

# MICROBIOLOGY OF MILK

## DTM-121



**Dr.Sonia Kumari**

Asstt.Prof cum Jr.Scientist

SGIDT, Patna

# CONCEPT OF CLEAN MILK PRODUCTION (CMP)

- ◉ Clean Milk-Milk drawn from udder of healthy animals, Which is collected in clean environment Free from dust and dirt,flies hey and manures etc .
- ◉ Clean milk has abnormal flavour
- ◉ with low bacterial counts and safe for human consumption

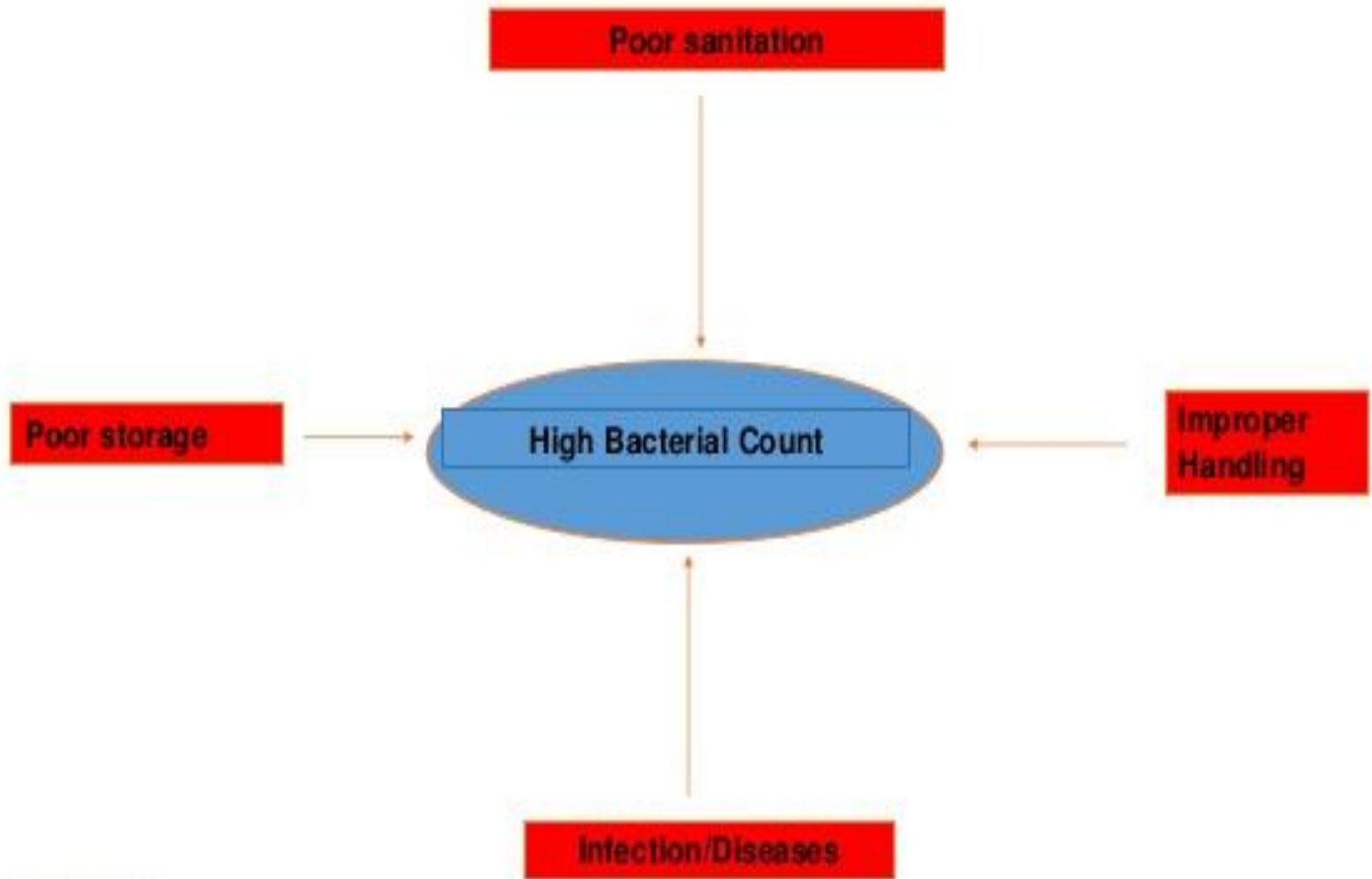
- ⦿ Milk from udder- normally sterile contain protein lipids and lactose and minerals.
- ⦿ Ideal medium for growth of microorganisms.
- ⦿ Need to be protected from all possible source of contamination.
- ⦿ Application of hygeinic practise at the time of milking is very important

# CMP-BENEFICIAL FOR BOTH PRODUCERS AND CONSUMERS

- ◉ Safe for human consumption
- ◉ Better keeping quality
- ◉ High commercial value
- ◉ Protection against diseases like typhoid, dysentery septic sore throat.
- ◉ Help to produce good quality products.
- ◉ Transportation over long distance

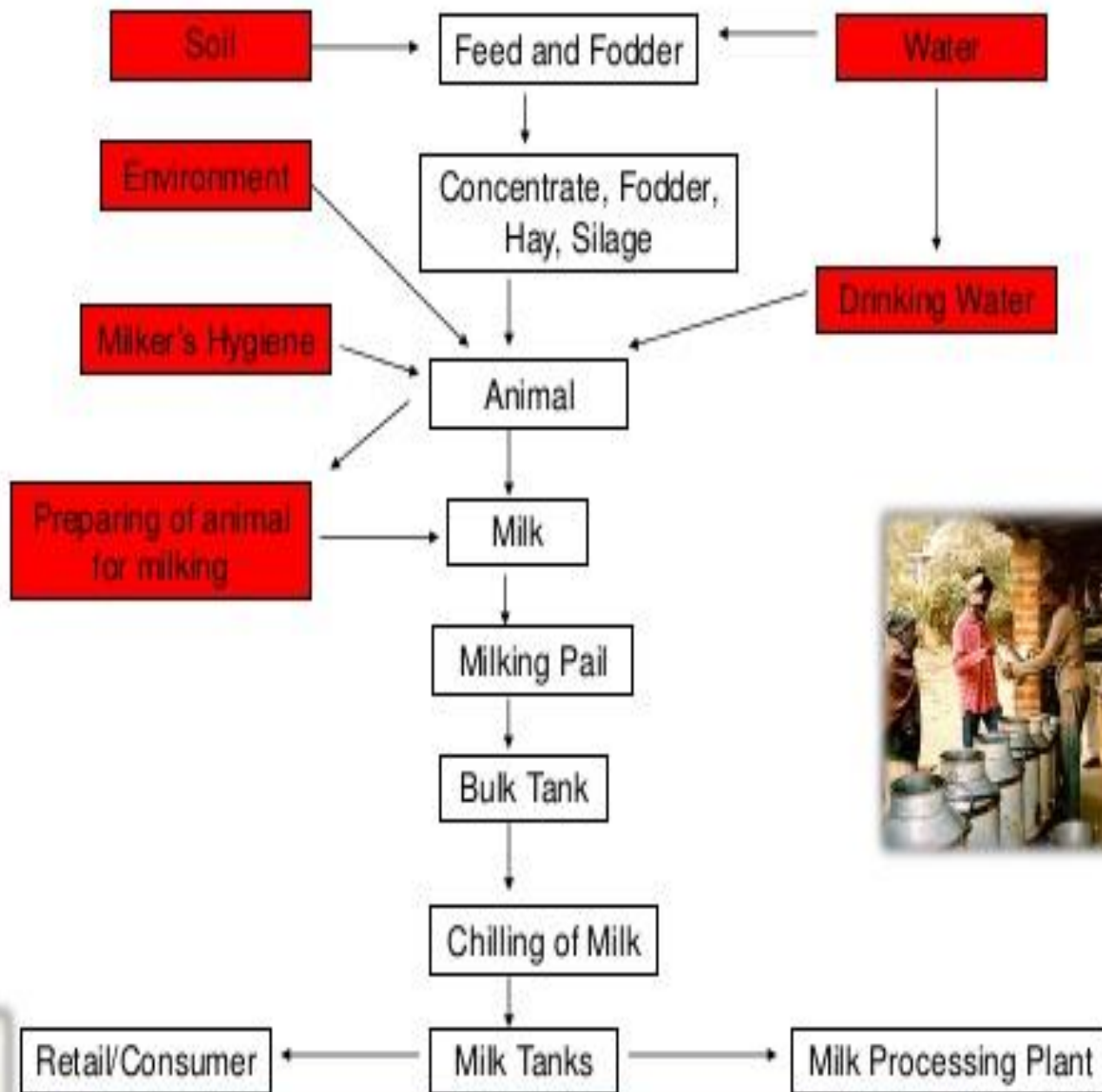
# FACTORS AFFECTING CMP

- ◉ Milk-Source of calcium and Protein
- ◉ Milk is most easily perishable and contaminated commodity
- ◉ Milk should be stored and chilled immediately
- ◉ Maintenance practice from milking to factory.



**Causes of high bacterial load in milk**





**Source of contamination of milk**

## Internal factors

- Udder infection – Mastitis
- Foremilk – contains large no. of bacteria

## External factors

- Cow/animal's body
- Udder and teats
- Milk Storage utensils
- Milking Utensils
- Milker – hygiene and habits
- Method of milking
- Feed and water
- Milking environment





# CORRECTION OF CONTAMINATION AT VARIOUS LEVEL

- ◉ Animal management
- ◉ Hygiene of milking equipments and utensils.
- ◉ Milking and Milker practice
- ◉ During storage and transport
- ◉ Personal hygiene

# MEASURES TO OBTAIN CLEAN MILK PRODUCTION

## 1. Animal Management at Farm level-

- Feeding
- Housing
- Animal Health

## 2. Cleanliness of Milking equipment.

## 3. Hygienic Milking Practice.

## 4. Cooling

# ANIMAL HEALTH

- ◉ Milk from healthy udder-free from harmful microorganism
- ◉ High bacterial count reduces the keeping quality of milk
- ◉ Animal management involved feeding, Housing and Health management.

# FEEDING

- ◉ Balanced feed with appropriate quantity of green fodder, straw and concentrates having essential nutrients and minerals is important.
- ◉ Feed ingredients should be stored in moisture free condition.
- ◉ Feed and Fodder should be free from environmental contaminants like, pesticides, insecticides fungicides.
- ◉ Fumigants, Pathogenic agents Aflatoxin and heavy metals etc

- ◉ Good quality straw and supply of minerals and vitamins
- ◉ Feeding should be made one hr before milking
- ◉ During milky non dusty concentrate can be given to animal to keep them calm
- ◉ Silage and wet crop residue should not be feed at milking place as it may impart foul odour to milk

# HOUSING

- Protects animals against micro-organisms, people, wind, rain, heat etc.
- Mud, urine, faeces and feed residues should be regularly removed from the shed
- Shed should have proper drainage, sufficient ventilation and lighting
- Sufficient water facility should be available for drinking as well as washing the shed and animal



- ◉ Shed: well roofed, well ventilated dry, comfortable with adequate elevation
- ◉ Appropriate arrangement for disposal of animal waste (Manure pit or biogas plant and leftover feed and fodder).

Protection from flies and mosquitoes which may be potential source for contamination

Piggery and Poultry farming should be avoided near animal shed

# ANIMAL HEALTH

- Pre-requisite for CMP – healthy herd
- Routine examination of cattle for diseases like TB, Brucellosis etc.
- Diseased animals should be kept separate
- Sanitary precautions to prevent and control diseases should be adopted
- Using inducer drugs should be avoided
- Check for udder wounds and mastitis.
- Vaccination of animals against FMD, Anthrax, etc. should be done regularly





# CLEANLINESS OF MILKING EQUIPMENTS AND UTENSILS

- Milking equipments : Milking pails, milking machine, milk cans, milk pipeline recorder, bulk, strainer, chiller, Bulk tank and storage tank etc.
- Residual milk in utensil – growth of microorganisms
- Proper cleaning removes germs and dirt
- Milk vessels should be cleaned before and after each milking rendering bacteria-free



- Detergents/chemicals used for cleaning should be non-injurious, non-toxic to health like Teepol
- Use of ash or mud not recommended
- Cleaned and sanitized vessels should be kept in inverted position
- Open buckets should not be used



# HYGIENIC MILKING

- Some organism may enter milk during hand milking and machine milking
- Floor sweeping just before milking should be avoided
- Milker's Hygiene
- Before milking, milker should clean his hands with soap, potable water and then wipe with clean cloth or towel



- Clean the udder and teats with warm water and wipe with clean cloth or towel
- After milking, teat should be dipped in antiseptic solution to minimize risk of infection
- Milking should be completed within 6-8 mins
- Milk should be strained using a clean cloth or a strainer. The cloth should be washed and dried daily



# COOLING

- To preserve the keeping quality of milk, it should be cooled as soon as possible to a temp. below  $5^{\circ}\text{C}$  in a refrigerator
- The sooner the milk is cooled after removal, the better is the quality
- Bacterial growth is retarded by cooling the milk within 2 hours of milking
- Delivery of milk to the factory or consumers should be as frequent as possible



# Thanks

