

A receiver operating characteristic (ROC) curve was created and used to identify the optimal cut-off for this dataset. The sensitivity (Se), specificity (Sp), and accuracy of the digital and optical Brix refractometers for assessing colostrum quality using optimal cut-offs were calculated. The level of agreement between results of 2 refractometers were assessed using McNemar's test for paired data to check for bias, followed by calculation of the kappa statistic.

### Results

The mean RID IgG concentration was 47.6 g/L (SD  $\pm$  28.3), with a range from 4.2 to 144.2 g/L. The prevalence of poor colostrum (RID IgG <50 g/L) was 61%. The mean of % Brix concentration determined by the digital refractometer was 22.7% Brix (SD  $\pm$  4.2) with a range from 10.2 to 29.8% Brix, whereas, for the optical refractometer was 23.1% Brix (SD  $\pm$  3.9) with a range from 7.4 to 30% Brix. The spearman correlation between RID IgG concentration and Brix scores determined by the digital and optical refractometers were 0.59 and 0.57, respectively, whereas the correlation between Brix scores from both the digital and optical refractometers was 0.96. The area under the curve (AUC) for the receiver

operating curve was 0.75 and 0.74 for the digital and optical refractometers, respectively. The best combination of Se (76%; 95% CI: 66 to 84%), Sp (69%; 95% CI: 61 to 77%) and accuracy (72%) for digital refractometer was at 23.7% Brix. For the optical refractometer the best combination of Se (72%; 95% CI: 61 to 80%), Sp (68%; 95% CI: 60 to 75%) and accuracy (69%) was at 24.2% Brix. The overall percent of agreement between results of the digital and optical refractometers was 93%, with a corresponding kappa-value of 0.85, which is in agreement with the McNemar's test that showed no significant difference ( $P > 0.05$ ) between proportions of colostrum samples classified as poor and good quality by the 2 refractometers.

### Significance

Both refractometers exhibited moderate utility in assessing colostrum quality. There was strong agreement between the 2 refractometers; however, the optimal cut-offs for the digital (23.7% Brix) and optical (24.2% Brix) refractometers were slightly higher than previously recommended cut-offs.

## Comparison of serum IgG half lives in dairy calves fed colostrum, colostrum replacer, or administered with intravenous plasma

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### Introduction

The cotyledonary placenta allows minimal transfer of immunoglobulins from the cow to the fetus during pregnancy. Consequently calves are born hypogammaglobulinemic, thus making it essential to ingest and absorb colostral immunoglobulins to acquire passive immunity. Therefore, the half-life of maternally derived colostral immunoglobulin G (IgG) in dairy calves is important in the development of the calf immune system as well as determination of the age at which to vaccinate the calf without interference from the maternally derived IgG. Half-life of maternally derived colostral IgG is estimated to be 20 days in dairy calves. In clinical settings, bovine plasma is used as part of treatment of sick calves that require additional immunity via plasma administration. Currently, no studies have evaluated the half-life of colostrum replacer derived IgG or plasma derived IgG in dairy calves. We hypothesized that the half-life of maternally derived IgG has a significantly different half-life compared to colostrum replacer derived or plasma

derived IgG in dairy calves. The aims of this study were to determine the half lives of IgG derived from colostrum, colostrum replacer or plasma in dairy calves.

### Materials and Methods

Thirty Jersey calves randomly assigned to 3 groups of 10. Group 1 was fed 3 L colostrum within 2 hours after birth; Group 2 was fed colostrum replacer (equivalent to 200 g IgG) within 2 hours after birth according to the manufacturer's recommendations; and Group 3 was administered bovine plasma intravenously at 13.6 ml/lb (30 ml/kg) within 2 hours after birth. Serum samples were collected prior to feeding colostrum or colostrum replacer or intravenous plasma administration, and at 2, 5, 7, 10, 14, 21, 28 and 35 days of age. Serum, colostral, or plasma serum IgG concentrations were determined by radial immunodiffusion followed by calculation of serum IgG half life by non-linear regression using a commercial statistical software.



## Results

The median IgG concentration at 48 hours after birth was 2061.06, 2306.54, and 669.06 mg/dL, for Group 1, 2 and 3, respectively. Failure of passive transfer ([IgG] < 1000 mg/dL at 48hrs) occurred in 80% of calves in Group 3 while all calves in Group 1 and 2 achieved adequate transfer of passive immunity. Half-Life of IgG was as follows: Group 1 (colostrum)= 28.5 days; Group 2 (colostrum replacer)= 19.1 days; and Group 3 (plasma)= 27.3 days.

## Significance

Our hypothesis was confirmed in that colostrum derived IgG has a longer half-life than colostrum replacer or plasma derived IgG. It is interesting to note that the half-life of plasma derived IgG was 8 days longer than colostrum replacer. We assumed that plasma derived IgG would have the shortest half-life considering that it is an exogenous protein. In the future, a study using sick calves administered plasma IgG and calculation of resulting half-lives would provide information relevant to clinical settings.

# Effect of different intrauterine oxytetracycline treatment on reproductive performance of dairy cows with clinical endometritis and determination of oxytetracycline residues in milk

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## Introduction

Following intrauterine administration of oxytetracycline, therapeutic concentration and drug action will be restricted to the uterine lumen and endometrium. The main objective of this study was to see whether intrauterine infusion of oxytetracycline (OTC) is an appropriate method for the treatment of postpartum endometritis in dairy cows.

## Materials and Methods

Two-hundred eighty lactating Holstein cows with clinical signs of endometritis were randomly assigned to 1 of 3 treatment groups, and 186 cows were sampled for cytology experiment. In Group 1 (n=73) cows were treated with intrauterine infusion of a 10% OTC solution to provide 5 g of OTC. In Group 2 (n=44), posterior epidural anesthesia with lidocaine was used before intrauterine OTC treatment to eliminate straining. In Group 3 (n=49) 100 ml of normal saline was infused after intrauterine infusion of 10% OTC (containing 5 g of OTC) to reduce the concentration of OTC. Untreated cows in Group 4 (n=20) served as the control group. OTC residues in milk were measured by HPLC method; milk samples from 6 treated cows from each group were collected randomly at 12, 24, 48, 72, and 96 hours after treatment.

## Results

Clinical cure rates were 79.4%, 68.1%, 65.3%, and 50% in OTC, OTC+epidural, OTC+saline, and control groups,

respectively (P>0.05). The average antibiotic residues in the OTC+lidocaine group was 189.86±38.42 ppb (ng/ml) and was higher than the average in the other 2 groups (P<0.05). Maximum amounts of OTC residues were found 72 hours after treatment in the OTC group (276.67±84.89 ng/g), OTC+lidocaine group (452.4±157.14 ng/g), and the OTC+saline group (286.67±78.77 ng/g). To evaluate the reproductive performance, the researchers compared the 280 treated cows with 1088 cows that were clinically healthy without any signs of clinical endometritis. Conception rates to all services were 45.01% in treated groups and 42.98% in cows the clinical healthy group. This difference was not statistically significant (P<0.05). The first service interval following calving was significantly lower (P<0.05) in cows without clinical endometritis (68.01±19.35 days) than in treated groups (86.89±31.88 days).

## Significance

The longer first-calving interval, coupled with the presence of antibiotic residues in milk samples at different times after treatment, make the use of intrauterine OTC for the treatment of clinical endometritis less acceptable. Development of effective alternative therapies instead of antibiotics for the treatment of postpartum endometritis is essential and is suggested for further studies.