**Semen Evaluation**

Semen must be evaluated as soon as possible after collection, because changes in temperature, exposure to light, and exposure to any type of chemicals, lubricants etc. can change sperm motility and adversely affect fertility.

**Macroscopical examination :**

**1- Color:-**

In animal the normal colour is:

a. **Bull**: creamy white (may be light yellow due to riboflavin secreted from seminal vesicles).
b. **Ram and buck**: creamy white and thick
c. **Boar**: milky
d. **Stallion**: greyish white and thin

**\*Abnormal colors:**

- **Yellow**: release from presence pus or urine in semen

- **Red**: release from new injury or bleeding in reproductive system .

- **Deep brown**: release from old bleeding or hemolysis in RBC

- **Green**: contamination the seminal fluid by feces

- **Watery color**: there are no sperms only plasma, this case called azospermia .

**2- PH:-**

Normal reaction of semen is alkaline 7.4 at the time of ejaculation.

**3- Viscosity:-**

Freshly ejaculated semen is liquid that is rapidly converted to a gelatinous state due to enzymatic coagulation of a protein like material secreted by the seminal vesicles .within the next half hour it is gradually re liquefied by the action of a prostatic secretion .the normal value is 3.74 .

**4- volume:-**

The ejaculate semen volume estimate by the graduate test tube.

The normal volume in human 2-6 ml.

In animal the volume different between species for example:-

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Animal species | Ram | bull | Horse | pig |
| Vol. of S.F (ml) | 0.5 - 2 | 5- 15 | 40 - 200 | 250 - 400 |

 **Bull semen density scale**

|  |  |  |
| --- | --- | --- |
| Scale | Gross appearance  | Approximate sperm Concentration 10 sperm/ml) |
| 0 | clear to cloudy | 0 to 200 |
| 1 | cloudy to milky | 200 to 400 |
| 2  | milky | 400 to 800 |
| 3 | thick milky | 800 to 1200 |
| 4 | creamy | 1200 to 1800 |
| 5 | thick creamy | 1800+ |

 **Microscopical examination :**

**1-Motility**

A-Gross or mass motility is examined first.

* Mix the semen sample with a wooden stick, as motile sperm cells will try to swim upward and dead cells will settle to the bottom.
* For gross motility use 2 wooden sticks to place a drop of semen on a warm slide.
* Do not use a cover slip and examine the cells under a 10X objective.
* The motility is judged by the swirling motion(waves) of the sample.
* The swirling pattern will definitely indicate that there are cells alive.
* The swirling looks like currents and eddies (like a fast motion weather map).
* live cells will carry the dead cells.
* The gross motility will tell you though that the cells are alive.
* Gross - swirl pattern in bull, ram and buck.

**Bull semen mass activity rating system**

|  |  |  |
| --- | --- | --- |
|  scale | Scale % | Type of motility |
|  5 | 90 – 100  | Fast dark wave  |
|  4 | 70 – 80  | Moderate brownish wave |
|  3 | 60 – 70  | Slow yellowish wave |
|  2 | 40 – 50  | No wave – high individual  |
|  1 | 20 – 30  | No wave – low individual  |
|  0 | 10 | No motility |

 B-Individual motility is examined next.

Individual motility checks for the forward progressive movement of the sperm cells.

* + Make the sample by placing a drop of diluent (saline or Na citrate) on a warm slide.
	+ Place a small amount of semen into the saline.
	+ You want about 10 cells/high power field in order to accurately estimate the number of cells that are progressively moving across the field.
	+ Then place a warm cover slip on the drop.
	+ Examine the sample under high dry (40X) power.
	+ You must examine the sample quickly as the motility changes very rapidly with heat, light, and cold.

**Rate of progression of bovine spermatozoa**

|  |  |  |
| --- | --- | --- |
|  Rating |  % | Microscopic appearance |
|  0 | 0 – 5 | no sperm movement |
|  1 | 10 – 20  | slight tail undulation without forward motion |
|  2 | 30 – 40  | slow tail undulation with slow or stop and start forward motion |
|  3 | 50 – 60  | forward progression at a moderate speed |
|  4 | 70 – 80  | rapid forward progression |
|  5 | 90 – 100  | very rapid progression in which cells are difficult to follow visually |

Individual motility A-Normal: progressive forward motility

 B- Abnormal: defects in tail or head of sperm

1. Progressively backward motility - defect in tail.
2. Circular motility –defect in tail.
3. Oscillatory motility – defect in head.