

AI-The inside story

A Care of the bull



Maintaining the good condition of carefully selected breeding bulls is an important task of an AI station. The bulls (A1, A2) are usually kept in stables (A3). They are fed mainly on hay, grass and rough fodder – supplemented with extra minerals. They should be exercised regularly under the supervision of the bull groomers and checked periodically by veterinarians for brucellosis, leucosis, IBR/IPV virus and other illnesses. These precautions ensure both a healthy bull and good quality semen.



B Collection of semen

The first step in AI is collecting the semen. This usually takes place in a special collecting room containing a dummy or "teasing" cow (B1). An artificial vagina, which includes a neoprene liner, vaginal cone and protected collection tube, is also necessary. Artificial vaginas are stored in heated cabinets and removed only when the semen is to be collected. They are kept covered until required.

After the donor bull ejaculates, the semen is collected in a tube at the base of the artificial vagina (B2). The tube is then taken to a laboratory for analysis and processing. Between 3 and 10 milliliters of semen are usually produced with each ejaculation which after dilution is enough to inseminate 300 to 1000 cows.

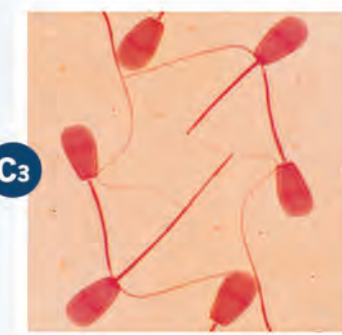


C Analysis and processing of semen

After collection the semen goes to the AI laboratory (C1) for analysis and processing. A Coulter counter (C2) is used to check the quality and the quantity of the spermatozoa (C3).

The semen is diluted with distilled water, egg yolk, antibiotics, glycerol and chemicals. This is done in a water bath heated to 31°C. The diluted semen is cooled to 5°C for a few hours to ensure a consistent mixture, and is then packed in mini straws containing 0.5 or 0.25 ml of fluid (C4). Before the mini straws are filled, they are individually coded with data about the bull, its breed, the ejaculation number and other pertinent information.

The straws are sealed, placed in plastic jars and immersed in canisters for storage in liquid nitrogen (C5). After freezing the quality of the semen is checked again under a microscope before the straws are delivered (C6). Mini straws have a high survival rate and are very hygienic.



D Production of liquid nitrogen

Liquid nitrogen is required for long-term storage of semen. Its low temperature of -196°C (77K) and inert capabilities prevent the deterioration of semen quality. The mini straws with bull semen are stored in cryogenic (low temperature) containers in the main AI centres where cryogenic facilities are located. The containers with bull semen are transported to sub-centres, from which trained inseminators transport the semen to farms for insemination. During transport and storage the liquid nitrogen must be replenished regularly because of evaporation.

A reliable supply of liquid nitrogen is vitally important. Liquid nitrogen supplied from bulk suppliers is often not available and can be extremely expensive. Just as AI strives to make your breeding process independent, Stirling is committed to making your supply of liquid nitrogen fully self sufficient - and reliable. A Stirling liquid nitrogen plant lets you produce the liquid you need, as you need it. The StirLIN line (examples: D1-D2-D3) is the new standard in reliability for AI stations.

They take up little space, are pre-calibrated, fully automatic and ready to start working. Simply connect water and power and start producing 10 liters of liquid nitrogen per hour in the storage vessel. Choose from a full range of StirLIN plants from a few liters up to tens of liters of liquid nitrogen per hour.



E Insemination of the cow

Inseminators are based at the AI station and carry small containers of liquid nitrogen filled with mini straws of semen and an insemination tool kit to the farm or place where insemination will be carried out.

The inseminators often travel by car and their cars can also carry their equipment very conveniently. If bad weather or inadequate roads make such transport impossible, the inseminators can also move around on foot or by bicycle to visit farms or roadside crushes.

At the farm, proper hygiene should be maintained. The inseminator takes the straws containing the frozen semen from the container, thaws it to the temperature of the cow and puts it in the insemination gun (E1). The gun deposits the semen in the cervix of the cow (E2, E3). Before leaving, the inseminator then completes the required registration work, preferably using a handheld terminal.



F Keeping records

All the work performed to this point is of little use without good record keeping. Records kept at each farm include up-to-date information on where, when and by whom inseminations have been performed (F1). They also include the identity of the cow identity of the bull and historical data such as dates of previous calving. If a cow requires a repeat insemination, this data is also recorded. Similar data is also kept in the AI centre. It is important to keep good historical records about the operation and servicing of the liquid nitrogen plant, including an up-to-date schedule of preventive maintenance. Finally, to ensure success in improving the productivity of cattle from generation to generation, full statistical records on each animal are needed. This is the only way the value of the AI program can be guaranteed and proven.



The result.....

will be a better calf, more suited to local conditions. When it matures, it will provide more milk and beef - and thus better nutrition and health - for people. There is a good chance this better calf will also be a new beginning - the parent of even more productive generations of cattle in the future.

In economic terms, the income of the cattle owners and farming cooperatives will improve through more valuable live stock.

Stirling Cryogenics is here to contribute to the future of AI centres:

- We advise farmers on how to organize AI centres and on the usage and handling of liquid nitrogen equipment.
- Our StirLIN liquid nitrogen plants ensure a reliable supply of liquid nitrogen when you need it, where you need it!

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