Bull and boar sperm DNA integrity evaluated by sperm chromatin structure assay in the Czech Republic

R. Rybak, L. Faldikova, M. Faldyna, M. Machatkova, J. Rubes

https://doi.org/10.17221/5668-VETMED

Citation: Rybak R., Faldikova L., Faldyna M., Machatkova M., Rubes J. (2004): Bull and boar sperm DNA integrity evaluated by sperm chromatin structure assay in the Czech Republic. Veterinarni Medicina, 49: 1-8.

download PDF

Analysis of sperm parameters is very important for predicting the outcome of assisted reproductive techniques and is necessary for determination of fertility potential of males tested for artificial insemination. In our study we have determined the level of bull and boar sperm DNA damage by Sperm Chromatin Structure Assay (SCSA). This test is based on increased susceptibility of altered DNA (strand breaks) in sperm nuclear chromatinto in situ denaturation measured by flow cytometry after staining with acridine orange (AO). Sperm chromatin damage was quantified by percentages of spermatozoa with detectable DNA Fragmentation Index – DFI divided into moderate (m-DFI) and high (h-DFI) DFI. Percentage of immature cells (HDS; cells with High DNA Stainability) was also evaluated. We measured sperm SCSA parameters in a total of 37 bulls in two groups from different localities and 68 boar samples from one locality. Significantly higher percentage of spermatozoa with detectable DFI was detected in six bulls (16.2%) and a significantly higher percentage of immature cell forms (HDS) was found in other six bulls (16.2%) among all tested bulls. The mean percentages of spermatozoa with h-DFI and HDS of bulls from the second group were statistically higher than those from the first group ($P < 0.01$). Five boars (7.4%) of all tested boars had significantly higher percentage of spermatozoa with DFI and 18 boars (26.5%) had significantly higher percentage of sperm with HDS compared to the other boars. Both percentages of spermatozoa with DFI and HDS were significantly higher in one boar compared to the others. Boars had significantly higher percentages of spermatozoa with h-DFI and HDS ($P < 0.0001$) in comparison to bulls. For individual bulls, the highest percentages of spermatozoa with DFI and HDS were 20.8% and 3.5%, respectively while for boars these were 17.6% and 10.2%, respectively. No significant correlations were found between percentages of spermatozoa with DFI and HDS. This sensitive procedure seems to be convenient as additional method for semen quality detection in farm animals before their exploitation in breeding.

Keywords:

sperm; DNA integrity; flow cytometry; bull; boar; fertility

download PDF

Impact factor (WoS)

2016: 0.434
5-Year Impact Factor: 0.764

SJR (SCOPUS)

2017: 0.280 – Q2 (Veterinary (miscellaneous))

Abstracted/Indexed in

Agrindex of AGRIS/FAO database
Animal Breeding Abstracts
CAB Abstracts
CNKI
CrossRef
Current Contents®/Agriculture, Biology and Environmental Sciences
Czech Agricultural and Food Bibliography
DOAJ (Directory of Open Access Journals)
EBSCO – Academic Search Ultimate
FSTA (formerly: Food Science and Technology Abstracts)
Google Scholar
J-GATE
Science Citation Index Expanded®
SCOPUS
TOXLINE PLUS
Web of Knowledge℠
Web of Science®

Contact

Mgr. Zuzana Karlíková
Executive Editor
phone: + 420 227 010 352
e-mail: vetmed@cazv.cz

Address

Veterinární Medicína
Czech Academy of Agricultural

Sciences
Slezská 7, 120 00 Praha 2, Czech Republic