



Androstar®

superior protection



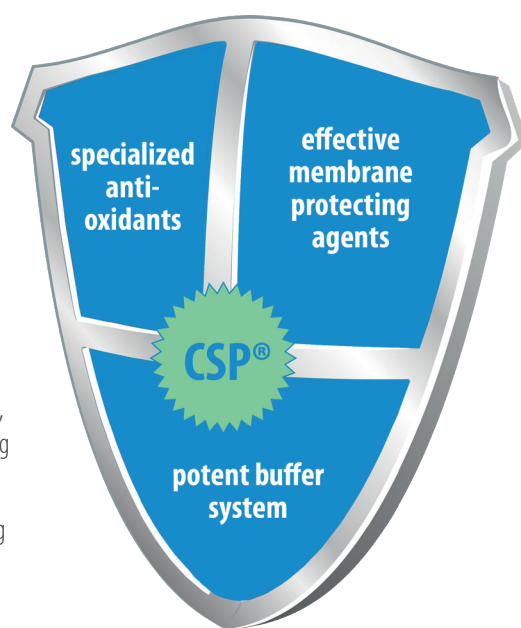


Robustness T³: Temperature, Transport, Time

Androstar® Premium and Androstar® Plus extenders for boar semen feature an innovative combination of highly **effective membrane protecting agents** and **specialized antioxidants**.

Cell Shield Protection (CSP®) is a proprietary component of Androstar® extenders which provides unparalleled protection for sperm when exposed to temperature fluctuations, physical stress and long-term storage. CSP® actively stabilizes sperm membranes maintaining their functional elements and protects against premature sperm capacitation.

Androstar® extenders reduce adverse effects from unpredictable environmental and handling conditions. Androstar® Premium provides outstanding preservation and protection. High stress resistance of the semen leads to **more homogeneous results**.



Powerful temperature buffer

External influences on the sensitive sperm cells are effectively buffered over a wide temperature range from +5° to +25°C



High physical stress resistance

The functionality of the spermatid cell membranes is protected against the influences of suboptimal transport and storage conditions



Long-term preservation

Unique proprietary membrane and viability stabilizing components help sperm to maintain their viability over a longer duration

T³



minitube



TEMPERATURE

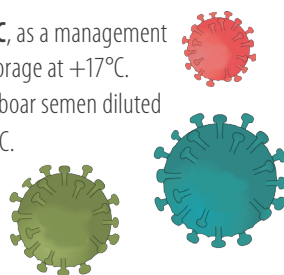


Weapon against cold shock:

Boar semen is very sensitive to storage temperatures below 15 °C. Androstar® extenders offer **exceptional protection** against temperature-caused cell death or damage. Boar studs gain **freedom of operation** because of a greater latitude in acceptable semen temperature ranges and processing schemes.

Weapon against resistant bacteria:

Androstar® Premium allows semen preservation at **+5°C**, as a management tool in case resistant bacteria contamination prevents storage at +17°C. Scientific studies prove **excellent fertility rates** with boar semen diluted in Androstar® Premium and stored for three days at +5°C.





Androstar® Premium:
temperature range from +5° to +25°C
without loss of semen fertility



Field fertility study with chilled semen

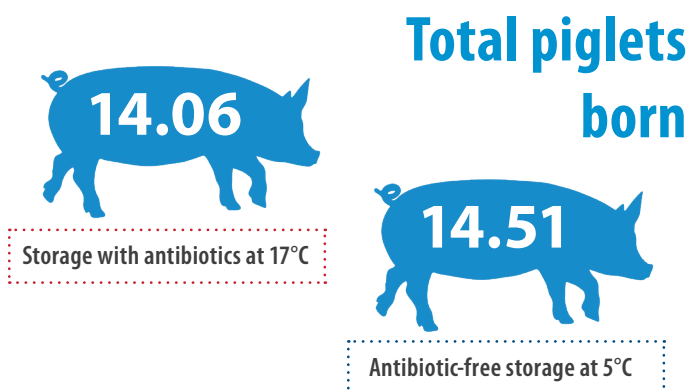
Description: Fertility data obtained from 829 sows inseminated with pooled semen of 23 boars (3 boars per pool). Semen was extended in AndroStar® Premium, split in 2 groups and either stored at **17°C** with antibiotics (0.25 g/L gentamicin sulphate) or stored at **5°C** antibiotic-free. Data for total and live born piglets are presented as mean and SEM.

	 Storage temperature 17°C	 Storage temperature 5°C
Sows (n)	406	411
Non-return rate (%)	94.1	94.6
Farrowing rate (%)	93.1	92.0
Total piglets born	14.06 ± 0.17	14.51 ± 0.15
Live piglets born	13.20 ± 0.17	13.70 ± 0.15

Results: The study reveals that boar spermatozoa stored hypothermically at +5°C and diluted in Androstar® Premium preserve not only the **sperm quality** but ultimately **in vivo fertility** as well.

Boar sperm stored in Androstar® Premium and submitted to chilling temperatures – intended or not – maintain **high motility, membrane integrity** and a **low DNA-fragmentation index** throughout the whole storage period of 24 to 72 hours and their values do not differ from controls stored at +17°C.

Likewise, the **responsiveness to capacitating stimuli** and the results of the **oviduct binding assay** do not differ from controls.



Waberski D., et al. (2019): Sperm function in vitro and fertility after antibiotic-free, hypothermic storage of liquid preserved boar semen; Scientific Reports, Volume 9.



TEMPERATURE

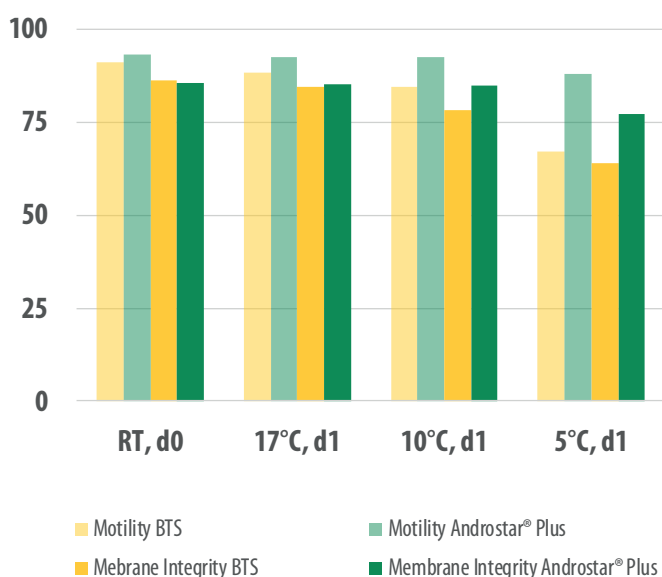


Androstar® Plus: support of semen quality at different temperature schemes

Study of responsiveness to capacitating stimuli

Description: Dilution of seven ejaculates of different boars with **BTS** and **Androstar® Plus**. Cooling of samples to 17°C, 10°C or 5°C (cooling rate approx. 0.1°C/min). Evaluation of samples on d0 (room temperature, 22°C) and d1 (17°C, 10°C, 5°C) for motility, membrane integrity and responsiveness to capacitating stimuli. The specific response to **capacitating stimuli** is a sensitive indicator of chilling injury in hypothermally stored boar sperm - normally it decreases in relation to storage temperature.

Results: The study confirms Androstar® Plus' protective effects on sperm function and ability to reduce chilling-induced changes in sperm reactivity. Sperm diluted in Androstar® Plus and stored at 5°C show reactivity to capacitating stimuli almost twice as high as BTS-diluted samples. Androstar® Plus maintains high motility and membrane integrity in boar sperm stored below 15°C. At 5 ° storage, the differences / advantages compared to a standard extender are most evident.



Specific reactivity to capacitating stimuli (5°C)

Schmid S., et al. (2011): Changes in responsiveness to capacitating stimuli in chilled boar spermatozoa in vitro; Reproduction in Domestic Animals, Suppl 2, 96-97.

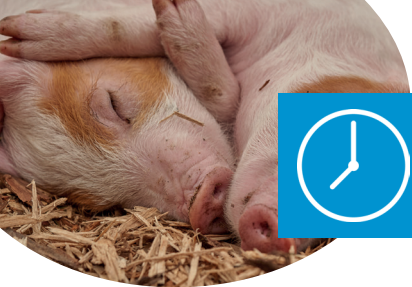


**Consistent quality
results even with low
temperature storage**



“ For almost 10 years we are now using the Androstar Plus extender of Minitube in order to **optimally protect** our high quality insemination doses from uncertain temperature conditions. ”

Heikki Hassinen, Finnpig Oy, Finland



TIME



Long-term preservation of boar semen:

With their highly effective membrane protectors and advanced antioxidants, Androstar® extenders maintain optimal storage conditions over a **minimum of 7 days** after semen production. Their high protection performance makes them the perfect choice for semen that needs to be transported over long distances. Also biosecurity time requirements can be met without problems.

Compensation of detrimental effect of seminal plasma (SP):

The long-term exposure to autologous SP causes a dramatic loss in sperm motility in some boars. Studies prove that even in boars with high sensitivity of sperm to autologous SP, the protective Androstar® extenders counteract this detrimental effect on sperm during long-term storage.

Luther A.-M., et al. (2019): Protective extender medium may enhance seminal plasma tolerance in long-term stored spermatozoa of sensitive boars; Reproduction in Domestic Animals, Volume 54, Issue S3.

Androstar® Plus: optimal insemination results after short and long-term storage



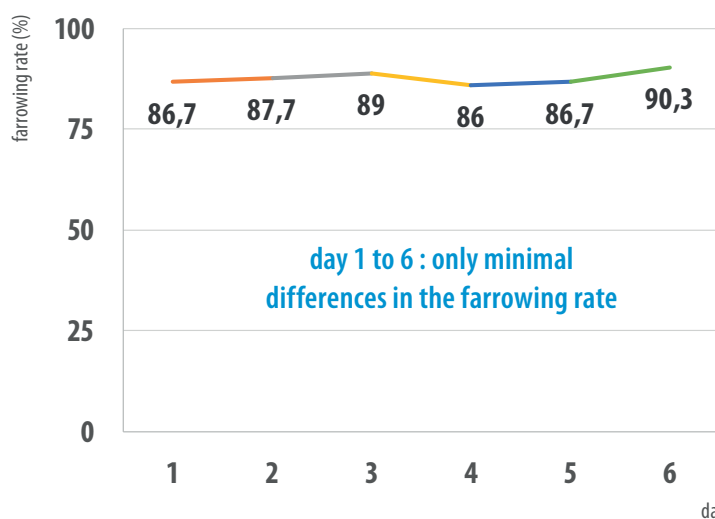
Comprehensive field study in the US

Description: Retrospective field study on the influence of semen age (day 1 = 24 hours age of semen) on fertility with three commercial sow farms in the US using Androstar® Plus on a total of 12,000 sows. 300 sows per age of semen were randomly selected.



Results: Androstar® Plus supports semen fertility and reproductive performance over a **minimum of 6 days** from semen production. In these commercial farms excellent reproductive performance of sows is achieved with Androstar® Plus, independent of semen age.

Mean semen age (d)	Total born piglets (n)	Farrowing rate (%)
1.0	14.36	86.7
2.0	14.11	87.7
3.0	13.91	89.0
4.0	14.16	86.0
5.0	14.8	86.7
6.0	14.27	90.3



“Androstar® Premium with its **wide temperature protection** allows us to confidently ship semen in any weather Minnesota has and not sacrifice any production or semen quality at the sow farm.”

Andy Kamm, Boar Stud Manager,
Wakefield Pork, Minnesota, United States



Confidential customer data



TIME



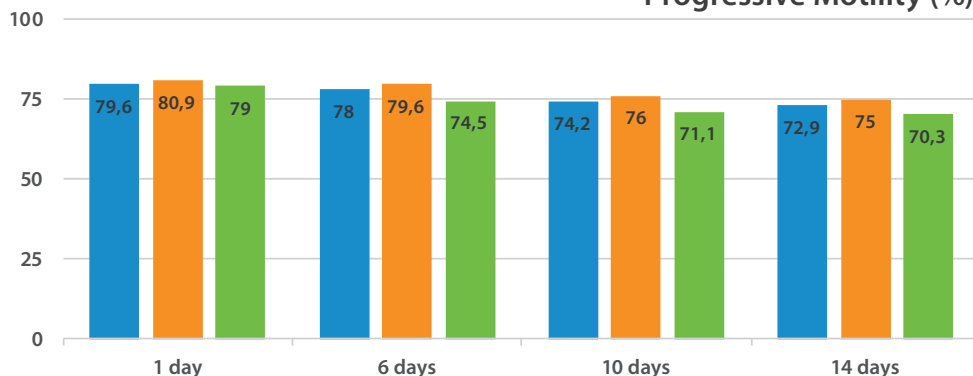
Androstar® Premium & Androstar® Plus: maintain high semen quality for up to 14 days

Laboratory trial long-term storage

Description: In a test series at the University of Veterinary Medicine Hannover, Foundation (TiHo) semen from 7 boars was diluted and stored with Androstar® Plus (17°), Androstar® Premium (17°) and Androstar® Premium (5°, without antibiotics). This test was conducted during summer months. After 24, 144, 240 and 336 hours, motility and membrane integrity were examined.

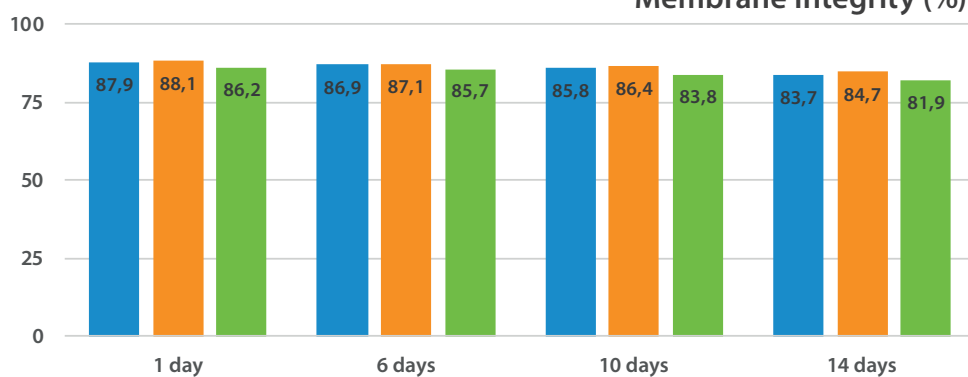
Results: Motility and membrane integrity decrease only slightly over the course of storage. This proves that Androstar® extenders protect the functionality of sperm cells very well over a period of up to 14 days and maintain a high level of boar semen quality even after long-term storage.

Progressive Motility (%)



Membrane Integrity (%)

- Androstar® Plus (17°)
- Androstar® Premium (17°)
- Androstar® Premium (5°)



University of Veterinary Medicine Hannover, Foundation (TiHo) (2019): Laboratory trial.



**Consistent quality
results even after 14
days storage**



“By switching to Androstar® Plus, we gave our customers the option to inseminate even days after the semen tube delivery. They gratefully accepted the logistic benefits – and at the same time achieved **greater fertility** in their sow herd!”

Josef Limmer, Laboratory Head Eberstation Kammerlehen,
Bayern-Genetik GmbH, Germany



TRANSPORT



Compensate for the negative impact of transport stress:

With their potent buffer system, Androstar® extenders counteract vibration emission-induced injury of long-term stored boar sperm. Extender components are especially selected for their ability to protect the functionality of sperm under conditions of transport.



Androstar® Premium & Androstar® Plus: protected sperm cells under uncertain transport conditions



Quality of sperm subjected to vibration

Description: Semen from a total of 18 ejaculates was isothermically diluted to a volume of 80 ml containing 23.5×10^6 sperm/ml. Extenders used were BTS, Androstar® Plus and Androstar® Premium (6 boars per experiment). Split samples were filled into 95 ml QuickTip Flexitubes® and exposed to a rotation speed of 150 rpm circular horizontal frequencies with an amplitude of 1 cm for 120 min at 21°C in the dark. Control samples remained unshaken. Semen doses were then stored for 144 h at 17°C.

Results: Androstar® Plus and Androstar® Premium counteract vibration induced injury in long-term stored boar spermatozoa. The values for both, progressive motility and acrosome integrity, are higher with Androstar® Plus and Androstar® Premium than with a standard extender.



Parameter	BTS diluted samples		Androstar® Plus diluted samples		Androstar® Premium diluted samples	
	control w/o air	shaken with air	control w/o air	shaken with air	control w/o air	shaken with air
ph	7.41	7.50	<7.10	<7.10	<7.30	<7.30
progressive motility	77.3	71.3	85.2	81.4	84.9	83.9
acrosome integrity	90.2	87.1	94.8	93.2	93.3	91.6

Le Thi X., at al. (2019): Potent semen extenders counteract vibration-induced injury in long-term stored boar spermatozoa; Theriogenology, Volume 137, 130.



Consistent quality
results despite of
vibration stress



Why choose Minitube Androstar® extenders?

Performance

Even under temperature, transport and time stress, Androstar® extenders provide unmatched robustness to sperm cells, maintaining high **levels of viability** and **fertility** of the semen.

Security

GMP (Good Manufacturing Practice)-certified quality control standards combined with strict quality assurance measures and complete documentation at each stage in production give you sense of security.



Outstanding preservation properties

More ejaculates reach end of storage time with optimal semen quality

Increased sperm viability of the ejaculate

More piglets per boar, greater reproductive efficiency

Safe and reliable products

Production and strict quality control under GMP certified standards

