



Transfer of Passive Immunity

Assessing Transfer of Passive Immunity

Passive immunity in calves can be assessed by measuring antibody (IG) serum or serum total protein within the first 7 days of life. Standards were established in the 1980's and since have been updated based the USDA National Animal Health Monitoring System (NAHMS) Dairy 2014 Survey. Seventy percent of calves should have an excellent or good level of serum IgG or serum total protein.

Step 1: Collect a 2-cc blood sample from a week-old calf's jugular vein using a red-topped blood tube.

Step 2: Separate the blood into serum and solids by letting the vial sit at room temperature for three to four hours or centrifuge. The blood will separate into a liquid (serum) and solid (red blood cells) faction.

Step 3: After the sample separates, withdraw a portion of the serum from the vial with a pipette or needle and syringe. Place serum on the glass of the refractometer and lower the cover. Look into eyepiece for reading. Interpret the values as follows:



Excellent

- **IgG Serum:** >25.0 g/L
- **Serum Total protein:** >6.2 g/dL
- **Brix level:** >9.4%

>40% of calves

Good

- **IgG Serum:** 18.0-24.9 g/L
- **Serum Total protein:** >5.8-6.1 g/dL
- **Brix level:** 8.9-9.3%

~30% of calves

Fair

- **IgG Serum:** 10.7-17.9 g/L
- **Serum Total protein:** 5.1-5.7 g/dL
- **Brix level:** 8.1-8.8%

~20% of calves

Poor

- **IgG Serum:** <10.1g/L
- **Serum Total protein:** <5.1g/dL
- **Brix level:** <8.1%

<10% of calves

Source: J. Lombard, USDA 2020

Reasons for Failure of Passive Immunity

<p>Colostrum immunoglobulin absorption is impaired</p> <ul style="list-style-type: none"> • Colostrum feeding is not within 0 to 3 hours of birth • Excessive bacterial contamination • Colostrum supplement or replacement powder is added to colostrum • High level of calving assistance 	<p>Colostrum quality is inadequate</p> <ul style="list-style-type: none"> • High producing cows • Delayed milking • Calving cows are suckled before colostrum collection • Cow has leaked milk or been pre-milked before calving • Dry period less than 30 days
<p>Inadequate volume of colostrum is administered</p>	<p>Source: Adapted from S. M. McGuirk, DVM, PhD</p>

Originally developed by UW-Extension Oconto County Agriculture Agent Sarah Mills-Lloyd & Fond du Lac County Dairy & Livestock Agent Tina Kohlman for the Nestlé Dairy Farming Institute Curriculum and adapted for UW-Extension Dairy Team Heifer Blueprints.

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