Working to ensure accuracy in DHI milk ELISA sample results – Monitoring Lab Performance

As previously presented in the June issue, DHI milk samples have been analyzed for milk fat, protein, and SCC, but there is an even greater wealth of information in each of those milk sample vials. The analysis of DHI milk samples for health screening and reproductive status using ELISA (enzyme-linked immunosorbent assay) testing can provide dairymen and their consultant teams with valuable information on animal disease and/or reproductive status of their herds. Minimizing carry-over and cross contamination while ensuring proper sample handling and identification is a key focus area incorporated into the training of DHI personnel related to milk ELISA testing. Equally important to both the DHI system and dairymen is the assurance of the accurate and reliable test results on a routine basis.

Laboratory proficiency is monitored monthly

One of the mainstays of the QCS DHI laboratory certification program for milk components is the monthly analysis of “Samples Unknown,” a blind ring-test of multiple samples with varying levels of each component. Each laboratory is evaluated for accuracy and reproducibility with immediate follow-up when deviating outside approved tolerances. With the expansion of the milk ELISA testing, QCS has implemented a voluntary proficiency program to provide both the DHI system and dairymen a monitoring program for laboratory performance.

The ELISA test itself involves multiple steps, each having a source of variation. Yet the real question the dairy manager asks is how can I be sure the wells of the plate indicating Johne’s positive cows (Picture 1) are accurate and that this result will be translated into a usable report that identifies individual positive and negative cows (for Johne’s in this example.) That is where QCS plays a critical role in the assurance of accurate results from any DHI laboratory. The QCS ELISA Proficiency Program provides each laboratory with a panel of 25 samples on a monthly basis that represent negative, suspect, and positive cows. Laboratories are required to blindly submit results each month for evaluation and comparison across all participants. To ensure that laboratories with multiple technicians performing ELISA assays, technicians rotate in their submissions so that each laboratory technician is evaluated on a routine basis.

This review by QCS includes both a quantitative and qualitative performance evaluation with results reported back to both the participating laboratories and ELISA test kit suppliers. Picture 2 illustrates a partial certification report that provides useful information on many fronts. This program ensures that not only are the qualitative results accurate and repeatable, but also that the results received by the dairy are interpreted correctly as positive or negative.

When areas of non-compliance are identified, the laboratory works directly with test kit manufacturers to identify the source of the variation and implement corrective action in a timely fashion. In addition to the monthly QCS proficiency program, DHI laboratories participate in the National Veterinary Services Laboratory (NVSL) annual certification program.

John’s ELISA Plate Showing Several Positive Reactions

Complements the NVSL annual program by using the same set of unknowns during the annual test month to reduce direct laboratory expenses and provides data submission and programming capture. This cooperative effort adds value to both the quality certification of ELISA labs and the quality of the results ultimately received by the dairy.

The bottom line...

When compared to the multiple times a cow is tested during a lactation for milk components or SCC, milk ELISA testing is usually a single event. Therefore, the accuracy of the milk ELISA test result is paramount in providing reliable results back to the dairy’s consultant team. These data will help dairies make economically sound management decisions that not only offer a solid return on investment in testing, but can add to the dairy’s profitability. While DHI field and laboratory technicians do not provide treatment or management protocols to dairies, National DHIA and QCS, along with these professionals, are working to assure that each dairyman’s dollar is well-spent on ELISA testing as part of a dairy operation’s animal health program.
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In addition to the monthly QCS proficiency program, DHI laboratories participate in the National Veterinary Services Laboratory (NVSL) annual certification program. While the programs are separate, QCS complements the NVSL annual program by using the same set of unknowns during the annual test month to reduce direct laboratory expenses and provides data submission and programming capture. This cooperative effort adds value to both the quality certification of ELISA labs and the quality of the results ultimately received by the dairy.

Johnne’s ELISA Proficiency Report

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Johnne’s ELISA Plate Showing Several Positive Reactions

New ELISA tests will be evaluated

Current DHI milk ELISA training programs and proficiency programs are established for Johnne’s disease testing. With the widespread launch of milk ELISA testing using the PAG (pregnancy-associated glycoproteins), QCS has implemented a proficiency test for PAG ELISA. Developed with support from participating DHI laboratories and the test kit manufacturer, this program will provide quality certification at the laboratory level and an assurance of accurate milk ELISA pregnancy test results. Further, as other tests are developed and implemented in the marketplace, QCS is poised to provide dairy producers with evaluations of laboratory performance and reliability of these results.

The bottom line...

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