FETAL SUPPLEMENTATION WITH VITAMINS C AND E, VIA MATERNAL INTAKE, IMPROVES ANTIOXIDANT STATUS

Parraguez VH1, 2, 3, Sales F3, Peralta OA1, Serendero C1, Peralta G1, McCoard S4, González–Bulnes A.5

1Faculty of Veterinary Sciences, 2Faculty of Agricultural Sciences, University of Chile; 3INIA–Kampenaike, Chile; 4AgResearch Grasslands, New Zealand; 5INIA–Madrid and Veterinary School, Complutense University of Madrid, Spain. E-mail: vparragu@uchile.cl

INTRODUCTION

- Twin pregnancies are essential to improve profitability in the sheep industry.
- Chilean Patagonia, concentrates over 55% of the country sheep population, characterized by low quality pastures which fail to meet nutrient requirements during pregnancy.
- In sheep, undernutrition and/or twining results in intrauterine growth restriction (IUGR), associated with fetal hypoxemia and oxidative stress.
- A possible strategy for counteracting oxidative stress of the feto-placental unit and thus IUGR is the maternal supplementation with antioxidant vitamins C and E.

AIM

To determine if vitamins C and E are adequately transferred from the ewe to the fetus and to evaluate their effect on fetal antioxidant capacity.

MATERIAL AND METHODS

- Location: INIA research farm, 65 km north from Punta Arenas, Magellan Region, Chilean Patagonia (Lat 52° 36'; Lon 70° 56')
- Animals: Corriedale single- (n=32) and twin–bearing (n=32) ewes were maintained under natural prairie, covering ~70% of NRC requirements. Half of the animals in each gestation rank received, in addition, daily supplementation with concentrate to satisfy ~100% of NRC requirements.

Half of the ewes from each group received daily oral administration of vitamin C (10 mg/kg) and vitamin E (9 IU/kg) from 30 days after mating.

Photos: Oral supplementation of vitamins C and E in pregnant ewes.

- At 140 days of pregnancy, maternal jugular and umbilical vein blood samples were taken for evaluation of vitamin C and E, and total antioxidant capacity (TAC).

Data were analyzed by ANOVA in a factorial model, considering rank (single or twin), nutritional plane (with or without supplementation) and vitamins supplementation. Differences were considered when P<0.05. Data are presented as mean ± SEM.

RESULTS

Peripheral blood plasma concentrations of vitamins C (panel A) and E (panel B) in single– and twin–bearing ewes

Umbilical cord blood plasma concentrations of vitamins C (panel A) and E (panel B), and total antioxidant capacity (panel C) in single– and twin–bearing ewes

CONCLUSION

It is concluded that maternal supplementation with vitamins C and E increased the vitamins delivery to the fetuses and improved their redox status. This research contributes to potential future strategies to prevent IUGR.

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