

semen quality has traditionally been assessed by measuring the concentration, morphology and motility of sperm cells. However, these parameters fail to take into account the integrity (or DNA fragmentation) of the genetic material that the sperm cells carry, which, if damaged, may decrease dramatically reproductive success rates.

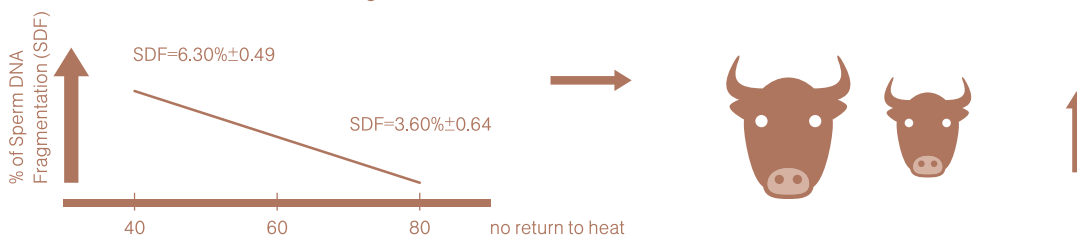
measuring Sperm DNA Fragmentation using halomax[®]:

- reduce costs
- increase the quality of semen samples
- select more productive breeding males
- monitor the breeding male's health
- improve the processes involved in preparing semen doses

sperm DNA Fragmentation (SDF) has an important impact on:

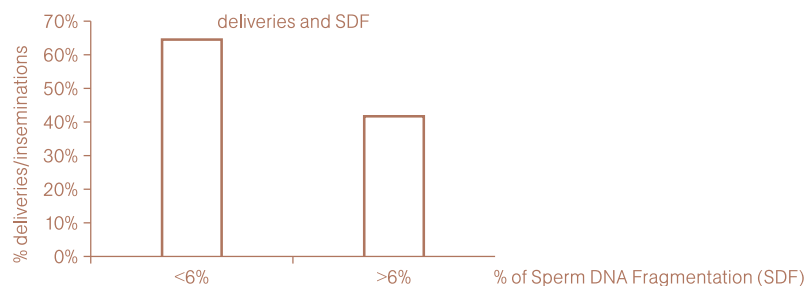
1. Fertility rates:

- **Bull:** the lower the Sperm DNA Fragmentation value, the greater the number of pregnant females and the lower the number of females that return to heat following insemination.



García-Macias, de Paz et al. 2007; Didion, Kasperson et al. 2009.

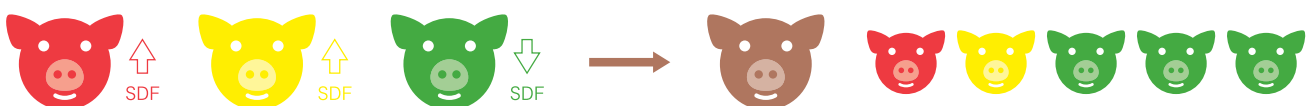
- **Boar:** the greater the number of pregnant females when the Sperm DNA Fragmentation (SDF) value is lower than 6% (Odds Ratio=1.5, $p=0.0003$, Confidence Interval=1.21–1.94)



2. Litter size:

Inseminations using semen with low SDF values increases the number of offspring.

- **Bull:** in heterospermic inseminations, more calves are obtained from the seminal fractions with the lowest SDF values ($r=0.87$, $p<0.001$).
- **Boar:** boars with a low SDF value produce a greater number of sucklings. The litter size is smaller when the SDF value is higher:



For SDF values greater than 6%, litter size is reduced by 0.5, 0.7 and 0.9 sucklings per delivery in Hampshire, Landrace and Danish Large White, respectively.



Kasimanickam, Nebel et al. 2006; Boe-Hansen, Christensen et al. 2008; D.S. Karabinus et al. 1990.

halomax[®]

in addition...

sperm DNA Fragmentation is inherent to the individual and is predictive of the animal's reproductive capacity. This parameter can therefore be used for the **early selection of breeding males**.

SDF is sensitive to external factors:

Sperm DNA Fragmentation is sensitive to external factors that can influence semen quality including vaccinations, infections or pathologies such as varicocele.

A high SDF value can therefore be indicative of the presence of such factors that may be affecting the breeding male's fertility.

García-Macías, de Paz et al. 2007; Didion, Kasperson et al. 2009; Martín et al. 2004; Hernández M. et al. 2006; Begoña Pérez-Llano et al. 2006; Karabinus et al. 1991; Boe-Hansen, Morris et al. 2005; De Ambrogi, Spinaci et al. 2006.

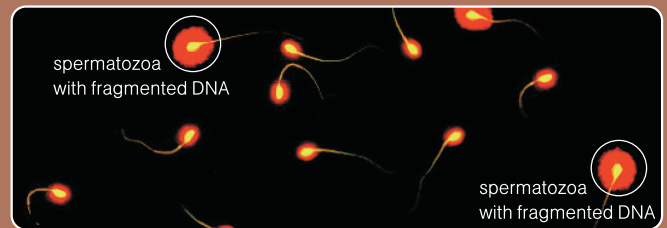
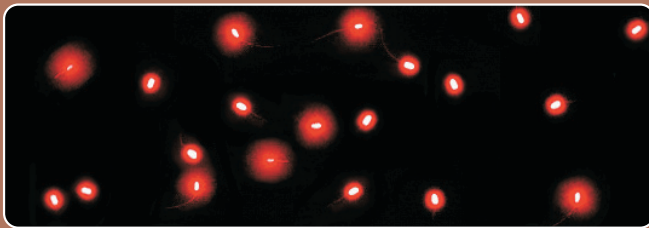
SDF is sensitive to iatrogenic damage:

Sperm DNA Fragmentation may be altered with the handling of semen in the preparation of semen doses.

Monitoring SDF values can therefore be useful in evaluating the quality of diluents, cryoprotectors, freezing and refrigeration processes and any other manipulation such as sperm sexing procedures.

Halomax[®] is a simple and fast kit to measure Sperm DNA Fragmentation in three easy steps:

- sperm embedding in agarose gel
- incubation in lysis solution
- staining and counting using fluorescence microscopy



Bibliographical references: D. P. Evenson, L. Thompson, L. Jost, *Theriogenology* 41, 637 (Feb 2, 1994); V. García-Macías et al., *Int J Androl* 30, 88 (Apr, 2007); G. B. Boe-Hansen, I. D. Morris, A. K. Ersboll, T. Greve, P. Christensen, *Theriogenology* 63, 1789 (Apr 1, 2005); R. Kasimanickam et al., *Theriogenology* 66, 1307 (Sep 15, 2006); M. De Ambrogi, M. Spinaci, G. Galeati, C. Tamanini, *Theriogenology* 66, 1994 (Nov, 2006); B. A. Didion, K. M. Kasperson, R. L. Wixon, D. P. Evenson, *J Androl*, (May 28, 2009); G. B. Boe-Hansen, P. Christensen, D. Vibjerg, M. B. Nielsen, A. M. Hedeboe, *Theriogenology* 69, 728 (Apr 1, 2008); J. Gosálvez, Vázquez J. M., *The open veterinary science journal*, 2008 2, 7 (2008); D. S. Karabinus, D. P. Evenson, L. K. Jost, R. K. Baer, M. T. Kaproth, *J Dairy Sci* 73, 2364 (Sep, 1990); G. Martin, O. Sabido, P. Durand, R. Levy, *Biol Reprod* 71, 28 (Jul, 2004); B. Pérez-Llano, M. Enciso, P. García-Casado, R. Sala, J. Gosálvez, *Theriogenology* 66, 2137 (Dec, 2006); S. D. Johnston et al., *J Androl* 28, 891 (Nov-Dec, 2007).

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