UNIVERSITY of GUELPH

ONTARIO AGRICULTURAL COLLEGE

DEPARTMENT OF ANIMAL BIOSCIENCES

PhD. Defence

Strategies to monitor and optimize the transfer of passive immunity in newborn dairy calves

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Date: April 25th 2023 at 8:00am

The PhD Defence for Alberto Jose Lopez Cabus has been scheduled for April 25th, 2023 at 8:00am. The defence will be held online via Teams and in 141: https://teams.microsoft.com/l/meetup-join/19%3ameeting_YzY3YzZhODctODcwYi00ODdjLWE5ZWYtY2JjYTUzZjg1Y2E4%40thread.v2/0?context=%7b%22Tid%22%3a%22be62a12b-2cad-49a1-a5fa-85f4f3156a7d%22%2c%22Oid%22%3a%22fbd28915-dda5-478f-8ecb-a3682dcf0c3a%22%7d

The exam committee will consist of:

Examining Chair: Dr. Trevor DeVries

Advisor: Dr. Mike Steele

Adv. Committee Member: Dr. Dave Renaud

Additional Graduate Member: Dr. Vern Osborne

External Examiner: Dr. Sandra Godden

Abstract:

The assessment and adequate management of transfer of passive immunity in newborn calves is dependent on various factors, with the majority of research focusing primarily on immunoglobulin G. Even though there are clear recommendations for calf rearing protocols, colostrum feeding practices can still be improved. Therefore, the objectives of this thesis were to: 1) Evaluate the accuracy of serum total protein (STP) measurements to estimate failed transfer of passive immunity (FTPI) in calves fed colostrum replacer (CR) in comparison to calves fed maternal colostrum (MC), 2) Determine if different CR feeding frequencies affect serum IgG levels and apparent efficiency of absorption (AEA), 3) Evaluate if reducing the total solids, and osmolality of CR by increasing dilution amount has an effect on colostral IgG absorption or abomasal emptying rates in newborn calves, and 4) Investigate if low and high-quality MC can be enriched with bovine dried CR to achieve adequate serum IgG levels at 24 h. Results from Chapter 2 demonstrated that current threshold points used for STP inflate the number of calves estimated to have FTPI when they are fed CR, but correctly classifies FTPI for calves fed MC. As a result, the efficacy of STP to estimate serum IgG in CR-fed calves needs to be elucidated to correctly assess calf health on-farm. Data from Chapter 3 shows that feeding three CR meals within the first 12 h of life did not result in added benefits to serum IgG or AEA levels. In addition, results indicate that an upper limit of IgG absorption does not occur when feeding less than 300 g of IgG at birth. Chapter 4 concluded that that feeding one CR meal high in TS at birth might not influence the incidence of abnormal fecal scores, decreasing TS increased abomasal emptying rate, and decreasing TS tended to increase IgG absorption. Lastly, data from Chapter 5 indicates that low-quality colostrum can be enriched with CR and achieve acceptable serum IgG levels at 24h in newborn calves without affecting AEA. Overall this thesis provides insight on colostrum feeding strategies that can enhance IgG absorption in newborn dairy calves.