

HEIFER NOTES

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Use RID to troubleshoot passive transfer problems

Indirect IgG measurements offer a simple testing option

Do you monitor failed transfer of passive immunity (FTPI)? You can evaluate it by measuring immunoglobulin G (IgG) concentrations – via direct or indirect methods.

According to Michael Nagorske, Saskatoon Colostrum Company Limited (SCCL), who spoke during the 2021 Dairy Calf and Heifer Association Annual Conference, the radial immunodiffusion assay (RID) is considered the “gold standard” for evaluating serum IgG measurement, since it is the only method that directly measures IgG. When using RID, successful transfer of passive immunity (TPI) is thought to be reached when serum IgG concentrations reach at least 10 mg/mL at 24 hours after birth.

Calves with serum IgG concentrations <10 mg/mL are classified as having FTPI. Despite being the gold standard test, RID is time consuming, not applicable on farm, requires laboratory procedures and gives results in approximately 24 hours. However, it is not a totally inaccessible test. “Use it to troubleshoot passive transfer problems and for benchmarking and understanding individual differences in passive transfer status among calves,” Nagorske urged.

STP measures serum IgG indirectly

Nagorske explained that practical and simple indirect measures are often used to estimate levels of serum IgG or FTPI. “The most common indirect method is serum total protein (STP) using refractometry,” he said. “Refractometers use the degree of refraction to estimate total proteins in solutions, which is valuable as immunoglobulins contribute to a proportion of protein in newborn serum. STP is highly correlated with serum IgG.”

Despite a wide range of STP thresholds being used to classify FTPI, Nagorske shared Buczinski’s STP threshold of <5.2 g/dL as the most accurate for classifying FTPI in calves fed maternal colostrum. However, this threshold may not accurately represent FTPI in colostrum replacer- (CR) fed calves. “The cutoff point to classify FTPI in calves fed CR is unclear.”

Nagorske discussed a study – “Hot topic: Accuracy of refractometry as an indirect method to measure failed transfer of passive immunity in dairy calves fed colostrum replacer and maternal colostrum” – conducted by Lopez et al. (2020). This study, which used pre- and post-colostrum STP, and serum IgG data from calves fed maternal colostrum or SCCL colostrum-derived CR, aimed to evaluate the ability of STP refractometry measurements to estimate serum IgG and FTPI in calves fed maternal colostrum and CR.

Based on the study’s results, Nagorske said that a lower STP cutoff point is warranted to predict FTPI in calves fed SCCL colostrum-

derived CR compared with calves fed maternal colostrum. “However, even with a lower threshold, the low sensitivity and specificity of this threshold further compromises the use of STP as an indicator of FTPI for CR-fed calves, in general,” he stated. “The low sensitivity will result in a greater proportion of false negatives, with those classified as FTPI actually having successful passive transfer of immunity.”

Health condition influences measurements

In addition to CR composition and manufacturing processes, other factors, such as dehydration, can affect refractometry readings. In dehydrated calves, blood components and protein contents become more concentrated and, as a result, their total STP increases and might appear satisfactory. “In consequence, calves could be mistakenly classified as having a successful TPI based on their elevated STP due to dehydration,” Nagorske warned. Also, sick calves (e.g., septicemia or diarrhea) experience systemic inflammatory processes that could elevate their IgG levels, causing elevated serum IgG concentrations. “Sick calves can also be wrongly classified as having a successful TPI because the serum refractance increased due to the higher presence of inflammatory markers.”

Nagorske shared a relatively new set of guidelines (<https://bit.ly/TPIstandards>), which was established to help dairy managers and consultants evaluate TPI. Follow the guidelines for maternal-colostrum-fed calves. On a herd level, the percentage of calves achieving each TPI category is outlined in the table. “If calves received CR, I recommend using the RID testing guidelines,” Nagorske noted.

For more details, read Nagorske’s conference proceedings paper in the DCHA Annual Conference Resource Guide, available on the DCHA website (www.calfandheifer.org), under the “Conference” tab. References available upon request.

Bovine groups develop guidelines to improve animal care outcomes

The Calf Care & Quality Assurance (CCQA) program published the first volume of its Animal Care Reference Manual. This manual assists farmers and ranchers who raise different breeds of male and female calves intended for dairy and/or beef production systems. One of the program’s goals is to encourage calf raisers to approach management decisions with thoughtfulness and an appreciation for the responsibility they have to their animals, consumers and the broader cattle industries in the United States.

“The Animal Care Reference Manual is a fantastic resource, which highlights best management practices and recognizes the good work that calf raisers implement across the country,” said Beverly Hampton Phifer, stakeholder relations manager for the FARM (Farmers Assuring Responsible Management) Program. “This inaugural CCQA resource was designed to help calf raisers continually improve animal care outcomes on the farm while providing assurances for the supply chain.”

In addition to the manual, the CCQA program offers resources specific to the needs of calf raisers, such as protocol templates and animal observation scoring reference guides. Online and in-person opportunities for individuals looking to be CCQA certified, as well as a facility self-assessment, will be available soon.

The CCQA program is jointly led by the National Dairy FARM program, managed by the National Milk Producers Federation and National Cattlemen’s Beef Association’s Beef Quality Assurance program, funded by The Beef Checkoff. The Dairy Calf and Heifer Association and Beef Checkoff-funded Veal Quality Assurance program also provided support.

To learn more about CCQA, go to: www.calfcareqa.org. View the Animal Care Reference Manual at: https://www.calfcareqa.org/Media/CalfCare/Docs/ccqa-manual_digital_final.pdf.

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Know your milk replacers' amino acid content

Calf nutrition is a balancing act. Simply feeding for crude protein (CP) content and supplementing synthetic amino acids that are known to be limiting will not do the trick. Efficient growth requires a specific sequence of amino acids in the correct amounts to optimize calf growth (see barrel image).

A milk replacer balanced for lysine, methionine and threonine (essential amino acids) has benefits for your calves and business:

- Improved feed efficiency and average daily gain (ADG)
- Reduced wasted nutrients, such as CP
- Lower feed costs

Newborn calves are the most efficient animals on a farm with respect to using protein, but they need the right building blocks. If a dairy is only providing a high protein diet and not ensuring that amino acids are balanced, much

of the protein may be wasted.

For example, feeding calves more milk is not always the best practice and can lead to overfeeding protein. Many dairy farmers understand the pitfalls of overfeeding protein to their cows and the production loss that can occur because energy must be diverted from milk production to excrete excess nitrogen. Excreting excess nitrogen can be more taxing on young calves because they do not have a fully developed rumen to help recycle it.

Based on studies done by the Nurture Research Center, calves fed a 20% CP milk replacer with added amino acids achieved the same weight gain as calves fed a 22% CP milk replacer without added amino acids. These studies demonstrated that supplemental amino acids increased ADG about 10%. Similar results were observed when calves fed a 24% CP powder with supplemental amino acids at 1.5 pounds of powder grew at similar rates to calves fed a 28% CP powder without supplemental amino acids. In this trial, supplemental amino acids increased ADG more than 15%.

While there are a lot of milk replacers on the market that don't balance for amino acids, some do. The next time you purchase milk replacer, ask questions that go beyond CP level.

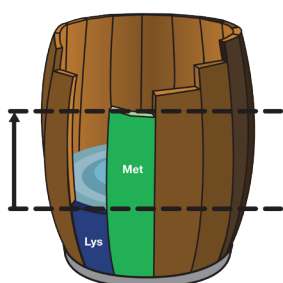


Figure 1a. The Liebig barrel analogy illustrates limiting essential amino acids result in "gaps" in the diet that limit growth.

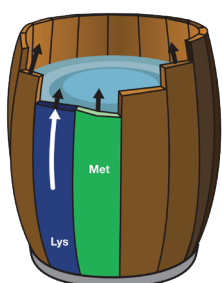


Figure 1b. Black arrows indicate other amino acids can be supplied in small amounts to further increase performance without additional crude protein.

Tana Dennis, Cargill, provided this article. The Dairy Calf and Heifer Association does not support one product or business over another.

Quickly stimulate at-risk calves to get them on their feet and eating

Using caffeine to stimulate the body is commonplace, with many of us feeling unable to start the day without the morning coffee hit. How did it come to be that caffeine can largely impact alertness and ability to function? The use of caffeine in premature neonatal human infants has been in practice for more than 40 years. Science has shown caffeine can be used to minimize the risk of death due to apnea, which causes infants to have a reduced heart rate and slower breathing, reducing oxygen flow to the body. Using caffeine in this manner has been proven safe and effective. In fact, it is one of the top five treatments given to newborns. There are multiple effects of caffeine at the biological level, including blocking of adenosine (neurotransmitter, which causes lethargy), supporting formation of healthy nerve fibers, reducing pulmonary inflammation, increasing the heart's pumping ability and consequently increasing blood pressure.

In agriculture, naturally occurring caffeine sources can be used in calves that are at risk, such as following dystocia, being hypothermic or being run down from a stressful event. These calves are often depressed, hypoxic (low blood oxygen) and facing challenges in the form of inflammation that can result from a long-labored birth. At this young age, inflammation can impair suckle response,

time to stand and colostrum uptake and thereby reduces the chance of calves reaching their full potential. There are many methods used to support these calves, such as heat lamps, bringing them into a house to warm up, putting them in warm baths and giving them a supplement that may not be designed or legal for calves. As well as reducing the risk of these challenges, caffeine use has shown beneficial effects on lung development and neural and brain development. Caffeine has saved calves; where otherwise, it is unlikely they would have survived.

Caffeine use has shown beneficial effects on lung development and neural and brain development.

TechMix developed Calf Perk®, which contains a naturally occurring source caffeine and other antioxidants, to support at-risk calves in these critical times. Calf Perk is an easy-to-use, immediate energy boost for newborn calves. Calf Perk's ingredients naturally stimulate respiration, body temperature and blood flow to support improved suckle response, colostrum uptake and reduce the risk of inflammation. It is administered orally and its unique, patent-pending formula ensures rapid absorption.

Mike Reid, TechMix, provided this article. The Dairy Calf and Heifer Association does not support one product or business over another.

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