



Minitube UV-Protect Boar Semen Tubes

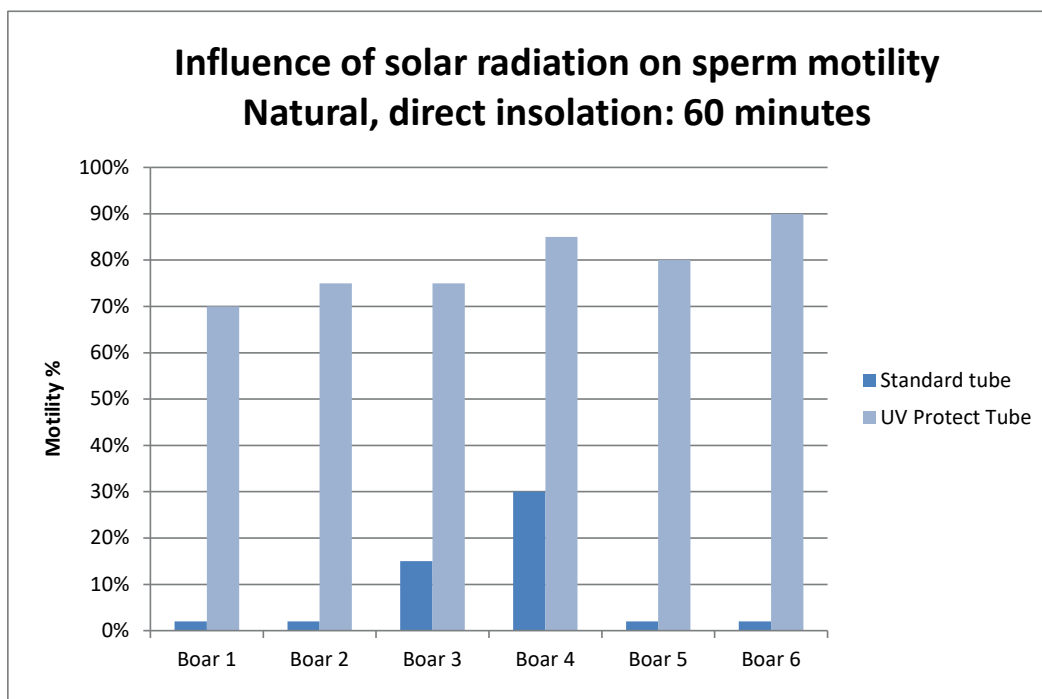
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Biosecurity and a fail-safe, reliable quality of semen doses are preconditions for a successful reproductive management in swine. The Minitube UV-Protect Boar Semen Tube supports both.

Why protect boar semen against UV radiation?

Protection against direct sun light:

Natural ultraviolet (UV) radiation has a highly negative impact on the motility and quality of boar sperm. As shown in Graph 1, an exposure of semen tubes to direct sunlight for 60 minutes, i.e. during improper transport or storage, causes severe damage to the sperm cells.



Graph 1

The UV-Protect Tube developed by Minitüb in cooperation with GFS (Genossenschaft zur Förderung der Schweinehaltung eG, Germany) contains special components in its wall, which do not let UV-C radiation pass through.

Optimized biosecurity in the sow barn:

The sow barn is a highly sensitive area with regards to contamination by bacteria and viruses. Therefore it is of outmost importance to protect the barn from possible entry of elements affecting the health status of the animals. The UV-Protect Tube offers an additional protective barrier for the sow population. The surface of this tube can be sterilized via UV-C radiation which offers now possibilities to enhance biosecurity and to avoid bacterial or viral contamination.

UV-C radiation is a safe and non-toxic alternative to disinfection with chemical agents. Another advantage of UV-C sterilization is that the disinfection is finished within few minutes. There is no risk of formation of resistances like with antibiotics.

While UV-C radiation exerts a detrimental effect on bacteria and viruses on the tube surface, the specially developed UV-Protect Semen Tube protects the sperm cells within the semen tube from the radiation. All tubes can easily be sanitized.

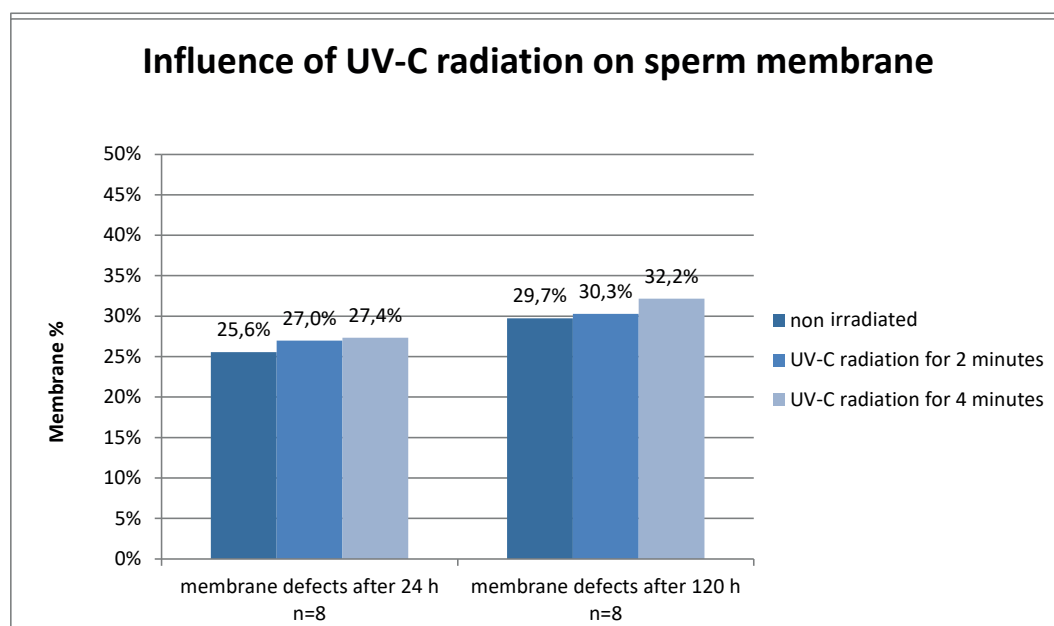
In order to guarantee that sterilization and UV-protect substances in the tube material have no effect on sperm quality, Minitube initiated several tests in collaboration with the University of Veterinary Medicine, Hannover.

The ejaculates of several boars were evaluated (n=8 and n=5). The following parameters were analyzed:

- Progressive motility after storage at +17°C for 24 hours
- Membrane defects after storage at +17°C for 24 hours and 120 hours and
- Acrosome defects after storage at +17°C for 24 hours

In addition a sperm chromatin structure assay was performed.

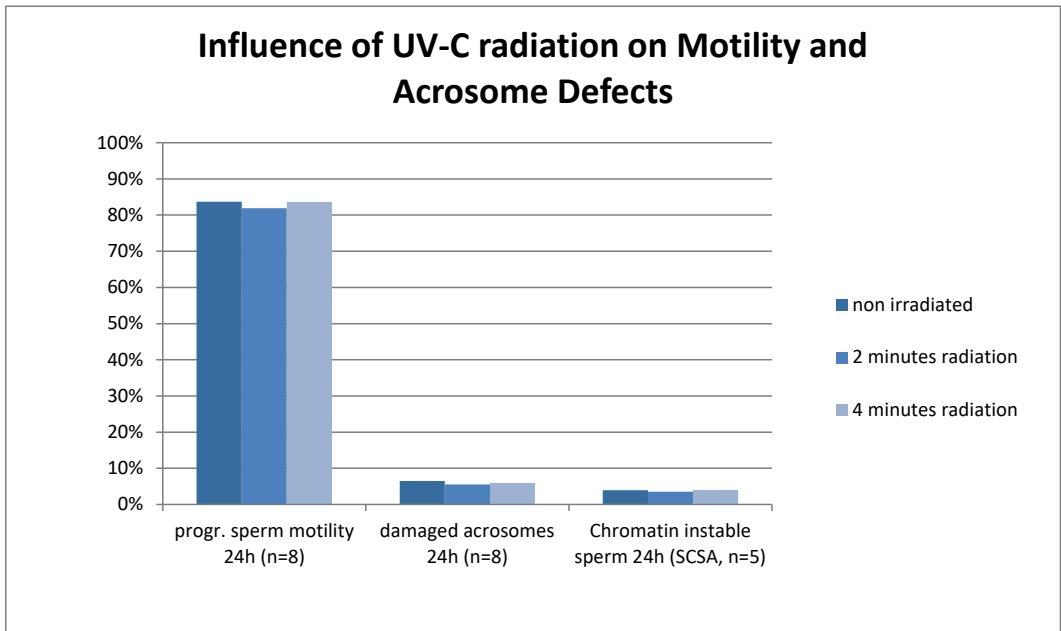
All semen samples were incubated in the Minitube UV-Protect Tube.



Graph 2: Membrane defects measured 24 hours and 120 hours after sterilization

An intact sperm membrane is an important precondition for the fertilization ability of the sperm cells. Eight ejaculates of eight different boars were evaluated. Each ejaculate was split in three aliquots. One part was not irradiated and tested as a control sample. The other part was exposed to UV-C radiation in a UV tunnel for 2 minutes and the third part was exposed to the UV-C radiation for 4 minutes.

Neither of the aliquots showed a significant increase in membrane defects measured 24 hours and 120 hours after exposure.



Graph 3: Progressive motility and acrosome defects measured 24 hours after exposure to UV-C radiation

The acrosome is a cap-like structure on the anterior half of the sperm's head. It enables the sperm cell to penetrate through the zona pellucida of the female oocyte. The membrane surrounding the acrosome fuses with the plasma membrane of the oocyte, exposing the contents of the acrosome and allowing fertilization to occur.

As can be seen in Graph 3 eight ejaculates of eight different boars were evaluated. Each ejaculate was split in three aliquots. One part was not irradiated and tested as a control sample. The other part was exposed to UV-C radiation in a UV tunnel for 2 minutes and the third part was exposed to the UV-C radiation for 4 minutes.

This figure shows that the acrosome defects measured after 24 hours of storage at +17°C stay at the same low level for all three aliquots.

The sperm chromatin structure assay (SCSA) is the Gold-Standard for sperm DNA fragmentation screening giving a highly accurate measurement of DNA intactness.

For this test five ejaculates of five different boars were evaluated. Each ejaculate was split in three aliquots. One part was not irradiated and tested as a control sample. The other part was exposed to UV-C radiation in a UV tunnel for 2 minutes and the third part was exposed to the UV-C radiation for 4 minutes.

The result of the SCSA-test showed a low and similar level of DNA fragmentation for all three groups tested.

Conclusion:

The Minitube UV-Protect Boar Semen Tube protects against natural and artificial UV-C radiation. It is an optimal protection against accidental solar radiation during transport, storage and AI. The possibility of UV-C sterilization offers enhanced biosecurity in the sow barn. The tests show that the semen quality is not influenced negatively neither from the tube material itself, nor from the exposure to UV-C radiation due to sterilization or natural sun light when stored in a UV-Protect Tube.