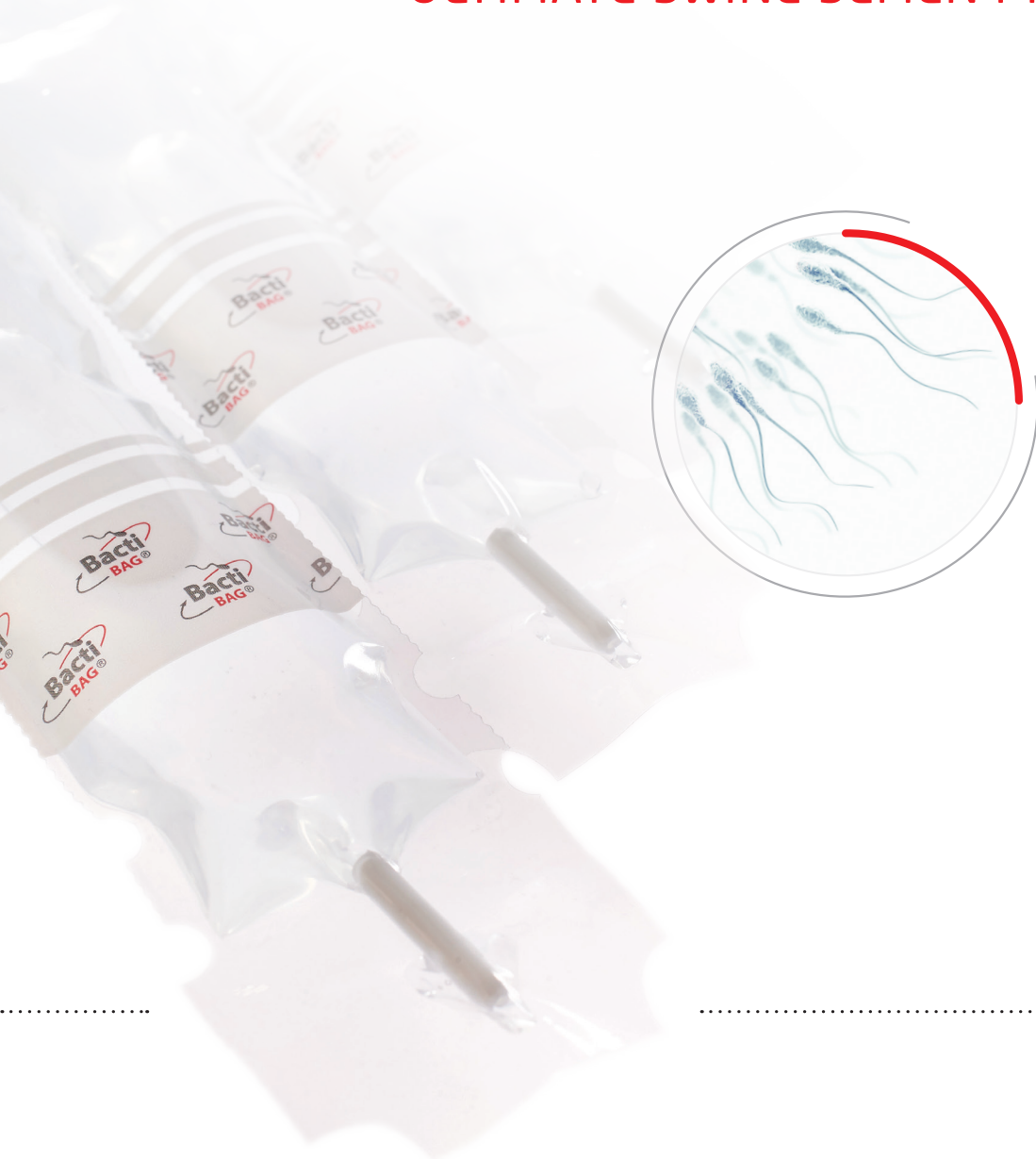




NEXT-GENERATION PACKAGING FOR  
ULTIMATE SWINE SEMEN PROTECTION





INTRODUCING...

...THE MOST-ADVANCED PACKAGING SOLUTION  
ON THE MARKET TODAY



IMV Technologies has been a pioneer and a trusted market leader in reproductive technologies for the past 50 years.

Bacterial contamination remains one of the biggest challenges facing most artificial insemination (AI) centers and breeders. With that in mind, IMV Technologies has developed the BactiBag, a new bag for swine semen protection.

**With breakthrough bacteriostatic technology, BactiBag is able to do what no other bag in the market today can do: keep bacterial proliferation under control.**

Developed through years of research, this next-generation packaging system brings added safety to the insemination process, allowing for extended preservation period of semen doses.

**Simply put, it preserves swine sperm quality better and longer.**

*In vitro* and *in vivo* studies have demonstrated the added value of BactiBag with superior reproductive results. With greater flexibility to accommodate various insemination schedules, producers can reduce costs and streamline processes, ultimately increasing efficiency.

BactiBag is simply setting a new standard in the packaging market, by offering ultimate swine semen protection.



# ADDED SAFETY

## AN ACTIVE TECHNOLOGY TO PRESERVE SPERM QUALITY

### BactiGuard, keeping bacteria under control

BactiBag presents an innovative solution, called BactiGuard, to prevent the proliferation of bacteria detrimental to swine semen quality.

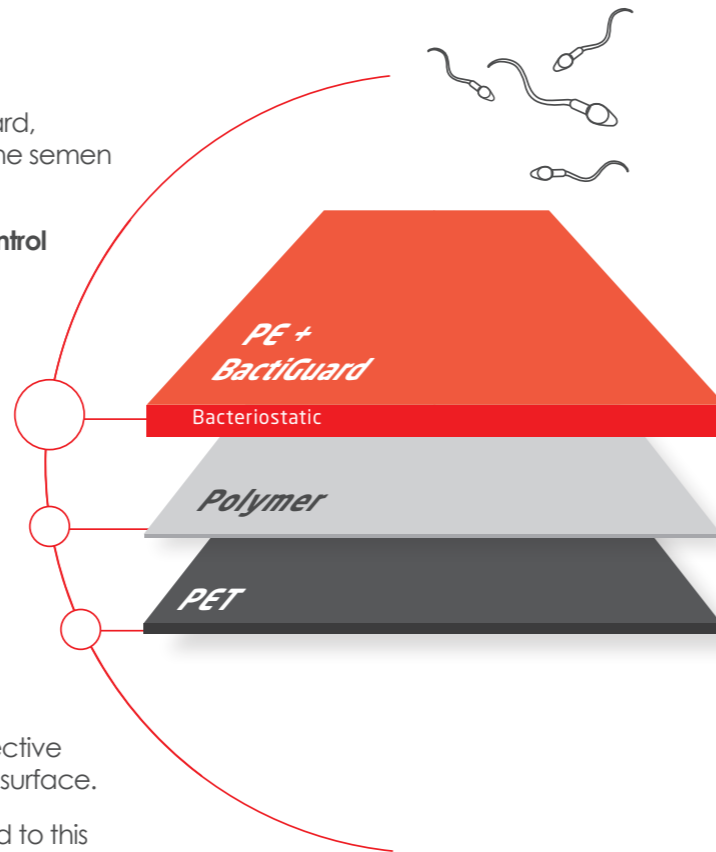
**BactiGuard exerts a bacteriostatic action to efficiently control bacterial proliferation, while posing no risk for the diluted semen.**

### 100% sperm-safe : a new approach with the "contact effect"

The innovation lies in the active technology provided by the novel design of having the anti-bacterial agent coated on the internal surface of the BactiBag, instead of being diluted within the media.

Therefore, the unique bacteriostatic action becomes effective on the diluted semen through a "contact effect" with the surface.

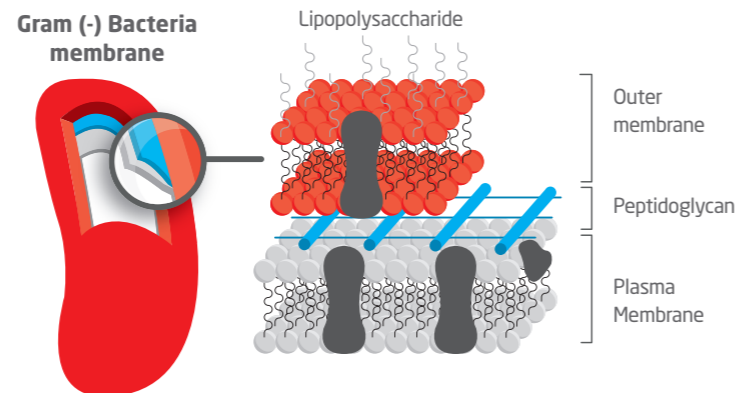
Years of research into finding the correct dosage have led to this conclusion : BactiBag contains a quantity of the coated anti-bacterial agent that is sufficient to prevent bacterial proliferation but is low enough to remain safe for swine semen.



### Two mechanisms of bacteriostatic action

1. BactiGuard prevents bacterial proliferation by disrupting the cellular membrane of bacteria, stopping their growth.
2. It increases Gram(-) bacteria membrane permeability, making them more sensitive to antibiotics.

With bacterial growth prevented, BactiGuard also limits the release of endotoxins harmful to sperm.



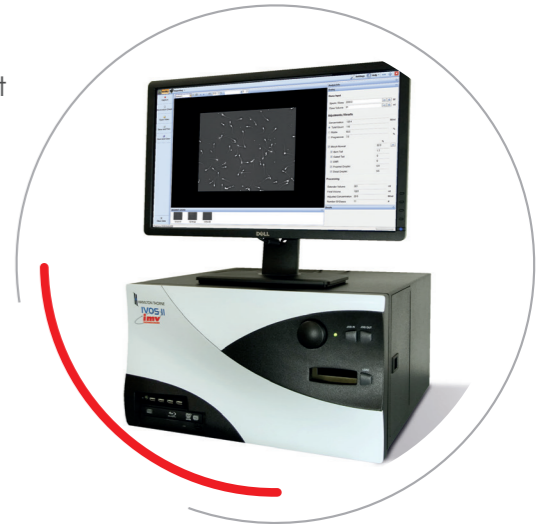
# TOP-LEVEL QUALITY CONTROL

## TO MEET SAFETY REQUIREMENTS

### From the raw material to the finished product

IMV Technologies implements rigorous quality control measures to meet safety requirements, from raw material to the finished product.

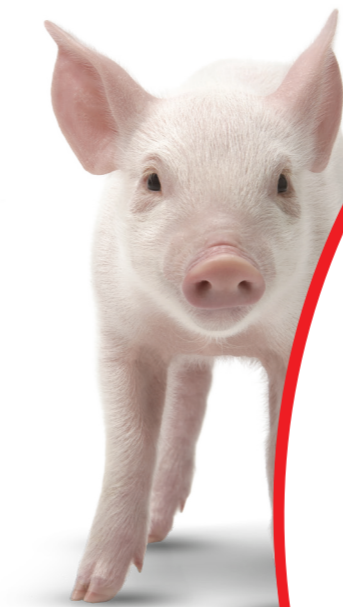
- Raw materials are controlled through the use of an infrared spectrophotometer to verify the plastic composition
- Plastic films are tested *in vitro* (7 days duration)
- Rigorous testing is carried out by an independent laboratory with the quantification of measures of BactiGuard agent.
- On the production line based in France, three cameras control each produced bag.
- Pressurized testing of finished bags to confirm seal quality.



### THE NEED TO FIGHT BACTERIAL PROLIFERATION

### WARNING

Bacterial contamination is an issue of great importance for AI Centers and breeders.



### A detrimental impact on sperm quality

The presence of bacteria creates competition for nutrients. Endotoxins released by bacteria can harm spermatozoa by decreasing motility and its viability, by causing premature acrosome reaction, and increasing sperm agglutination.

Bacterial contamination can also stimulate the development of antibiotic resistance.

### A negative impact on reproductive performance

Many studies have demonstrated the negative effect of bacterial contamination on swine reproductive results.

**Decreased litter size by 2.53 to 3.35 piglets per litter** (if E. coli > 3.5 x 10<sup>3</sup> CFU/ml) <sup>(1)</sup>

**Reduced conception rates by 6 to 12%** <sup>(2)</sup>

(1) : Luis O. Maroto Martina et al, 2010

(2) : C.E. Kuster, G.C. Althouse, 2015

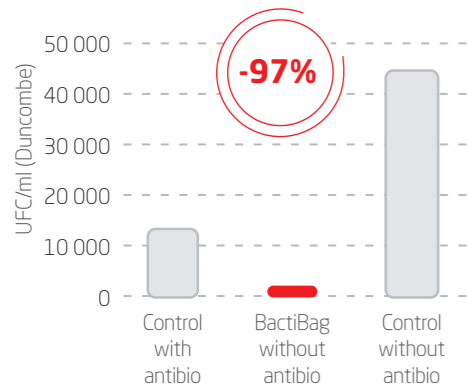


# UNMATCHED PERFORMANCE FOR BETTER RESULTS

## Best-in-class for preserving sperm quality

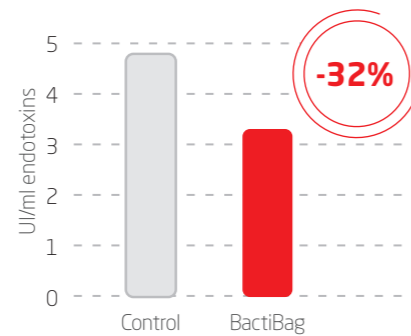
In vitro studies conducted to compare BactiBag vs. classic bag clearly show its unique profile in terms of added safety for swine semen conservation.

### 97% reduction in bacteria level (1)



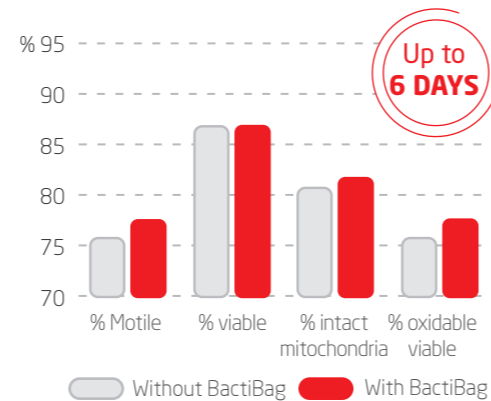
It allows for longer preservation period. Bacterial proliferation is considerably reduced (up to 6 days).

### 32% reduction in endotoxins level (2)



Endotoxins are harmful to sperm and released by dead bacteria.

### Up to 6 Days protection of spermatozoa (3)



All sperm quality criteria (motility, viability, intact mitochondria, oxidizable viable) are preserved and even higher (up to 6 days).

## Best proven reproductive results

In vivo observations from IMV Technologies and field studies demonstrate superior reproductive results.

**+6,6%**  
Average gain in fertility index

IMV Technologies field study on 424 sows (France)

**3% to 6%**  
Average gains in fertility index

Field confirmation studies on 3.376 sows (Germany, Russia)

1. Efficacy of BactiBag compared to standard bag, without the use of antibiotics, study conducted on 6 boars, January 2014.  
 2. Measurement tests of endotoxins released by bacteria during its life and multiplication, study conducted by R&D at IMV Technologies, 2016.  
 3. In vitro data of BactiBag compared to standard bag at day 6. Storage with antibiotics. Quality control with CASA system (IVOS II) and a flow cytometer (EasyCyte II Plus). Study conducted on 48 samples. January 2014."

Artificial insemination outcomes may vary from site to site.



# FIVE UNIQUE BENEFITS FOR OVERALL IMPROVED PERFORMANCE

BactiBag brings added value and clear benefits to artificial insemination centers and breeders with longer preservation of sperm quality, yielding **overall improved performance**.

### Added safety

Keeping bacterial contamination under control means **better preservation** of sperm quality

### Extended storage period

Less contamination allows for **longer preservation** of sperm quality

### Superior reproductive results

Preventing bacterial proliferation leads to **gains in fertility index**

### AI schedule flexibility

Longer preservation of semen allows easier planning of AI schedules

### Reduced costs and greater profitability

Streamlined AI processes



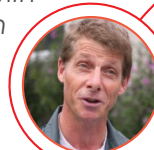
# THE CHOICE OF BREEDERS

## SETTING A NEW STANDARD

With over 10 million bags sold in more than 10 countries, BactiBag has an excellent track-record. Its performances are unrivaled in the market, no wonder BactiBag gets high satisfaction marks from breeders.

*"The BactiBag allows us to extend semen conservation times compared with what we had with traditional semen bags. The biggest change we've seen is litter size. We've gained one piglet per sow and per litter".*

**Marc Touchais**  
**"La Petite Fontenelle" pig farming facility (France)**  
(520 sows, traditional insemination)



*"We now work with the BactiBag to secure our performances and control bacterial contamination of semen doses. For the deliveries received on Friday, the BactiBag enables us to have a constant semen quality until Monday, even Tuesday. The BactiBag allows us to be more confident in the equipment we use and the results we will obtain.*

**Jérôme Debroize**  
**"Debroize" pig farming facility (France)**  
(320 sows, traditional insemination)



## QUALITY AND TECHNOLOGY MADE IN FRANCE



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