduced time to pregnancy and increased risk for pregnancy, especially in multiparous cows but was not associated with health traits post-calving.