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Semen Evaluation in Bulls

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INTRODUCTION

SEMEN AND ITS COMPONENT

Semen is biological fluid composed of seminal plasma and spermatozoa. Its source is epididimyis, vasdeferens and seminal vesicle, which provide most of the fluid portion (Seminal plasma). The quantity and sperm concentration vary with species. Animal discharging large volume semen have poor sperm concentration. Total sperm discharged per ejaculate is 1000-1500X10^6 /ml. in bulls. Mature Sperm are terminal cells, the end products of complex developmental processes of spermatozoa that cannot undergo further division or differentiation.

SPERMATOZOA

The concentration of spermatozoa in an ejaculate of semen is approximately 1.2 billion in bulls. Sperm are having different parts such as Head, neck, mid piece, tail piece and end piece. In a high quality semen, 80-90 % of the spermatozoa are normal in morphology. The overall length of spermatozoa of bull is 60-70µ

EVALUATION OF SEMEN

No single test accurately predicts fertility of sperm sample. The main goal of semen evaluation is to predict the fertilizing capacity of a semen sample. Semen evaluation is done by following method

1. Volume of semen
2. Color and consistency of Semen
3. Motility of Sperm
    i. Mass motility
    ii. Progressive motility
4. Concentration of semen
5. Percentage of abnormal sperm
6. Percentage of live and dead sperm
7. pH of Semen

1. VOLUME OF SEMEN

The capacity to ejaculate as well as quantity of semen produce by each animal has different. Volume of ejaculate semen and its characteristic depends on various factors such as category of species, age of the animals, diets of animals and environment. The normal volume of semen is 1-15 (range) ml in bulls

2. COLOR AND CONSISTENCY OF SEMEN

Normal color of semen is milky cream or greyish white to yellow white. Thick semen look like cream or some time milk when this is of thin type consistency on the basis of the color and consistency it can be classified the type of semen. But mere on the basis of this external characteristic we cannot tests it quality. Without seeing sperm under microscope we cannot differentiate live and dead sperm in semen. The lowest volume of semen having more number of semen and vise-versa.

3. MOTILITY OF SPERM

i. MASS MOTILITY

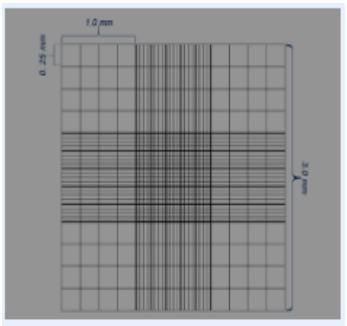
Mass motility is examined for fresh semen. Sperms of semen are a live matter in which sperm are motile. To know the motility status, sperm can be visualized under microscope. If the number of motile sperm are more this is considered as good semen. The best semen is having number sperms as well as motile and look like wave whereas the semen having lower number of sperm are less motile and absent of wave as it appeared in good semen. To view the motility of sperm, semen is examined under microscope. The quality of semen is particularly depends on motile nature / movement /wave of sperms. The good quality sperm live for long time and it also helps in successful conception of cows/female animals.

Before examination of semen under microscopes. A drop of semen is put on glass slide and viewed. Normal procedure adopted to know the motility percentage of semen is by putting the mark of plus sign (+). Putting one plus meaning motility is less than 20% and four plus (++++) meaning 60-80% motility of sperm and that is very good.

ii. PROGRESSIVE MOTILITY

This type of motility of sperm is examined under microscope after adding of extender in semen. A drop of semen is putted on warm glass slide and viewed under cover of thin glass slide (coverslip). This is used to estimate the percentage progressive motility of sperm and displayed by 5, 4, 3 and its mean is 80-100%, 60-80%, 40-60% respectively. The samples gaining lees than 3 point is understood discarded.

4. CONCENTRATION OF SEMEN



The numbers of sperm or concentration of sperm in different male animals are having different. Thin consistency semen having comparatively less number of sperm than thick consistency of semen. Concentration of semen is usually measured by hemocytometer and extension of semen can be calculated accurately. After 1:200 dilution of semen some drops of semen is putted on hemocytometer under coverslip and examined by microscope. Sperm are counted in five big square and after calculation this known as total number of sperm in one cubic centimeter

5. ABNORMAL SPERM PERCENTAGE

Faulty structure sperm is known as abnormal sperm. The quality of semen deteriorates as soon as the number of abnormal sperm increases. Such sperm give less chances of conception

6. LIVE AND DEAD SPERM PERCENTAGE

Live and dead sperm numbers are counted from semen. If dead sperm are more in semen then dilution/ extension of semen is done in very less. If the number of dead sperm are

exceptionally very higher than semen should be discarded for further uses. This livability test is done by making smear by utilizing one drop of collected semen mixed with eosin-nigrosine and putted over the glass slide followed by examination under microscope. The lives sperm do not takes eosin stain while dead sperm takes and change to pink color.

7. pH

Normally the medium of pH should be 6.6-6.8. The medium is slightly acidic in nature. If the medium is less or more than this then that should not be used.

Mass Motility: Observe under (10x) microscope immediately after collection. This is recorded on +5 (Excellent- difficult to trace origin and disappearance of the waves) to +0 (all dead) numerical scales. To assess the fertilizing capacity of the semen.

Progressive Motility: Diluted semen will be observed (40x) under the microscope following types of motility may be observes-

1. Straight forward
2. Forward circular motion
3. Reverse circling motion
4. Oscillatory movements and jerks without change of place.

Progressive motility	**Descriptive value**
1. 80-100%	Excellent
2. 60-80%	Good
3. 40-60%	Fair
4. 20-40%	Poor
5. 0-20%	Very poor

Artificial Insemination with frozen semen

1. AI in cattle done by rectovaginal method.
2. AI with frozen semen using polyvinyl chloride straws.
3. Frozen spermatozoa after thawing do not survive long and also they cannot be frozen. The frozen semen once taken out from the LN2 container should be used soon after thawing.
4. The canister should be raised only to the level from where the straws can be grasped.
5. Take out the desired straw as quickly as possible and put them immediately in the thaw bath. Not more than 2-3 straws should be taken out at one time.
6. For straw thawing temperature 35-37Oc for 30 to 60 seconds is recommended under field conditions. The thawing water should be fresh and clean.
7. After thawing period, remove he straws from the water bath and wipe out all the water from the outer surface of straws with an absorbent materials.
8. Hold the straw vertically with the cotton plug (factory seal) downward. Shake the air bubble from the middle of the straw to the sealed end of straw (laboratory seal).
9. Cut the straw at right angle to remove the seal plug with sharp blade.
10. Withdraw the piston (wire) of AI gun and place the straw in the chamber of AI gun.
11. Take sheath and fix the sheath over AI gun. The cut end of semen straw should be securely fit to the top of the sheath to avoid semen leakage.
12. Set the lock securely.
13. The sheath is a device which retains the straw and allow escape of semen only.
14. Semen is deposited in the middle of the cervix by recto-vaginal method.