

External effect which causes death shock to the spermatozoa after semen collection

1. Remnants of detergents of artificial vagina.
2. Remnants of tap water or distilled water.
3. Disinfectants.
4. Urine and feces.
5. Acidic and alkaline solutions.
6. Diluents of abnormal concentrations.
7. Sudden decrease or increase in temperature.
8. Exposure to high temperature (40c°) outside the animal body.
9. Increased concentration of antibiotics in the diluents.
10. Exposure to the intensive light.

Characteristics of the proper diluents:

1. Have no bad effects on spermatozoa.
2. Has a suitable osmosis resembles that of the seminal plasma.
3. Has a suitable pH for activity of spermatozoa.
4. Possess a suitable viscosity for seminal plasma.
5. Have the ability to regulate the continuous changes in pH resulted from activity of spermatozoa.
6. Keeps the activity of spermatozoa for a longer time without any change in their fertility.
7. Cheap and easy to be prepared.
8. Has some effect against microorganisms.
9. Keeps the semen from temperature shock.

The most suitable used diluents

1. **[Sodium citrate - egg yolk] diluents and [Sodium Phosphate - egg yolk] diluents:**

It is superior to the most known diluents because:

- Sodium citrate decreases the fat droplets found in egg yolk so it becomes easy to see the spermatozoa clearly during microscopic examinations.
- No any abnormal effect to semen metabolism.
- Keeps the activity of spermatozoa for a long time.

Advantages of egg yolk when used with the semen diluents:

1. It has a protective effect against cold shock to the spermatozoa during storage.

2. Has a special substance important for sperm metabolism as well as it is sugar can be used by sperm for nutrition.
3. It has a great role in semen storage because it keeps the sperms from the effect of bad byproducts resulted from lyses of some amino acids found in the semen.

2. [Milk - egg yolk + Streptomycin + Penicillin] diluents:

Type of milk used:

- Cow milk: either whole milk or skim milk after pasteurization.
- Goat milk: either whole milk or skim milk after pasteurization.
- Powder milk.
- Coconut milk.

3. [Sodium citrate + egg yolk + streptomycin + penicillin].

4. [Sodium Phosphate + egg yolk + Fructose or Glucose + Citric acid + streptomycin + penicillin].

5. [Triss + egg yolk + Fructose or Glucose + Citric acid + streptomycin + penicillin].

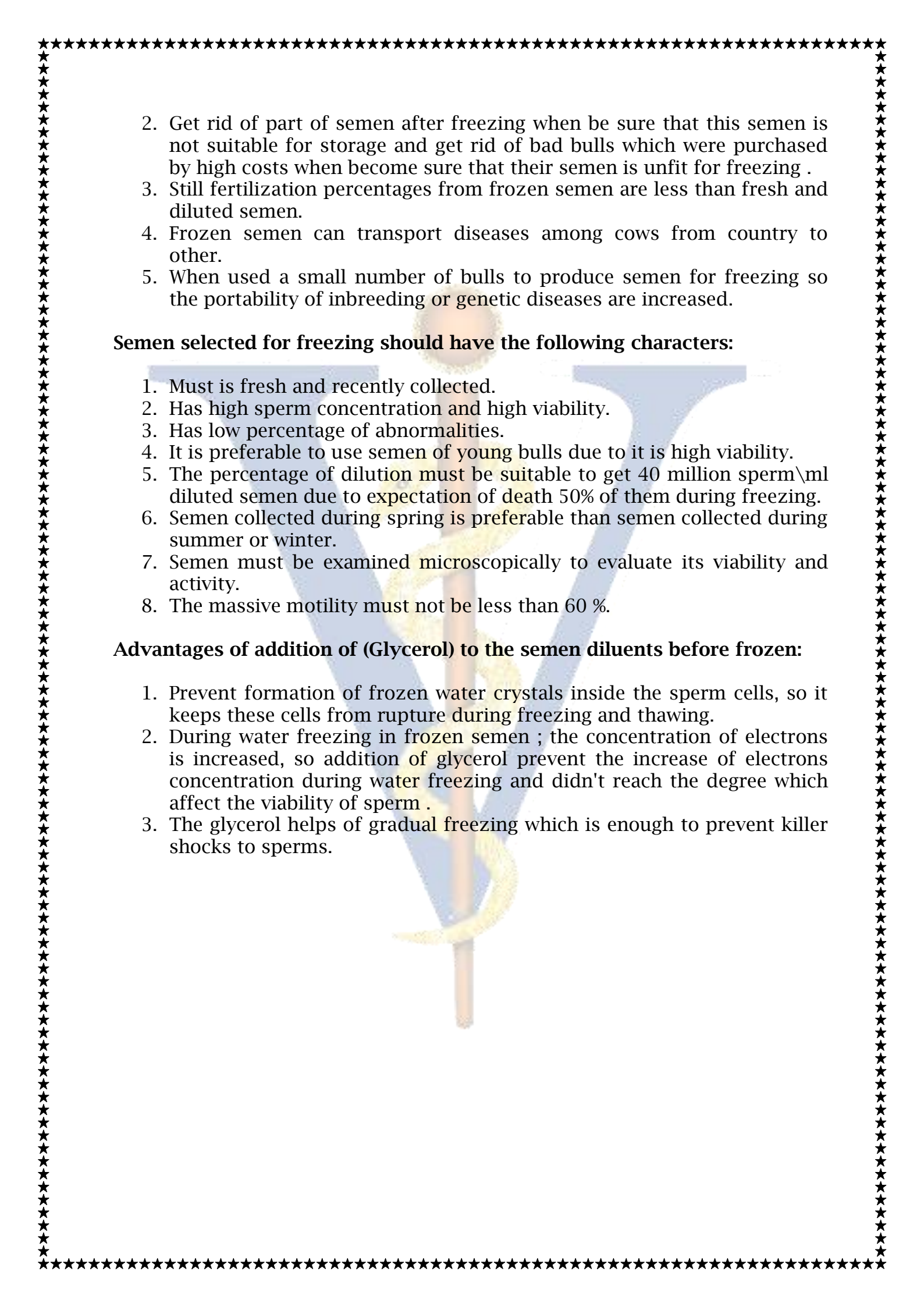
Frozen Semen

Advantages of frozen semen:

1. Make use of all amounts of semen produced from bulls especially during seasons when artificial insemination services are decreased such as cold winter or hot summer.
2. Make use of diluted semen produced from bulls of high producing efficiency during seasons of active artificial insemination through storage of semen of those bulls in a large amount during that period.
3. To satisfy the owners need to get benefit from selected bull in any time they want and even for a long time after the death of the bull.
4. Make use of seminal fluid produced from excellent bulls throughout the world because of easy transportation for long distances of frozen semen.

Limitations of using frozen semen:

1. High cost of producing frozen semen due to expensive equipments used during freezing procedures in addition to exhaust large amount of electricity and liquid nitrogen.

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2. Get rid of part of semen after freezing when be sure that this semen is not suitable for storage and get rid of bad bulls which were purchased by high costs when become sure that their semen is unfit for freezing .
 3. Still fertilization percentages from frozen semen are less than fresh and diluted semen.
 4. Frozen semen can transport diseases among cows from country to other.
 5. When used a small number of bulls to produce semen for freezing so the portability of inbreeding or genetic diseases are increased.

Semen selected for freezing should have the following characters:

1. Must is fresh and recently collected.
2. Has high sperm concentration and high viability.
3. Has low percentage of abnormalities.
4. It is preferable to use semen of young bulls due to it is high viability.
5. The percentage of dilution must be suitable to get 40 million sperm\ml diluted semen due to expectation of death 50% of them during freezing.
6. Semen collected during spring is preferable than semen collected during summer or winter.
7. Semen must be examined microscopically to evaluate its viability and activity.
8. The massive motility must not be less than 60 %.

Advantages of addition of (Glycerol) to the semen diluents before frozen:

1. Prevent formation of frozen water crystals inside the sperm cells, so it keeps these cells from rupture during freezing and thawing.
2. During water freezing in frozen semen ; the concentration of electrons is increased, so addition of glycerol prevent the increase of electrons concentration during water freezing and didn't reach the degree which affect the viability of sperm .
3. The glycerol helps of gradual freezing which is enough to prevent killer shocks to sperms.