



The best performing packaging on the market



Risks of bacterial contamination

Bacterial contamination comes from main sources:

- animal or human⁽¹⁾: preputial fluid, urogenital system, skin, hair, respiratory secretions, excrement, poor hygiene conditions, staff contamination, etc.
- environmental⁽²⁾: contaminated water, food, litter, equipment, ventilation systems, etc.

Impact on semen quality⁽³⁾

The presence of bacteria creates competition for nutrients. In addition, bacteria and the endotoxins they release can harm spermatozoa by:

- decreasing mobility and viability of spermatozoa
- causing premature acrosome reaction
- increasing sperm agglutination

Bacterial contamination also stimulates the development of resistance.

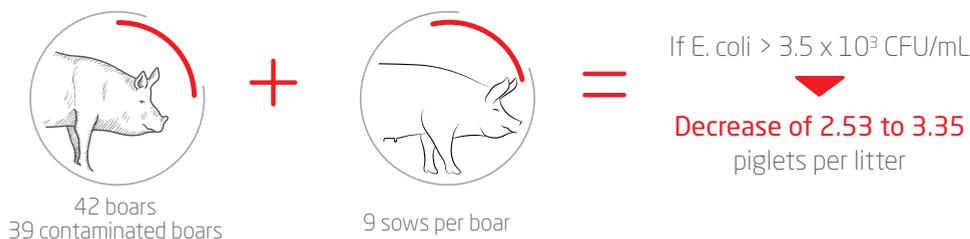
Impact on reproduction parameters⁽³⁾

- potential development of genital infections and diseases
- reduced fertility: lower conception rate and lower total born per litter.

Many studies show the effect of bacterial contamination on swine reproduction.

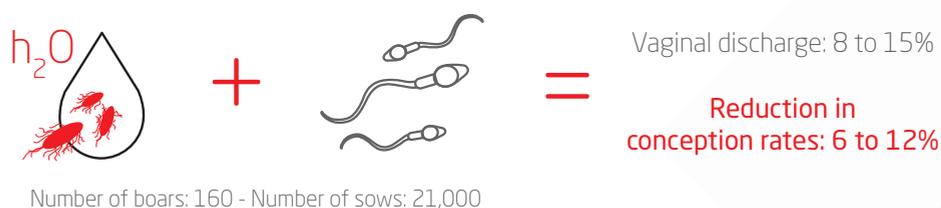
Bacterial contamination of boar semen affects litter size

Luis O. Maroto Martínez et al., 2010



The impact of bacteriospermia on boar sperm storage and reproductive performance

C.E. Kuster,, G.C. Althouse, 2015*



1. Althouse, 2008

2. Althouse and Lu, 2005; Althouse et al., 1998

3. Dagmar Waberski et al./ Morrell JM/ Althouse et al., 2008/ Engblom et al., 2007

BactiBag, following in the footsteps of GTB Bag

The existing technology of GTB Bag

By design, BactiBag has the same advantages as GTB Bag:

- non-spermicidal multilayer plastic bag to mitigate sperm oxidation prior to use,
- easy to use and compatible with many insemination catheters,
- leak-free and easy to open,
- protected tip until time of use.

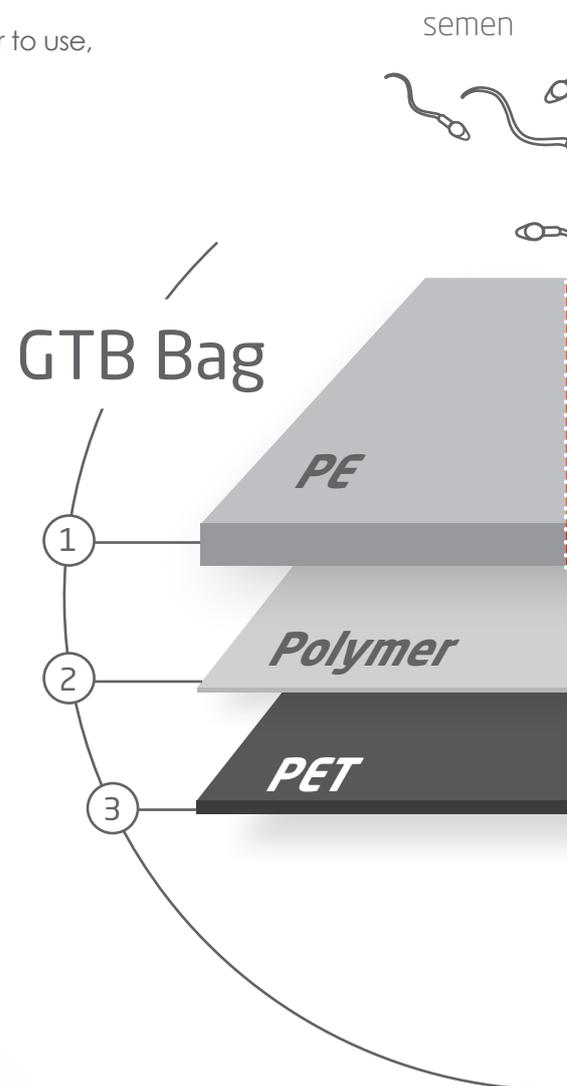
Guaranteed top-level quality control

With 50 years of experience in the production of non-spermicidal plastics, IMV has proven its technological leadership in this field. Since 1992, more than 300 million bags have been sold in more than 40 countries.

To keep this edge, BactiBag, like GTB Bag, has a special quality control process:

- Inspection of raw materials (spectrophotometer test versus validated semen control)
- Inspection of production lines by camera and artificial intelligence
- Inspection of each seal produced via a pressurized seal test

BactiBag, like GTB Bag, is made in France.



- ① The PE film is in contact with the semen and has non-spermicidal properties (agri-food quality).
- ② The polymer is a binder that connects the PE and the PET.
- ③ The PET film protects the semen from oxidation by preventing oxygen penetration.

BactiGuard an original technological innovation

To improve the semen's bacteriological stability, IMV has developed a plastic film that contains a bacteriostatic molecule, BactiGuard, which completes the multilayer structure of the GTB Bag. This innovation led to the development of a new bag that works even better: BactiBag.

BactiGuard and its bacteriostatic action

BactiGuard acts on multiple levels:

- it prevents the multiplication of bacteria by acting on their cellular membrane,
- it increases the membrane permeability of some bacteria, thereby making it more sensitive to antibiotics.

BactiBag is also a new alternative for centers needing to supplement the effectiveness of a medium by adding antibiotics. Fewer antibiotics mean fewer bacteria being killed, which may limit the release of endotoxins that are harmful to sperm.

BactiBag

PE +
BactiGuard

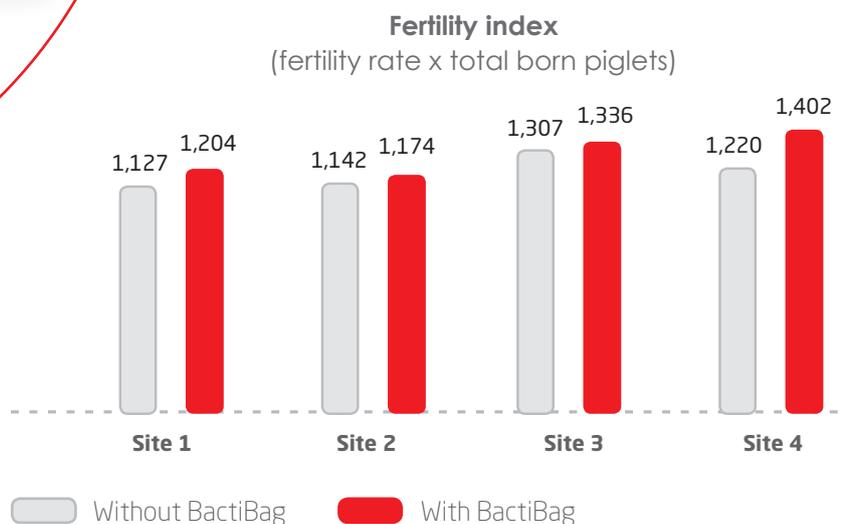
Bacteriostatic

2

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BactiBag and reproductive results

The study below was conducted at four sites in Brittany, France across 424 sows. ^(c)



(a) IMV - R&D tests - January 2015

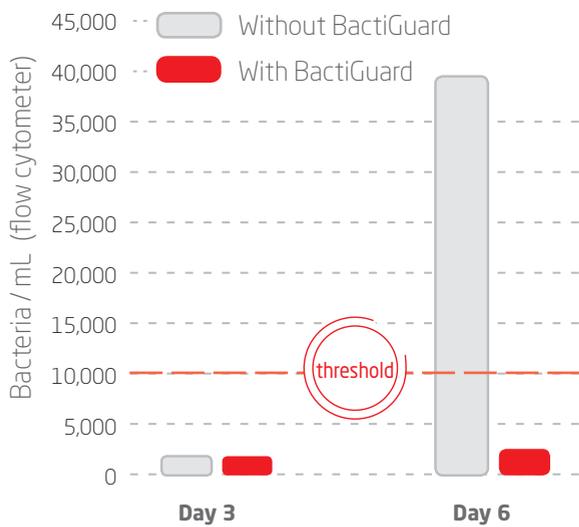
(b) Martín LOM, Muñoz EC, Cupere F, Driessche EV, Echemendia-Blanco D, Rodríguez JMM, et al. Bacterial contamination of boar semen affects the litter size. *Anim Reprod Sci* 2010;120:95-104.

(c) Fertility study on 424 sows throughout four sites in France - 2015

With BactiGuard, BactiBag offers better storage for semen

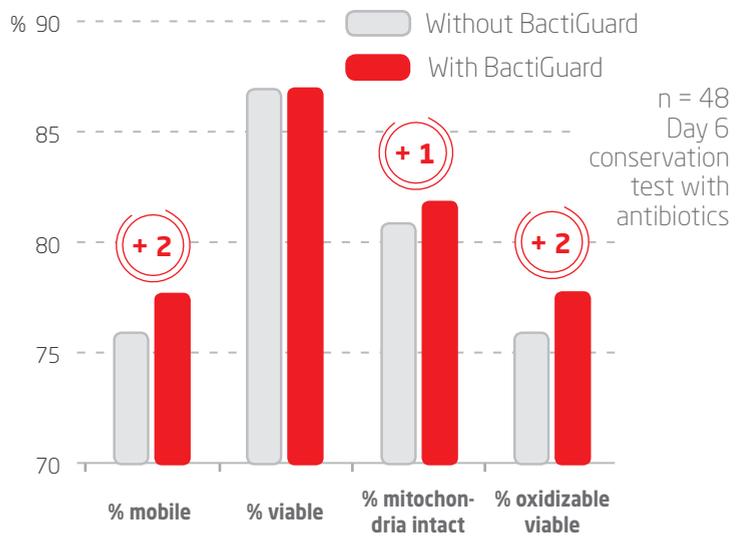
BactiGuard's bacteriostatic efficacy makes the BactiBag the ideal packaging for extending the *in vitro* qualities of semen.

BactiBag very substantially limits bacterial multiplication ^(a)



— Beyond this threshold, there may be an impact on reproductive quality ^(b)

BactiBag preserves the quality of sperm



The specific features of BactiBag make it the most sophisticated and effective packaging on the market today.

BactiGuard
Bacteriostatic agent



A breakthrough for production centers

With BactiBag, production centers can offer their customers a value added product with increased security in semen storage.

Customization of BactiBag is also possible, allowing production centers to increase their brand image.

Security and peace of mind for breeders

Enhanced semen storage is a major advancement for breeders. Without changing working methods, BactiBag makes it possible to work more flexibly while increasing reproductive performance.

By increasing the quality of stored doses, BactiBag offers breeders greater flexibility in how they work.

Consistent semen quality is also crucial. An increase in litter size has been seen by some farms using BactiBag. Others have been able to reduce the number of doses per breeding from three to two.



"We receive the doses on Friday, so there is no more stress on Monday morning. And I use the doses until Wednesday."

Arnaud Brielle, breeder in Brittany



"The biggest change we've seen is litter size. We've gained one piglet per sow and per litter."

Marc Touchais, breeder in Brittany