Bovine Leukosis

Bulk milk testing: Frequently Asked Questions

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What is Leukosis?

Leukosis, or enzootic bovine leukosis (EBL), is an important disease of dairy cattle caused by the bovine leukemia virus (BLV). Infected animals are usually asymptomatic, but about 5% of cows will develop clinical disease. Clinical signs are highly variable and will depend on affected organs. Fever, weight loss, shortness of breath, bloat and decreased milk production are often seen in infected animals. Some animals will not be able to rise due to presence of tumours in their spinal cord. At necropsy, animals will often have enlarged lymph nodes and tumors in the uterus, abomasum and heart. BLV is adapted to cattle and once an animal is infected, it will remain infected for life. Although cattle can become infected with BLV at any age, tumours are not typically seen in cows until they are over three years of age.

Despite the low frequency of clinical signs, BLV causes significant losses for the North American dairy cattle industry. Test-positive herds produce less milk per cow than test-negative herds in general. There is also building evidence BLV can alter proper functioning of the immune system, meaning infected animals will be more susceptible to other infections. Condemnation of carcasses at slaughter, as well as restrictions on international trade of infected cattle and their products, will also account for major economic losses associated with EBL. In Europe, most countries are now officially free from EBL, whereas EBL is still very common in Canada and the United States. In the Maritimes, nearly 90% of herds had at least one cow infected by BLV.

How does the BOVICHECK® BLV ELISA work?

Once infected, cows will develop antibodies against BLV that can be detected using enzyme-linked immunosorbent assays (ELISA). The Biovet BOVICHECK® BLV ELISA detects antibodies against BLV in milk. The test compares the concentration of antibodies in test milk samples with the concentration of the same antibodies in a positive control (samples known to have antibodies against BLV). Since there is no clearance of BLV-infection, once cows become infected with BLV and start producing antibodies, they are very likely to remain antibody test-positive over their remaining lifetime.

How will my results appear?

Based on the results of bulk tank milk testing, herds will be classified as “low-risk” or “high-risk.” You will also be provided with the Sample to Positive percentage (S/P), which is a comparison between the concentration of antibodies in your milk versus the concentration of antibodies in a milk sample that is known to contain antibodies against BLV. Herds with a S/P higher than 60% will be classified as “high-risk” herds. Herds with a S/P lower than 60% will be deemed as “low-risk” herds.

What do my results mean?

As the concentration of antibodies against BLV in bulk tank milk samples increases, so does the probability BLV-positive cows are present in the milking herd. The Biovet BOVICHECK® BLV ELISA is very accurate for detecting herds with and without BLV-infected cows. Based on data from studies in Quebec, 167 out of 170 herds with at least 7% of BLV-infected cows will test positive in the bulk milk testing. Conversely, it is expected the bulk milk of all herds with < 7% of infected cows will test negative.

The Biovet BOVICHECK® BLV ELISA fails to detect EBL in herds where only a few cows (< 7% of the milking herd) are BLV-positive. In addition, the test will not tell us the exact proportion of infected cows. Nevertheless, it is extremely unlikely, if not impossible, herds that test negative will have most of its milking herd infected by BLV. Based on data from the Maritimes, a typical BLV-infected herd will have nearly 40% of its milking herd infected with BLV on average, which would be sufficient to trigger a positive bulk milk test.

Bulk tank milk testing excludes young stock and dry cows, which might have been infected with BLV and do not contribute to the bulk tank sample. If infections are restricted to these age groups, bulk milk testing will fail to correctly classify that herd. As test results are best interpreted with farm specific history and information, and there are imperfections with respect to the testing, herds will be classified as either “low-risk” or “high-risk” herds.

What do I do now?

Remember…

Once your results are available, you should consult your herd veterinarian and review the test results in the context of your herd biosecurity protocols and disease control strategies.

Low-risk herds, particularly those with no clinical history of EBL should resume their normal activities. It is recommended these herds develop or continue to implement biosecurity protocols in order to keep EBL out of the herd. A recent Bovine Ontario Animal Health Network study found 30% of purchased dairy cows were positive for BLV. Testing of all incoming animals before they arrive on the farm, and not allowing test-positive animals to enter the herd, are very efficient methods to prevent BLV. High-risk herds should prevent further spread of EBL. EBL is a blood-borne disease, meaning the virus spreads primarily thru transfer of blood or other body fluids among animals. For instance, the virus can spread from animal to animal through blood-contaminated needles, syringes, gloves, ear taggers, dehorning irons, hoof knives etc. Additionally, the virus can spread by feeding milk from infected cows to susceptible calves.

The following is a list of best management practices (BMPs) that should be considered to limit the spread of BLV:

1- Do not purchase BLV positive cattle. Test all incoming animals before they arrive on the farm, and do not allow test-positive animals to enter the herd. Additionally, consider isolating incoming animals at arrival and re-testing them 45 days after arrival;
2- Use electric dehorner, caustic paste or disinfect gouge dehorners. Keep in mind, items such as gouges and saws cause bleeding and are very difficult to clean properly;
3- Do not reuse needles and syringes. They must be discarded after single use. If syringes must be reused, discard ones that are contaminated with blood;
4- Wash and disinfect any instruments contaminated with blood. Those include hoof knives, pill guns, drenchers, tattoo equipment, ear taggers, nose tongs and surgical instruments;
5- For pregnancy checks and A.I., change gloves between cows or check BLV negative cows first. Keep in mind, an infected bull in natural service could easily spread BLV in the herd;
6- Keep the maternity area clean after each calving. Alternatively, consider using a separate calving pen for each cow. Do not allow calves from positive dams to have contact with other animals until tested;
7- Pasteurize milk when feeding colostrum. Feed only colostrum from negative cows. Consider feeding frozen colostrum;
8- Implement an effective fly control program. The role of flies in the spread of BLV has been suggested in the literature, but it is not fully understood.

Eliminating EBL from a herd depends on producers' ability to prevent the virus from spreading from animal to animal. Further, it is much easier to eradicate the disease in herds where only a few animals are infected.

Where do I obtain more information about EBL?

Bovine leukosis virus – Dairy Farmers of Canada[2]
Bovine leukemia virus in your herd? Get rid of it – University of Calgary[3]

Producers and veterinarians can also contact[4] the Dairy at Guelph team to participate in ongoing studies, as well as to request more information on bulk tank milk testing.

Disclaimer

The content of this FAQ document was current at the time of its preparation (Feb. 2, 2022) and is believed to represent the best information about presence of bovine leukemia virus in dairy herds. Neither Dairy Farmers of Ontario, University of Guelph, nor any of their funding partners or content providers shall be held liable for any improper or incorrect use of information described and/or contained herein, and assumes no responsibility for any direct, indirect incidental, special, exemplary, or consequential damages that anyone incurs from the use of this information.

Take home messages

Leukosis or enzootic bovine leukosis (EBL) is caused by the bovine leukemia virus (BLV). Infected animals are usually asymptomatic, but about 5% of cows will develop clinical disease characterized by weight loss, enlarged lymph nodes and tumours in the uterus, abomasum and heart. The BOVICHECK® BLV ELISA detects antibodies against BLV in bulk tank milk. The test is very accurate at identifying herds with and without BLV-infected cows. It is extremely unlikely herds that test negative will have many infected cows; those herds should focus on adopting biosecurity protocols to keep BLV out of the herd. High-risk herds should work to prevent further spread of EBL. Eliminating EBL from a herd depends on producers' ability to successfully prevent the virus from spreading.

Weblinks

[1]OMAFRA's List of Frequently Asked Questions (http://www.omafra.gov.on.ca/english/food/inspection/ahw/aha-regs-faq.htm)
[2]Bovine leukosis virus – Dairy Farmers of Canada (https://www.dairyfarmers.ca/Media/Files/proaction/Bovine_Leukosis_Virus.pdf)
[3]Bovine leukemia virus in your herd? Get rid of it – University of Calgary (https://wcds.ualberta.ca/wp-content/uploads/sites/57/2019/05/p-185-196-van-der-Meer-WCDS-2019-Bovine-Leukemia-Virus.pdf)
[4]Dairy at Guelph (https://dairyatguelph.ca/contact/)

References

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Your test results will be strictly confidential and will be provided to you via DFO correspondence. DFO takes the privacy of producer information seriously. For this reason, only aggregate test results will be made public. That said, you should be aware that, under the Animal Health Act, EBL is "periodically notifiable" to the Office of the Chief Veterinarian for Ontario (OCVO). That means that the laboratory will share an annual report containing all bulk milk test results with OMAFRA veterinarians, who monitor the disease on a yearly basis for disease trends in the province. More information about this can be found here[1].