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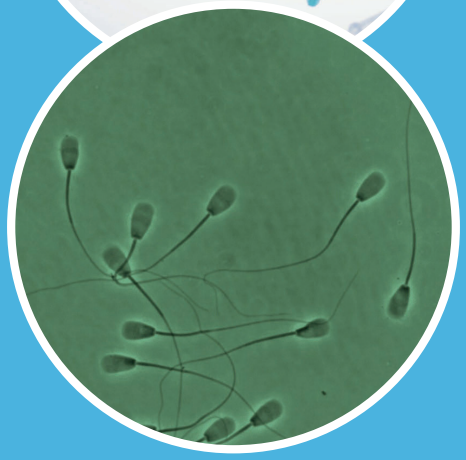
SUSTAINABLE
USE OF ANTIBIOTICS
In Boar Semen Production



Transparency

We let our customers fully understand the antibiotic components in our semen extenders

Selective use

We use scientifically selected antibiotics from GMP approved sources, excluding WHO-classified HPCIAs

Appropriate use

We provide SOPs for hygienic boar semen production and precise antibiotic application

Innovative concepts

We develop and pioneer sustainable alternatives to traditional antibiotics

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Sustainable use of antibiotics in boar semen production

Introduction

In modern animal production, responsible antibiotic use is crucial to meet societal expectations, combat development of resistance, and ensure sustainability. Minitube leads the way in promoting responsible antibiotic use in assisted reproduction technologies. Our sustainable initiatives focus on product transparency, selection and appropriate use of antibiotics as well as innovation. The intent of this white paper is to outline our commitment to this important initiative.

Our Ethos

We prioritize responsible antibiotic use in boar semen extenders, guided by:

- ✓ **Transparency:** Our transparency ensures that our customers have a complete understanding of the antibiotic components in our semen extender products.
- ✓ **Selective Antibiotic Use:** We source our ingredients only from GMP approved manufacturers. We use scientifically based evidence to select the appropriate antibiotic(s), and purposely exclude WHO-classified Highest Priority Critically Important Antimicrobials (HPCIA) from our products.
- ✓ **Appropriate Use:** We offer a comprehensive array of Standard Operating Procedures (SOPs) for hygienic boar semen production and precise antibiotic use, featuring novel ways to apply antibiotics at the efficient in vitro concentration.
- ✓ **Innovative Concepts:** We invest in development of alternatives to antibiotic reliance and pioneer sustainable alternatives to traditional antibiotics.

Transparency

Our commitment to transparency supports our customers' sustainability management, regulatory compliance and personnel safety goals. We provide Certificates of Analysis (CofAs) and Material Safety Data Sheets (MSDS) for each product and batch we produce and market, which always state the antibiotics used and their precise concentration. Our GMP-certified facility is open for scheduled customer visits.

Selective Antibiotic Use

We only use antibiotic compounds that have been scientifically proven to work effectively and safe in animal semen extenders. We then source our antibiotics from carefully selected suppliers complying with European (Ph. Eur.), British (BP) or US (USP) Pharmacopoeia. Lastly, we purposely exclude any HPCIA antibiotics (e.g., quinolones, colistin, polymyxins, cephalosporins, antibiotics for human-use only) to aid in the global effort of preventing resistances against essential human and veterinary antibiotics. With this, Minitube contributes to the WHO's One Health approach.

Standard Operating Procedures (SOPs)

Hygienic conditions during semen collection and processing minimize antibiotic use and resistance. Our equipment is designed for thorough cleaning, and our SOPs ensure prudent antibiotic use. Our concept of **A**ccurate **D**osage of **A**ntibiotics (**ADA)** optimizes antibiotic dosing and enhances efficacy while reducing resistance potential. Laboratory automation and software modules help to achieve precise dosing, ensuring standardized semen dose quality and avoiding human error.

Innovative Concepts

We pioneer sustainable alternatives to traditional antibiotics:

- **Hypothermic Storage:** Storing semen at 5°C inhibits bacterial growth without antibiotics. Over the last decade, we developed Androstar® Premium, a semen extender that supports hypothermic long-term storage, and the necessary procedures to preserve boar semen at 5°C while maintaining fertility and fecundity in the field.
- **Organic Bactericidal Substance (OBS):** OBS in semen extenders controls bacterial contamination naturally. OBS effectively inhibits bacterial growth at 17°C, reducing the required concentration of antibiotics or even eliminating the need for antibiotics for certain contaminants.

Conclusion

Our commitment to sensible and sustainable antibiotic use in assisted reproductive technologies remains an underlying principle of Minitube's culture as we strive to support global health and food security. This commitment is demonstrated through our prioritization in transparency, prudent antibiotic selection, comprehensive SOPs, and ongoing development of alternatives to antibiotic reliance. We invite our customers to join us in this mission for the highest safety and efficacy standards.

For more information or to obtain our CofAs, MSDS sheets, and SOPs, please contact our customer service team.

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