

NOTES ON SEMEN CONTAMINATION

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INTRODUCTION

Quality of the ejaculate and the semen portion are fundamental for successful artificial insemination. Semen is qualified as good when there is no contamination, that is, no presence of bacteria (plus meeting the standards of motility and morphology).

When the seminal dose is contaminated semen viability decreases and within a short period of time sperm death occurs. As a result, the risk of pathologies in the female reproductive tract increases, resulting in impairment of fertility. Therefore, hygiene is, or should be, crucial for AI Centers during the semen production process, from collection of the ejaculate to production of the seminal dose.

SOURCES OF BACTERIAL CONTAMINATION

1. Boars. Most of the pollutants identified during semen collection have their origin here, through feces or prepuceal fluid. The boar's skin and hair, the dummy and any other surface that comes in contact with the boar is considered as a source of contamination.

2. Environment. Contaminants include environmental organic matter such as food, bed, air/ventilation system and water.

3. Humans. They are often guilty of spreading an animal or environmental host organism during routine collection and semen production process (cross contamination).

- Any organism that enters the laboratory from the boar area (semen, containers, people, etc.) must be considered as a potential contaminant and therefore properly treated.

Photo 1: Traces of dirt on the bottom of a collection dummy



- Material entering the laboratory from the boar area should be identified as dangerous. Fresh semen is a „healthy“ risk where we must take extra precautions. Always bear in mind that it is not possible to identify with the eyes if the semen is contaminated or not.

- Once a bacteria strain becomes resistant to antibiotics and contaminates certain lab areas, the process for identifying, locating and eliminating can be long.

RISK FACTORS THAT CONTAMINATE SEMEN DURING COLLECTION

1. Poor hygiene (boar and facilities)
2. An environment with high temperature and humidity on the floor
3. Wrong semen collection technique



Photo 2.
Manual and automatic semen collection

- Bacteria are "normal" components of the boar ejaculate. Generally, bacteria that is introduced during natural mating have little effect on fertility. However, bacteria can adversely affect the fertility of stored semen.

- There are few methods that can be considered effective when there is bacterial contamination either in raw or diluted semen. A widespread strategy is to add additional antibiotics to the extender. However, the boar studs that use this method can create resistances.

■ PRACTICAL METHODS TO CONTROL BACTERIAL CONTAMINATION

1. Emptying the preputial sac will reduce semen contamination by the presence of preputial fluids at the time of semen collection.
2. Cleaning the prepuce with a mixture of antibiotic + disinfectant. This practice is difficult to support, except in extraordinary circumstances and when it is in the opinion of the veterinarian since re-colonization is inevitable.

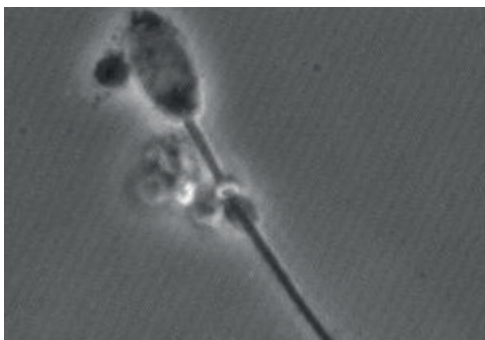


Photo 3.
Agglutination caused by semen contamination (100x objective immersion image of Sperm Vision®)

■ INDICATORS OF BACTERIAL SEMEN CONTAMINATION

1. Sperm agglutination
2. Poor or no motility
3. Damaged acrosomes

The mechanism by which bacteria damage semen cells is generally based in spermicidal effects. Bacteria attach to the surface of sperm and promote the adhesion of sperm to each other through the damaged membrane.

3. The addition of antibiotics to the extender is a popular practice. This should be considered as a short-term measure, and should be done only under the supervision and direction of the veterinarian, together with results of the microbiology test. Once the source of contamination has been identified and treated, the antibiotic must be eliminated.

4. By using extender containing third-generation antibiotics (Amino glycosides and cephalosporin), which show excellent tolerance to sperm cells. Its spectrum of

activity is greater and more potent against gram positive and negative bacteria, including *E. Coli*, *Klebsiella*, *Proteus*, *Serratia*, *Leptospira*, *Pseudomonas*, *Mycoplasma*, and against most species of salmonella and enterobacteria.

5. Monthly or quarterly bacteriological tests in fresh and diluted semen, dyes and other materials or equipment in direct or indirect contact with semen. Samples can be grown and examined in a special or own laboratory using culture control kits such as culture slides. Different areas at the laboratory, tables, heated plates etc. should also be inspected.

6. Performing daily quality control of motility samples of each semen batch ensures that the stud would be the first to know if there is a problem.

■ CONCLUSIONS

1. It is necessary to minimize contamination during collection and processing of semen, by putting the so called Techniques to Minimize Contamination (TMC) into practice.

2. The double glove method during semen collection can be a very effective, but also ineffective tool. The aim is to use a clean hand during the actual process of collection. If the second glove is contaminated during boar stimulation before collection or just for additional stimulation, then the technique is not effective. Some workers find it useful to use 3 gloves, or have some additional clean gloves in their pockets.

3. The elimination of the pre sperm fraction (the first secretions of the ejaculate that are light in color) helps to prevent the fraction with the highest bacteria concentration to contaminate the rest of the ejaculate.

4. Do not use antibiotics as a routine and use a good extender to ensure bacterial control.

5. Carry out regular quality checks. Analyze seminal doses for routine culture and subject to observe a decrease in the ability of conservation of semen doses.

6. Guidelines to follow should be to make monthly checks of 1% of all the collections (individual ejaculates or semen pool) or four samples per week.

7. The bacteria isolated in the semen develops resistance to antibiotics and so it promotes contamination with other pathogens. Furthermore, in future it is possible that the continued use of antibiotics is prohibited.

8. It is a good tool to have audits in the stud by outsiders to solve not only problems but even more importantly, help to identify critical points to prevent problems from arising.

Photo 4. Culture slides for a quick assessment of liquid and surface contamination

