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Popular Article

Microbial Contamination of Semen and Its Prevention

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Introduction:

Over the past 50 years, the artificial insemination (AI) industry has grown to the point where it is utilized in practically every nation on the planet. Farmers' assurance that germplasm is not linked to infections, allowing AI to be used risk-free, is one of the key elements influencing its success. This has been made possible by a significant quantity of study that has identified the main danger pathogens using reliable scientific data. Naturally, this emphasizes the degree of accountability that all parties involved have, both on the production line and from a regulatory perspective, to guarantee efficient management of semen flow both within a region and between regions globally. The danger pathogens should be assessed from the perspective of how these agents interact with the semen recipients rather than separately. Every ejaculate contains microorganisms. The goal of getting sterile semen is almost impossible to accomplish. Therefore, while using AI, it's critical to effectively manage the number of microbes in the semen to avoid introducing diseases into herds, individual animals, regions, or nations where they weren't previously present.

Different Causes of Contamination:

Specific Microorganisms Can Transmit Through AI:

These microbes are present because of local infections in certain areas of the genital tract, while others enter the semen as a result of bacteremia or viral infections. In certain instances, microbes may also be linked to blood cells, urinary tract inflammation, or preputial damage. All 15 from the OIE's major diseases in the list are viral in nature, with some the exception of infectious bovine pleuropneumonia and this is brought on by Mycoplasma mycoides subsp. Mycoides.

Given that significant eradication efforts have been underway, brucellosis and tuberculosis are the two bacterial illnesses of cattle in List B that have been the subject of the most thorough investigation. Tritrichomonas foetus, a protozoan parasite, is also significant. Therefore, it is very advised and required in some regions of the world that bulls used for AI be free of these diseases.

Infections in mammals that can be spread by AI	
List A	**List B**
Foot and Mouth disease	Aujesky's disease
Vesicular stomatitis	Leptospirosis
Swine vesicular disease	Lepstospira
Rinderpest	Qfever
Peste Petits ruminants	Paratuberculosis
Contagious bovine pleuropneumonia	Anaplasmosis
Lumpy skin disease	Babesia sp.
Rift Valley fever	Bovine brucellosis
Blue tongue	Br. abortus
Sheep pox and goat pox	Bovine genital campylobacter
African horse sickness	Bovine tuberculosis
African swine fever	Enzootic bovine leukosis
Classical swine fever	IBR–IPV

Non-specific Agents:

Non-specific agent contamination can also happen during the processing and storage of semen, not just from the ambient but also from compounds added to the semen diluents, particularly those originating from animals. Additional sources of contamination include tools and supplies that come into direct or indirect touch with sperm. Liquid nitrogen can be an unexpected source of contamination and is an efficient cryopreservative of pathogens. This highlights the necessity of using sealed, well-protected containers to store semen straws.

Prophylactic Measures:

Simple hygienic practices, such as using clean and appropriate bedding, separating entrances before and after semen collection when entering and leaving the AV washing room, using clean procedures for semen collection, and getting rid of dust and feces, can greatly lower the level of bacterial contamination (Lechat and Guerin, 1991). After the collected semen is sent to the processing laboratory, additional measures should be taken to avoid contamination. An extender that contains egg yolk is one of several possible sources of contamination. After the pack is opened, the semen straws must be kept clean. The sum of all the steps taken by an organization to stop the spread of disease pathogens in a particular region is known as animal biosecurity (Mishra et al.,2012).

The following guidelines form the foundation of a livestock farm's biosecurity:

- Stop the introduction of disease in the farm.
- Stop the spread of disease across the farm.
- Enhancing the immunity of animals.

Maintaining a disease-free herd depends heavily on routinely evaluating the animals for illnesses. As required, screening should be done for infectious conditions such TB, Johne's disease, Brucellois, trichomoniasis, and campylobacteriosis. In order to create an adequate immunity against infections, animals need to be vaccinated against infectious diseases such Foot and Mouth Disease (FMD), Haemorrhagic Septicaemia (HS), Black Quarter

(BQ), and Theileriosis in accordance with the farm's prescribed regimen.

Conclusion:

Farm managers continue to bear the primary duty for protecting herds. By implementing a sound bio-security plan, every attempt should be taken to stop an introduction of an infection from the outside and its spread among the resident animals. Despite adding to the farm's expenses, bio-security measures yield enormous rewards in the form of disease-free as well as healthier animals and the products they produce.

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