DIARY MANAGEMENT

The main reason why farmers keep diary cattle is the production of milk.

Milk is a white nutritiuos liquid produced by a cow (lactating animal) after successful parturition.

The lactating cow produces milk from the time of parturition to the period of drying off.

Common diary breeds include;

- Hollestein Fresian
- Guernsey
- Ayrshire
- Jersey
- Brown Swiss

Characteristics of a good diary breed.

- ★ It is wedge or triangular shaped ie thin at the head and wide at the rear.
- ★ Have pronounced milk veins for good supply of blood to the udder.
- ★ Well spaced teats which are long enough.
- ★ Well attached udder.
- ★ Large capacity of udder.
- ★ Have long gestation period.
- ★ Should be able to produce a lot of milk.

Benefits/ advantages of diary farming.

- ❖ The farmer has a stable source of income and employment to the family.
- ❖ The cattle convert fibrous materials which are useless into high food value products like milk.
- ❖ The animals are more efficient producers of human Food compared to other animals.
- ❖ Are sources of farm Yard manure.
- ❖ After their production cycle, they are fattened for meat production

Limitations of diary farming

- It requires a lot of labour.
- Requires a lot of capital investment.
- Milk is highly perishable.
- Requires a lot of skills, knowledge and modern equipment.
- It has alot of risks.

Requirements for successful diary production.

- ✓ High standard of management on
- ✓ Good feeding for the animals.

- ✓ Good stockmanahip to look after the animals.
- ✓ Proper diseases control.
- ✓ Equipment for feeding, diseases control, milking, etc.
- ✓ Processing and marketing facilities.

Milk composition

Milk is made of;

1. Water. 87.6%
2. Minerals. 0.7%
3. Proteins. 3.2%
4. Fats. 3.7%
5. Sugars. 4.8%

Proteins mainly **casein** are formed by combining amino acids, sugars (lactose) formed from from glucose and galactose and fats are formed from glycerol and acetic acid.

QUALITIES OF GOOD MILK.

- ➢ Good milk has good flavour.
- ➢ Should be clean without foreign materials.
- ➢ Has a good keeping quality ie can stay for so long time without going bad.
- ➢ Safety to consumers ie should have no germs to cause diseases like tuberculosis.
- ➢ Nutritiuos containing all food values.

Why milk is highly perishable (reasons why milk easily go bad).

- ★ Contains alot of fats which easily go rancid
- ★ Contains alot of nutrients which are liked by germs.
- ★ Contains alot of water
- ★ Can easily absorb bad smell from the surroundings.

MILK SYNTHESIS, SECTION, LET DOWN AND HOLD UP.

MILK SYNTHESIS.

This is the making of milk. It's done by the secretory cellsof the alveoli found in the udder. The cells of the alveoli extract raw material like water, sugars and glycerol from the blood stream and use the nutrients to make milk. The whole process is controlled by the Luetenising hormone.

MILK SECRETION. (Lactogenesis).

This is the release of milk from the secretory cells into the alveoli cavity to the ducts and then gland cistern. This is controlled by the **leutenising hormone** secreted by the **anterior pituitary gland**.

Milk secretion begins some few months before calving usually during the **steaming up** period.

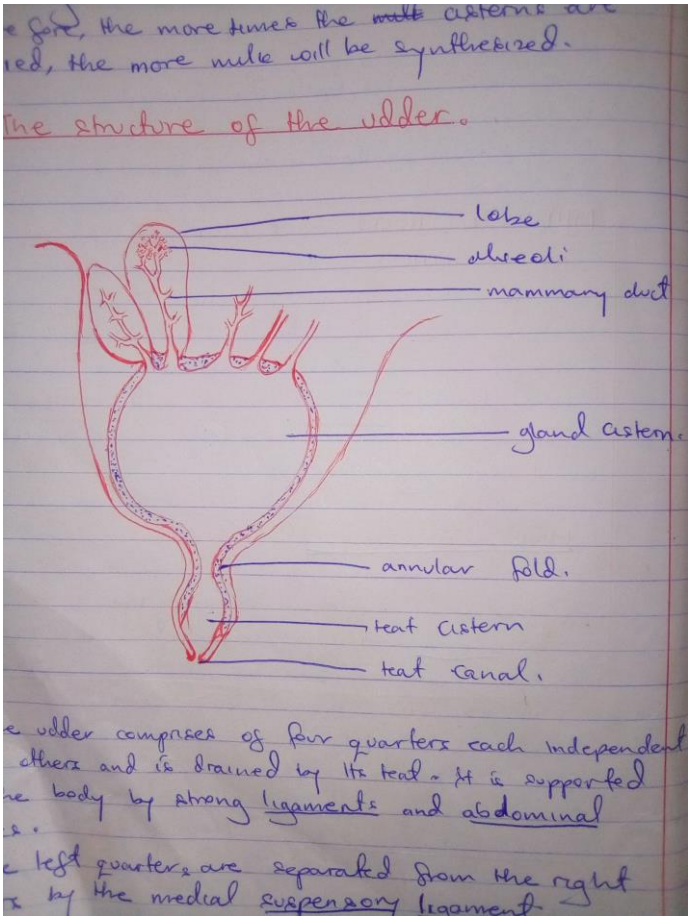
Milk secretion take place in the udder under the influence of **prolactin hormone** controlled by the **anterior pituitary** gland. A fall in the body level of **progesterone** initiate milk secretion and it happens just after **paturition**.

As the process of digestion and absorption take place, more raw materials are brought to the udder by blood vessels. Therefore milk has to be removed from the alveoli cavities and gland cistern during the process of milking. This ensures constant milk secretion.

Therefore, the more times the cisterns are emptied, the more milk will be synthesised.

The structure of the udder.

The udder comprise of four quarters each independent of the others and is drained by its teat.it is supported on to the body by strong **ligaments** and **abdominal muscles**.



The left quarters are separated from the right quarters by the medial **suspensory ligament**.

The secretory glands are composed of tiny spaces called alveoli which are lined by cells which secrete milk. The alveoli open into small ducts which converge into large ducts which open into the udder cistern.

QUALITIES OF A GOOD UDDER.

A good udder has,

- ★ Four well developed spaced teats.
- ★ Should be soft to touch.
- ★ Should be big enough to hold More milk.
- ★ Should not be liable to infection.

ABNORMALITIES IN THE UDDER.

- Blood stains in milk due to Mastitis.
- Udder inflammation due to bacteria infection like Mastitis.
- Congestion; udder swells before calving and when milking is skipped.
- Failure of milk let down especially in newly calving heifers.

MILK LET DOWN.

This is the down flow of milk from the alveoli cavities, mammary ducts, into the gland and teat cisterns.

Milk let down is controlled by the hormone oxytocin, secreted by the posterior pituitary gland. In order for oxytocin to be produced,the animal has to be stimulated by;

- Washing and massaging the under with warm water.

- Sight/ seeing the calf at milking time.
- Approaching of milking time.
- Suckling by the calf.
- Noise made by knocking of milking utensils.
- Attaching of teat cups on to teats.

When the animal is stimulated, a message is sent from the udder to the brain and the posterior pituitary gland secretes oxytocin hormone into the blood stream

Oxytocin is pumped to the udder and it causes contraction of the udder muscles surrounding the alveoli and dilation of the Annular fold leading to the down flow of milk.

MILK HOLD UP.

This is the situation where by milk let down is stopped due to secretion of adrenaline hormone by the adrenal gland.

Milk hold up may be due to ;

- ★ Un usual noise.
- ★ Pain due to poor milking techniques.
- ★ Beating the animal.
- ★ Backing by dogs.
- ★ Etc

CLEAN MiLK PRODUCTION.

Milking is a daily routine carried out on the diary farm.

Milking is the process of removing milk from the gland cistern and teat cistern into a container. It can be done with hands or Machines.

The process of milking is divided into;

a) preparation of the milking she'd and utensils.

b) preparation of the cow.

c) preparation of the milker.

PREPARATION OF THE MILKING SHED AND UTENSILS.

- ✓ The milking she'd should be scrubed clean before actual milking starts and allowed to dry or swept Clean in case no scrubbing is required.
- ✓ In case of machine milking, the teat cups and milk storage tank should be washed clean.
- ✓ Ensure that the whole milking machine is in good working condition.
- ✓ Clean the feed troughs and fill them with concentrates.
- ✓ Remove any material that may Tait milk.
- ✓ Clean and dry the milking utensils eg. pails, stainer, strip cups, etc.
- ✓ The utensils should be with in easy reach.

PREPARATION OF THE COW.

- ★ The animal should be allowed to assemble in the milking area in a good time to allow them to settle. I
- ★ The hind legs are tied with a milkers rope and udder washed with warm water mixed with disinfectant.
- ★ The udder is then wiped dry with a clean disposable towel.
- ★ Brush/ groome the hind quarters to remove loose hair and dust.

PREPARATION OF THE MILKER.

The milk man / woman should do the following before milking starts.

- ❖ Wash hands well with soap and dry them with a towel.
- ❖ Cut off finger nails.
- ❖ Put on clean clothes (overall).
- ❖ Put on a cap.
- ❖ Should be healthy and not suffering from infectious diseases like Typhoid and Tuberculosis.

PROCEDURE OF CLEAN MiLK PRODUCTION.

In order to produce clean hygienic milk on the farm, the following procedure should be followed.

- ➢ Ensure that the milking shed or parlor is clean before milking starts.
- ➢ The milking utensils should be washed with disinfectant and sterilised in the sun to kill germs.
- ➢ Milk cows which are free from Mastitis fast.
- ➢ The milker should wash his/ her hands and dry them before milking.
- ➢ The milker should cut off finger nails.

- The udder of the cow should be washed with warm water mixed with disinfectant and dried with a towel to prevent spread of Mastitis.
- The milker should put on a clean cap.
- The milker should put on clean clothes.
- The hind quarters of the cow are brushed to remove any loose hair and dust.
- Put feeds in the feed troughs so that the animal is not excited while being milked.
- A few streams of milk are drained from each teat into a strip cup to detect Mastitis.

  Animals with Mastitis should be milked last and their milk poured.

- Smear a milking salve/ jelly on the teats to reduce friction and cracking of the teats.
- Use Clean utensils to avoid contamination of milk.
- Use milk utensils with smooth inner wall to ease cleaning.
- Use aluminum or Plastic containers to avoid contamination of milk.
- Do not feed cows on silage before and during milking to prevent taiting milk.
- Filter milk after milking to remove foreign materials.
- Cover the milk well to prevent dust and flies falling into milk.
- Keep milk in a cool place to reduce multiplication of microorganisms.
- Keep utensils in clean stores upside-down to prevent dust and dirt settling in them.
- Scrub the shed clean.
- Record the milk produced in litres.

REASONS FOR USING A STRIP CUP.

- To detect Mastitis in milk.
- To remove milk low in butter fat content before actual milking.
- To remove milk high in living organisms usually found in the teat cistern.

METHODS OF MILKING.

There are two methods of milking;

Hand milking

Machine milking

HAND MILKING.

- The milker squats and ties the hind legs with a milkers rope, wash the udder with warm water and dries it with a clean towel. He then applies the salve on the teats to avoid cracking.

- The thumb finger is then placed along the teat and the index finger closes the top of our the teat. The pressure is exerted on the teat by squeezing the teat Rythmically. The milk trapped in the teat cistern is drawn downwards into the container.
- Avoid pulling the teats during milking as this may lead to milk hold up.

MACHINE MILKING

A machine is common equipment on large diary farms where hand milking may be impossible.

MILKING TECHNIQUES

- ✓ Before milking starts, wash the udder with warm water, dry it with a towel and provide the cow with a diary meal.
- ✓ Tie the hind legs with a milkers rope.
- ✓ Wash hands and dry them with a clean towel.
- ✓ Squat or sit on the milkers stool on the side of the cow near the udder.
- ✓ Apply milking salve on the teats, do not use water, Milk or saliva to lubricate teats.
- ✓ Rinse your hands with clean water.
- ✓ Draw streams of milk from each teat into a strip cup to detect Mastitis.
- ✓ Place the thumb finger along the teat and the index finger above the teat and squeeze **Rythmically** downwards.
- ✓ Milk quickly but gently with in 5 - 8 minutes to maximize the effect of oxytocin.
- ✓ Avoid exciting the animal during milking.

DRY COW THERAPY.

We have looked at drying off in care and management of the pregnant cow.

Drying off can be done using the **dry cow therapy.**

In this method, antibiotics are mixed in the feeds and inhibit the process of milk section. As a result, no more milk is produced.

MARKETING OF MILK.

Milk is highly perishable product and should be sold off or processed immediately before it goes bad.

To ensure effective marketing, the producers should not add anything to it in anyway of processing it, or increasing it's quantity. Such practices include addition of water and floor.

The process of marketing milk can be carried out by cooperative, processing plants and milk venders.

FACTORS AFFECTING MILK YIELD AND QUALITY.

Quality and quantity of MiLK produced on the farm is affected by the following.

- **Breed** : exotic breeds produce more milk than local breeds but local breeds produce milk with high butter fat content.
- **Age of the animals:** Dams produce more milk than heifers while young animals produce milk with high BFC.
- **Heat period**: there is variation in quantity of milk when the animal is on heat. This is due to loss of appetite and excitement which increase the level of adrenaline.
- **Diseases**: Blood clots and pus lower the quality as in the case of Mastitis. Also cows with Mastitis have their milk poured away reducing yield.
- **Stage of lactation :** Milk yield increases as the lactation period advances and reduce towards drying off. Similarly BFC is low after calving and increases in the later stages.
- **Feeds:** poor feeds affect the quality and quantity of milk as they lack food value.
- **Stage of pregnancy:** Milk yield increases with pregnancy period and declines towards drying off.
- **Interval of milking :** more milk is produced when the milking interval is shorter and the BFC is high when milking interval is longer.
- **Temperament :** Docile animals produce more milk with consinstent BFC than nervous ones.
- **Season of the year:** milk yield is higher in the rainy season due to abundance of pastures and water. However, BFC is higher in the dry season.
- **Milking techniques :** The way the animal is handled during milking influence the quantity of Milk obtained. If well stimulated, the animal release all milk.
- **Amount of water;** when a lactating cow is deprived of adequate water, the milk produced will be concentrated and it will be a low yield.

DETERMINING THE QUALITY OF MILK.

The quality of milk is lowered by adding water and solids like flour. This affects the **specific gravity of the milk.**

When the two are added, the specific gravity lowers or increases above 1.032 respectively.

A lactometer is used to this. A higher reading means that solids have been added while a lower reading water has been added.

MILK PRODUCT'S.

Milk can be consumed when processed instead of raw milk. Processing reduces the spread of contagious diseases like Brucellosis and also help to preserve excess milk.

Milk can be processed into various products like;

- Skimmed milk
- Yoghut.
- Butter.
- Ghee.
- Cheese.
- Powdered Milk.
- Condensed milk.

Yoghut (curd).

Whole milk is boiled and allowed to cool to atmospheric temperatures. It is then **inoculated** with bacteria and incubated until complete fermentation occurs.

It is cooled and flavoured into various flavours like sugar, salt or fruit juice.

Milk with high BFC is churned in an open pan to separate it from liquid milk.

GHEE;

Involves heating butter in an open pan to evaporate the water. Non fat solids settle at the bottom and ghee is skimmed off.

CHEESE.

Milk is standardized to 6% fat and is heated to 78°C for 20 second, cooled to 35°C then ***Streptococcus lactis*** is added as an active acid starter followed by enough rennin solution to make coagulation. Salting is done and whey (liquid) is drained off. Cheese is allowed to ripen.

CONDENSED MILK: Amount of water is reduced from the milk and sugar is added.

SKIMMED MILK : This is Milk with reduced butter fat to about 1%.

DRIED MILK (POWDERED MILK). Water is evaporated from milk on a roller to give a **browny powder**.

Revision questions.

1. Briefly describe the process of Milk synthesis and let down.
2. Explain the factors affecting Milk yield in a cow?
3. Give the procedure of clean Milk production.
4. Describe the procedure of hand milking.
5. Describe the structure of the udder.
6. Describe the characteristics of a diary animal.