

Quality assurance program for DanAvl boar studs in Denmark

As a supplement to the Danish and European legislation, a set of rules have been made in collaboration with SEGES and the Dan-Avl AI companies in Denmark. These rules are implemented by the boar studs with the aim to assure the quality of the semen doses produced on the boar studs. Besides these rules which are mentioned here, the individual AI-company may have taken further measures and procedures (i.e. a quality management program) to assure the quality of their products.

Semen collection

The personnel working with semen quality analysis and the production of semen doses are trained in this work and needs regularly to attend an internal course in assessment of motility, concentration, and hygiene and quality control. Semen collection is done using the two-glove method so that contamination of the ejaculate with material from the prepuce and skin is avoided. It is recommended that the AI companies control the individual workers regularly by microbial screening to assure that the ejaculates are free of contamination with bacteria.

Semen assessment

After collection volume is assessed by weighing the ejaculate. Color and smell is evaluated and assessment of the concentration of sperm in the raw sample is done using Nucleocounter SP 100. Visual assessment of motility and morphology is done using phase contrast microscope (20 x objective) at a temperature of 37-39 degrees Celsius (heating plate). A grade of 90, 80, 70 og <70 is given to the raw semen sample and it is a common evaluation of both motility and morphology.

Grade 90	Semen where almost all sperm cells are moving in a normal pattern and hardly any defect cells are noticed
Grade 80	Semen with a slightly increased number of non-motile sperm cells or visible increased number of sperm cells with defects
Grade 70	Semen with easily recognized non-motile or defect sperm cells
Grade <70	Semen with strongly reduced motility or the majority of the sperm cells show defects

Comments have to be given when the semen is graded below 90 and semen ejaculates graded below 80 is not used for AI, (except breeding herds can be allowed to get semen with lower grades if they accept this fact ahead of delivery).

Dilution of semen

When diluting the semen a compensatory amount of semen is added according to the grade given i.e. 10 percent extra for semen with grade 90 , 20 percent extra for semen with grade 80 and also 20 percent extra for semen with lower grades than 80 (breeders only). A minimum of 2,1 billions of motile sperm per dose (95 percent of the doses) and no doses with less than 1,8 billions of motile sperm per dose is the standard for Landrace and Yorkshire doses Semen from the finisher line Danish Duroc are pooled in batches containing 3-10 boars for the home market. A minimum of 1,75 billions of motile sperm per dose (95 percent of the doses) and no doses with less than 1,5 billions of motile sperm per dose is the standard for this product.

Dilution of semen is made using two-step hypothermal procedure with a temperature of 20 degrees Celsius for the final extender. All doses can be tracked to the time, place and boar(s) included.

In Denmark the standard extender used, is an EDTA-based extender manufactured at a Danish pharmacy. Other commercial extenders can also be used for the finisher lines and doses for export. The EDTA extender contains 112 milligrams of amoxicillin and 112 milligrams of gentamycin, and 30 mg tylosin per liter of extender.

Quality assurance of materials used in the production of semen doses

All materials in direct contact with the semen or the extenders are regularly tested using standard protocols. To assess the cytotoxicity of the material, motility of sperm doses after contact with test material and control is evaluated using Sperm Vision CASA. New types of materials must be approved before use.

Quality assurance of the extender manufactured by a Danish pharmacy:

Every batch is quarantined until screening for bacteria, refractory index, ph and tests for cytotoxicity has finished and the batch is approved for use.

Quality assurance of boar semen

Approval of the young boars:

The Danish Duroc boars are approved by the AI-stud for sale of semen doses, when a semen from one collection has achieved minimum grade 70, when motility is evaluated 72 hours after collection

The Landrace and Yorkshire boars are also approved by the AI-stud for sale when they achieve minimum grade 70, when motility is evaluated 72 hours after collection. Furthermore, doses from the 3 following jumps from each boar are sent to the SEGES research laboratory for CASA. The boars are ranked every week according to the CASA results and a list is sent out every week to the boar studs. This list (for slaughter) holds the 5 percent boars with the lowest results out of all the boars that have entered the boar stations the last year. The CASA evaluation of the semen quality continues for every 10th jump as long as the boar is active.

Quality assurance of semen doses

Microbiology:

Weekly, two semen doses from each AI unit is sent to the SEGES Laboratory for Swine Diseases in Kjellerup. The samples are plated on blood agar and incubated at 37 degrees Celsius.

Number of sperm per. dose:

Weekly, ten doses per production laboratory are controlled using Nucleocounter SP100 at the SEGES research lab in Ringsted. The doses are selected so that all breeds and products should be represented.

Motility 72 hours:

The AI companies have their own individual quality control programs depending on their customers.

External Control

The AI stations are controlled according to the EU legislation twice a year by the authorities

Also the local veterinarians perform audits of the AI stations. At least once a year the all the procedures regarding hygienic collection of semen and production of semen doses are evaluated.