The Ohio State University/ Department of Animal Sciences / Equine Program

Influence of a Maternal Dietary Yeast Supplement on Immunoglobulin Concentrations in Foals from Birth to Four Months of Age

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ABSTRACT

Previous studies in multiple species have shown that maternal diet can affect immunoglobulin concentrations in their resulting offspring. To our knowledge, the effect of maternal dietary yeast supplementation on immunoglobulin levels in foals has not been studied. In this study eight Quarter Horse mares (14.5 ± 7.5 yr) were randomly assigned to one of two groups: Yeast or Control. All mares received a control diet of 0.5% BW of a 16% CP pelleted concentrate with water and mixed grass hay *ad libitum*. Mares in the yeast treatment group also received 1g/45.4 kg of BW/d of a live culture of *Saccharomyces cerevisiae* from 250 d of gestation to 90 d post-foaling. All mares were vaccinated at d 300 of gestation against Eastern and Western equine encephalomyelitis, equine rhinopneumonitis (EHV-1 and EHV-4), equine influenza (type A2), tetanus and West Nile virus. Blood samples were collected from the foals via jugular venipuncture immediately after parturition (d 0), at 12 and 24 hr and 30, 60, 90, and 120 d post-foaling. Sera samples were analyzed for total IgG including IgGa, IgGb, and IgG(T), as well as IgA, IgM, and IgE concentrations using commercial ELISA kits. Data were analyzed using PROC MIXED of SAS and a p-value of ≤ 0.05 was considered statistically significant. Supplementing the maternal diet with live yeast did not influence foal IgGa, IgGb, IgA, IgM, or IgE concentrations. However, IgG(T) concentrations were significantly higher (P = 0.0063) on d 60 post-foaling in foals born from mares fed the yeast supplement compared to controls. Overall, maternal dietary yeast supplementation during late gestation and early lactation did not influence immunoglobulin concentrations in their foals.

INTRODUCTION

- In a previous study it was found that maternal supplementation can effect the immunoglobulin concentrations of both the mare and the foal [1].
- Yeast has been seen to raise immune response in different species through ingestion of the yeast or injection of a component of yeast [2, 3, 6].
- To our knowledge, there is limited information about the effect of maternal dietary yeast supplementation on immune responses in foals.

OBJECTIVE

The objective of this research was to evaluate the influence of maternal dietary yeast supplementation during late gestation and early lactation on immunoglobulin concentrations in foals.

Figure 1: Mare-foal pair: Wanita and Hogan

METHODS

- Eight pregnant Quarter Horse mares (14.5 ± 7.5 yr) were randomly assigned to either Yeast or Control treatment groups.
- Mares in the yeast treatment group received 1 g/45.4 kg of BW/d of a live culture of *Saccharomyces cerevisiae* from d 250 of gestation to d 90 post-foaling.
- Blood samples were collected via jugular venipuncture before suckling (d 0), 0.5, 1, 30, 60, 90, and 120 d post-foaling.
- Sera samples were analyzed for IgGa, IgGb, IgG(T), IgA, IgM, and IgE concentrations using commercial ELISA assays.
- Data were analyzed using the MIXED procedure of SAS v 9.3.
- The intra-assay coefficient of variation was less than 7.2%, the inter-assay variation less than 3.9% and the minimal detectable concentration for IgA, IgM, and IgG(T) was 15.6 ng/ml and IgGa, IgGb, and IgE was 3.12 ng/ml.

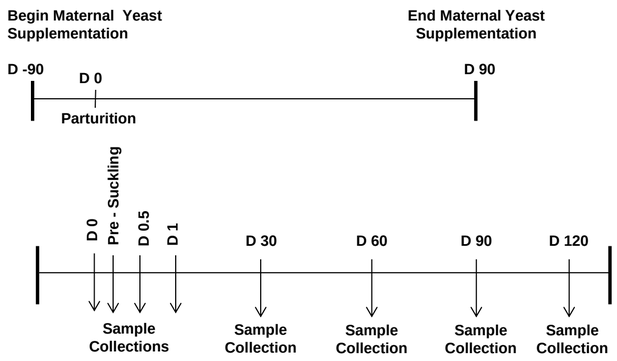

Figure 2: Timeline of experiment including maternal yeast supplementation and foal sample collection times.

RESULTS

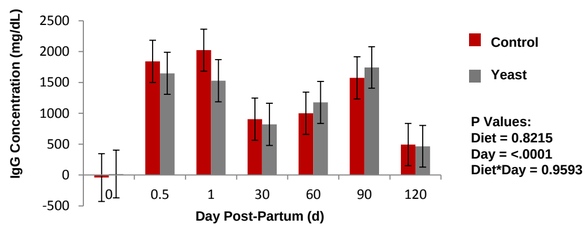

Figure 3: Average foal IgG concentrations from birth to four months of age.

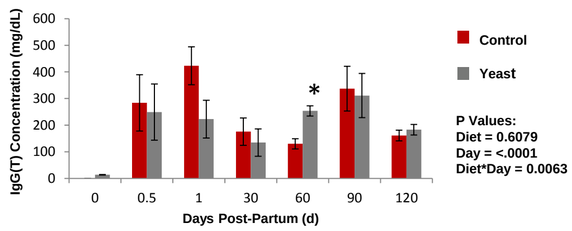

Figure 4: Average foal IgG(T) concentrations from birth to four months of age. *P Values for d 60 = <0.0001.

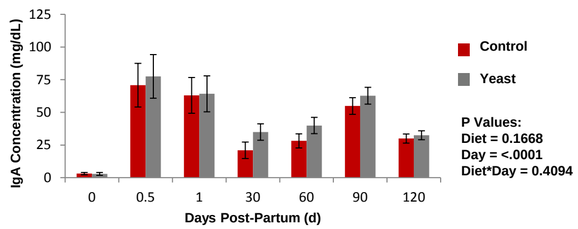

Figure 5: Average foal IgA concentrations from birth to four months of age.

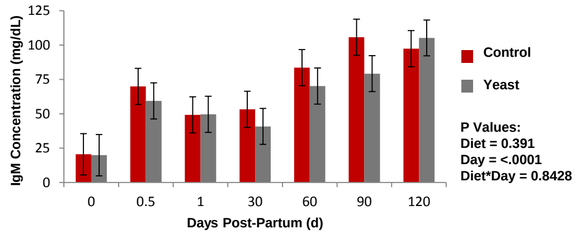

Figure 6: Average foal IgM concentrations from birth to four months of age.

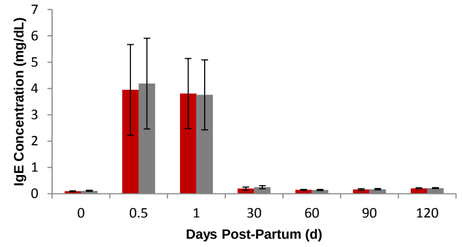

Figure 7: Average foal IgE concentrations from birth to four months of age.

DISCUSSION

- All of the serum immunoglobulin concentrations analyzed are consistent with normal ranges and trends for foals [4,7,8].
- In a previous study, the mare's immunoglobulin concentrations were analyzed and determined to have no significant differences between the control and yeast treatment groups [5].
- The lack of increased immunoglobulins in the mares is the most probable cause of similar results in their foals.
- This contradicts previous research in which a general increase in immune response was found when both cows in early lactation and feedlot steers that received a yeast supplement [2, 3].

CONCLUSION

In summary, maternal dietary yeast supplementation during late gestation and early lactation did not influence overall immunoglobulin concentrations in foals from parturition to 4 months of age.

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