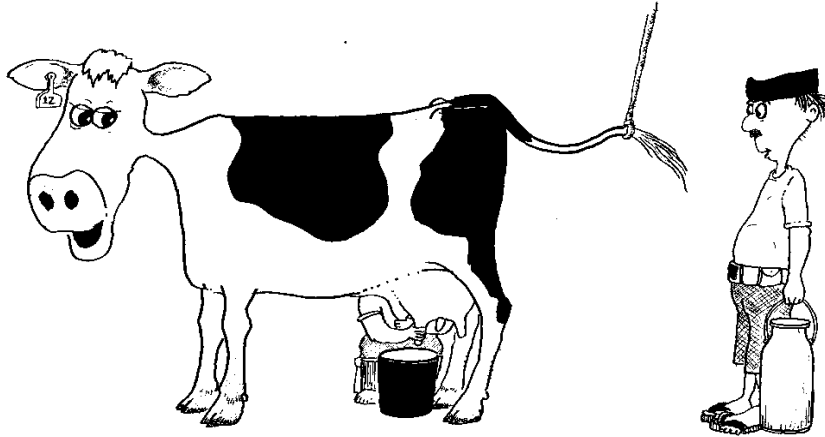


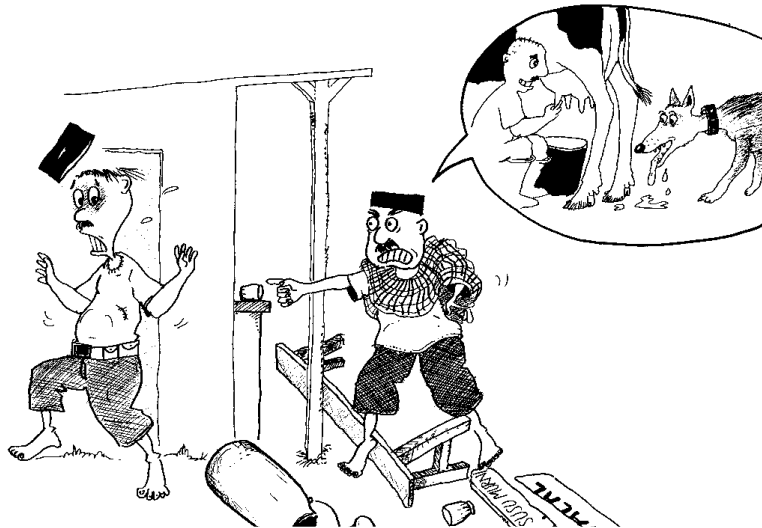
I. SANITARY MANAGEMENT OF MILKING

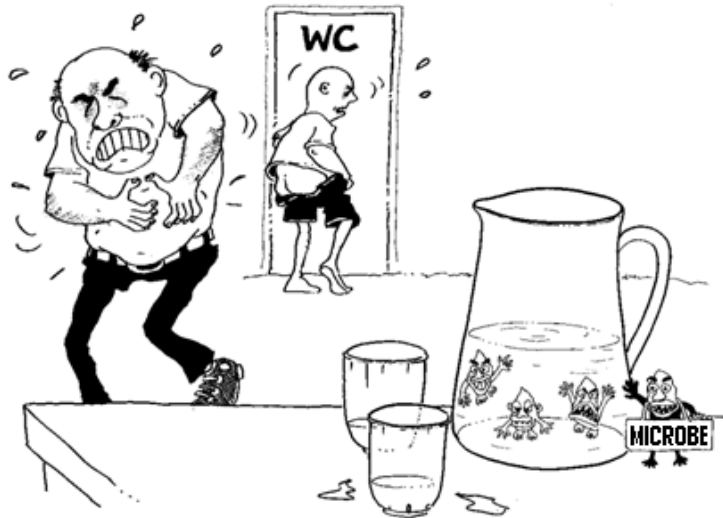


Milk is the most important outcome in dairy farming. The milk should fulfil the following condition.

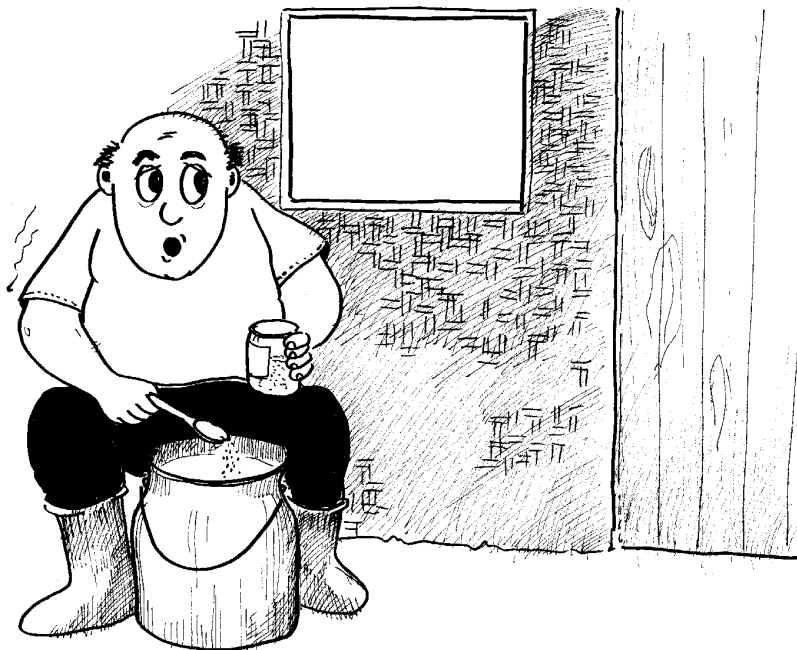
These are:

- a. **Intact** (not reduced the component or added any other material)
- b. **Healthy** (not contain any pathogen)
- c. **Safe** (not contain dangerous substance such as pesticide, heavy metal, antibiotics etc.)





Fresh milk will not be intact, if added with water, coconut milk, flour, or others. To sell the milk which has been reduced or added with something, as pure milk, will be a deceptive action. Such deceiving of milk is to violate the law.



Fresh milk which has illegal material, for example mixed with illegal or dirty material, will induce public apprehension. The public don't want to drink such milk at all.



Not-safe fresh milk, for example containing dangerous substance (heavy metal, pesticide, antibiotics residue from the cow's body) will endanger the public health consuming the milk as well as the milk processing industry.



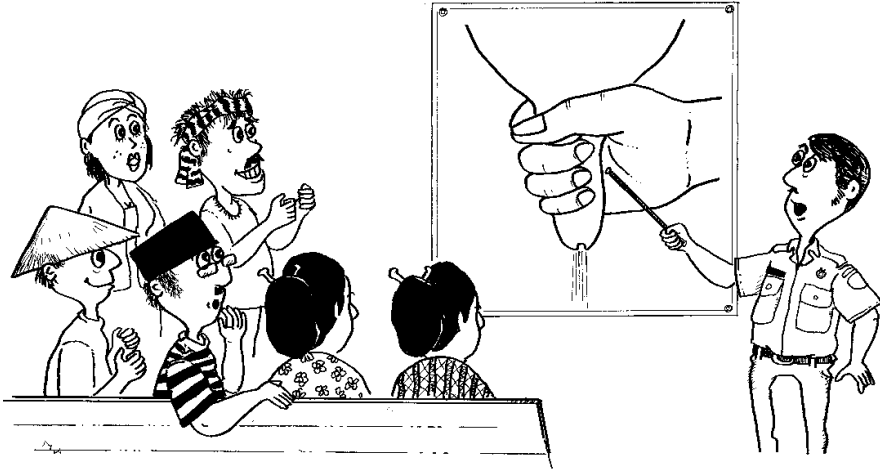
Nutrients in fresh milk such as fat and protein have a strong relation with the food given to cows. As a result of giving foods of low quality, the domestically produced milk's nutrient components will be lower than imported milk. Also, the **bacteria count** of domestic milk is high (more than 3 million/ml). If this condition continued, the imported milk will become more popular than the domestic milk.



The intact, healthy and safe milk will be obtained from:

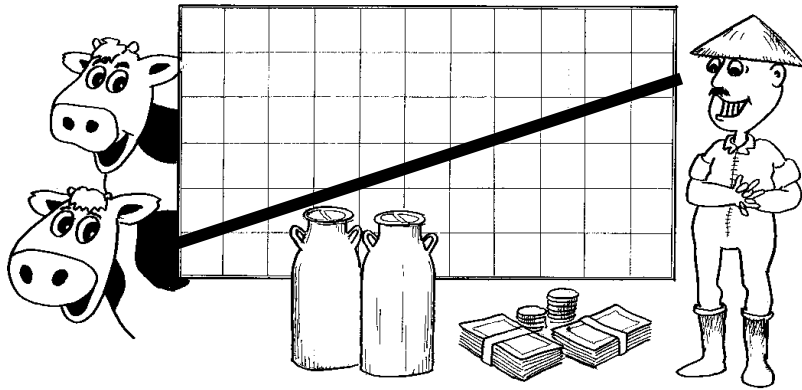
- a. Healthy cow, with healthy mammary,
- b. Good and correct milking procedures.

Based on the mentioned above, **Sanitary Management of Milking** is a very important matter in dairy farming.



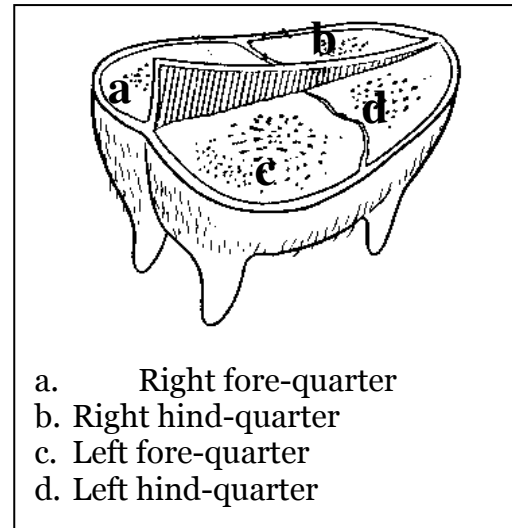
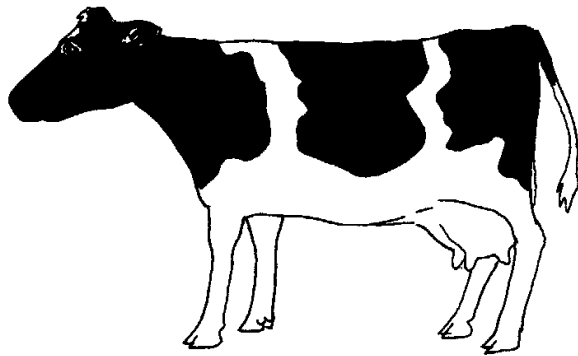
In educating the Sanitary Management of Milking, the necessary procedures before milking, during the milking and after milking should be instructed aiming at:

- a. To obtain intact, safe and healthy milk
- b. To take good care for healthy mammary
- c. To increase the milk production to optimal level

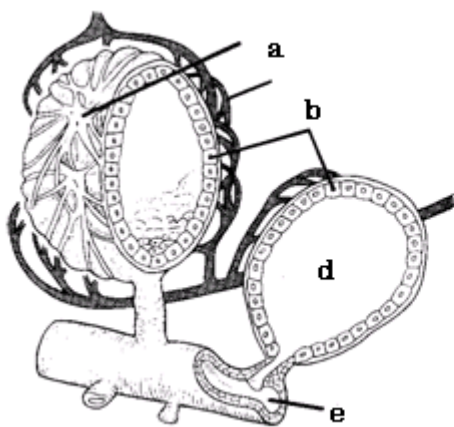


II. PRODUCING PROCESS OF MILK

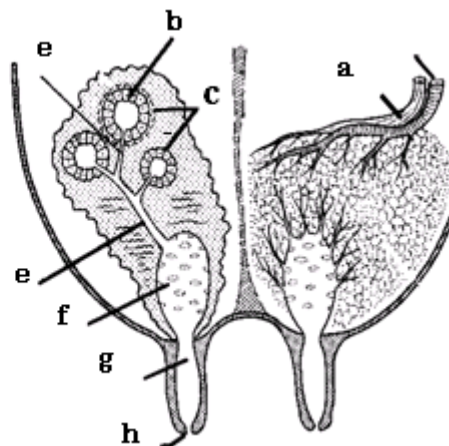
Inside the cow's body, milk is produced by mammary gland in the udder. The udder is separated to two, right and left. Each udder is separated to fore-quarter and hind-quarter. Every quarter has one



The mammary gland is composed with small vesicles (alveoli), so that the shape looks like a bunch of grape. The cells on the vesicle's wall secrete milk. The materials composing milk originate from the blood.

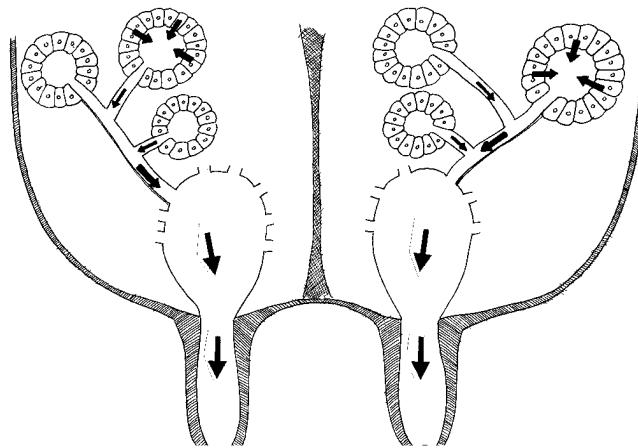


- a. Capillary vessel
c. Alveolus (mammary gland)
e. Milk duct

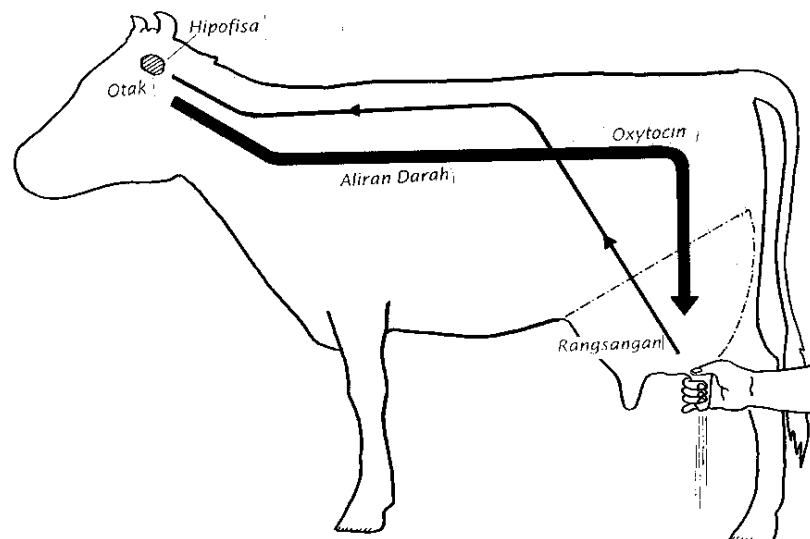


- b. Epithelial cell
d. Alveolar lumen

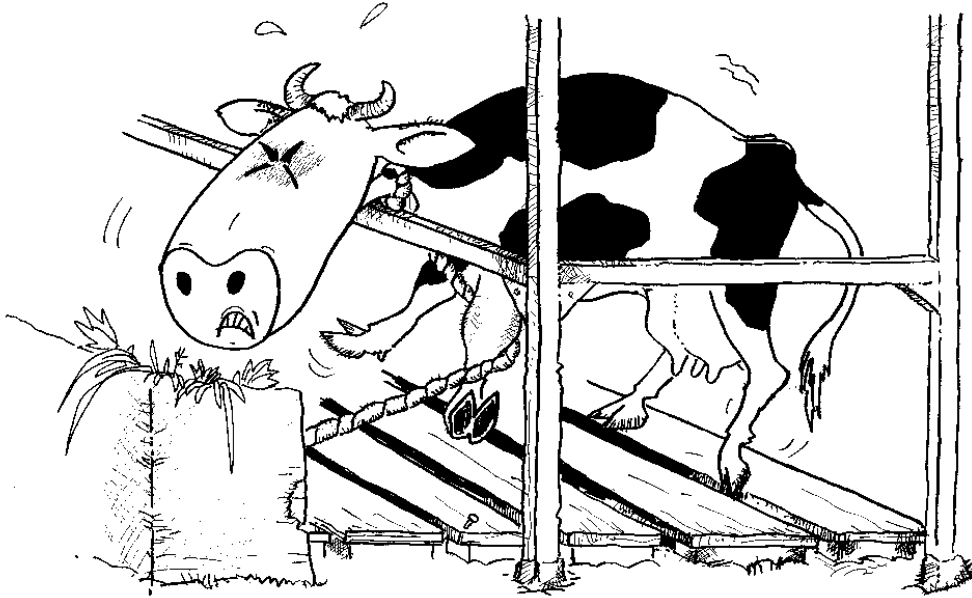
The milk flows out through small duct from mammary gland to gland cistern and teat cistern. In normal condition, the teat cistern is closed. The teat cistern will open by nervous stimulation or pressure, so that the milk inside gland cistern will flow out.



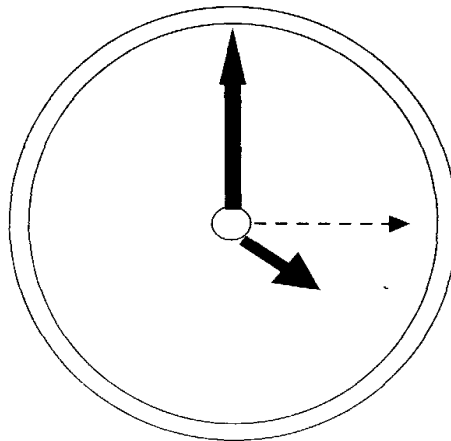
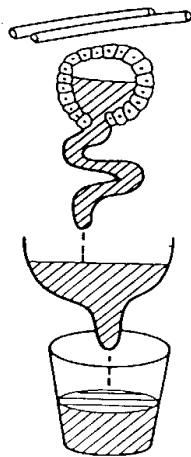
Calf's suckling, wiping or washing by warm water for udder will induce an excitement in the brain through nervous network. Then, the brain will excrete hormone oxytocin to the bloodstream. Oxytocin will cause the muscles in mammary gland to move, and the teat cistern to open, so that the milk will flow out.



Shock or rapid change will cause the cow to suffer **stress**. As a result, the excretion of oxytocin will be obstructed and only a little amount of the milk will flow out.



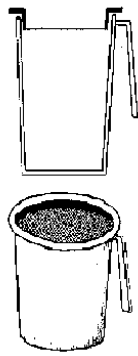
Oxytocin is effective for only 6-8 minutes. Therefore, the milking for one cow should be finished within 7 minutes.



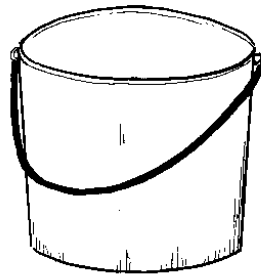
III. MILKING EQUIPMENTS

Necessary equipments for milking include:

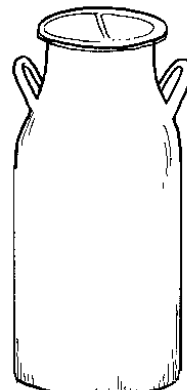
- a. Strip cup
- b. Bucket and milk can
- c. Wiping cloth for udder (**One cloth for one cow**)
- d. White cloth for filtrating milk (60 x 60 cm size)
- e. Brush
- f. Basket
- g. Bucket for used cloth
- h. Chemicals :
 - Soap for washing equipments
 - Disinfectant for bacteria in milking equipments, cloth, and filtrating cloth
 - Disinfectant for teat (dipping)



Strip Cup



Milking Bucket



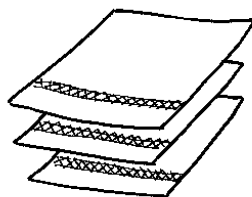
Milk Can



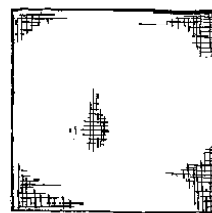
Sprayer



Disinfectant



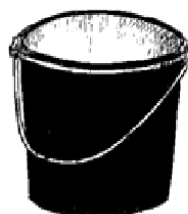
Wiping Cloth for Udder



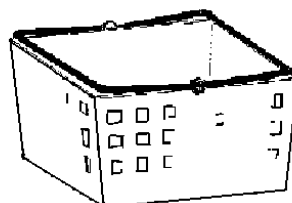
Filtrating Cloth



Brush & Soap



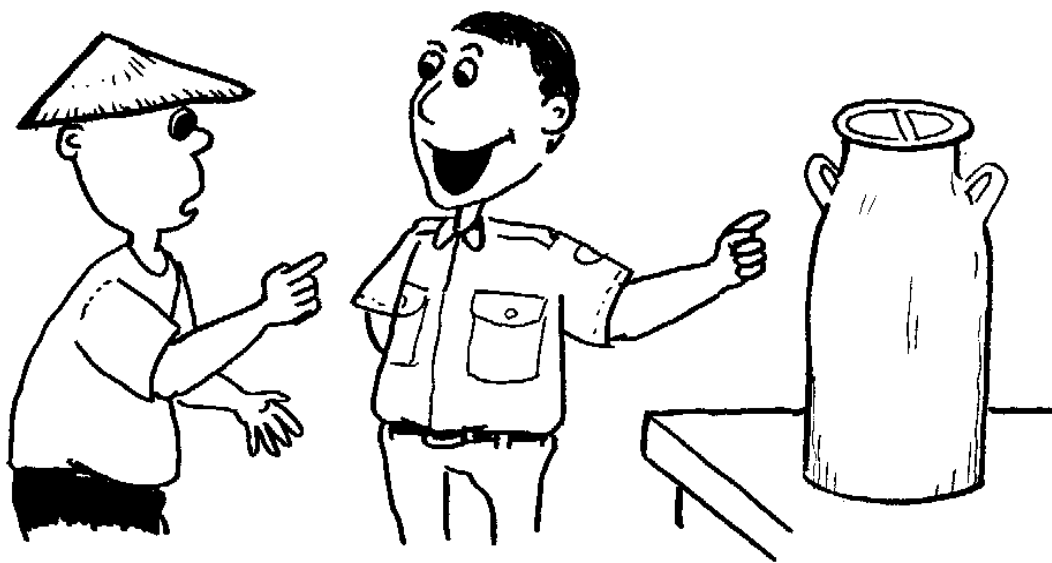
Bucket for Used Cloth



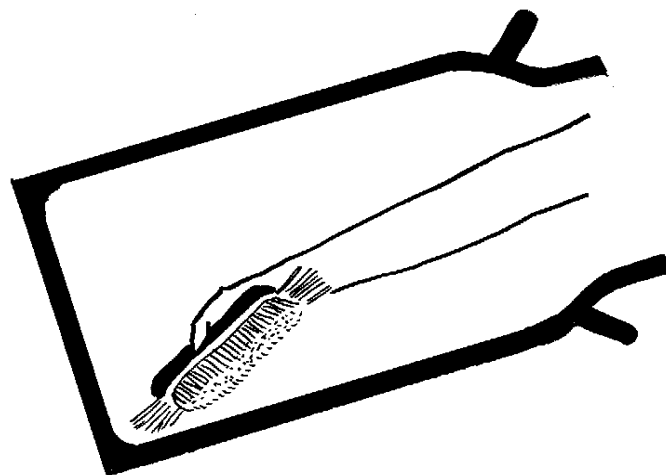
Basket

The equipments to keep and transport milk should fulfil the conditions as below:

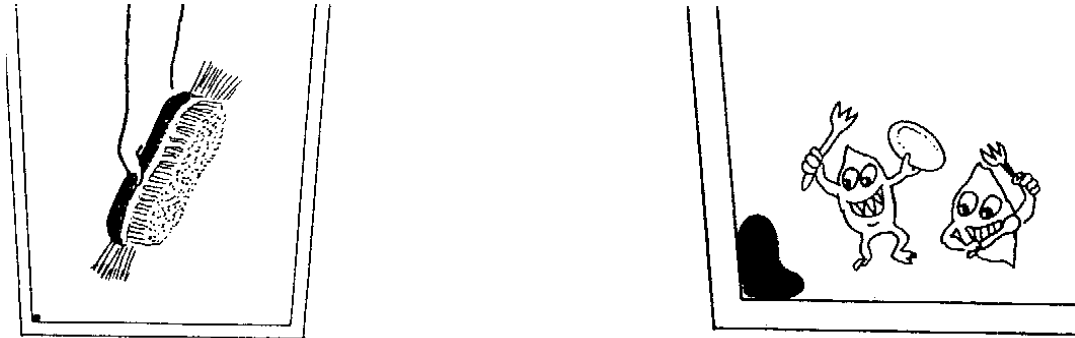
- a. Watertight
- b. Made with non-rusty material (stainless steel, aluminium)
- c. No cracks inside
- d. No reaction with milk
- e. No influence to the colour, smell and taste of milk
- f. Easy to clean and sterilized



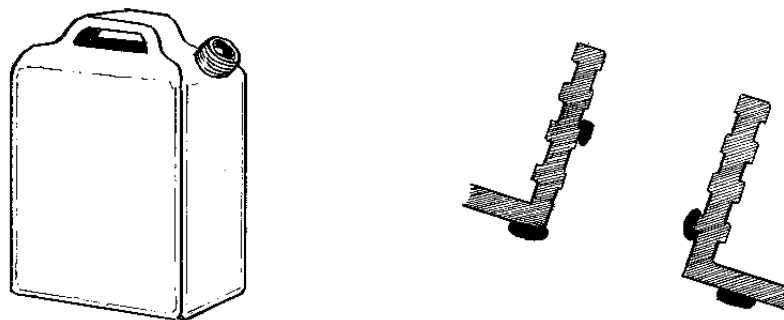
To clean the equipments, the deep corners should be brushed and cleaned.



The deep corner of the container which has sharp angle is difficult to clean by brush. The remained milk can attach to this place. Microbe can easily grow here, and the milk quality will down. Milk will be rapidly rotten.



A plastic bottle is not good for transportation of milk. The mouth of a plastic bottle which has screwed-cap is difficult to be cleaned. The remained milk can attach to inside the cap of plastic bottle.



Plastic drum is often used to collect milk at Milk Collecting Center. Inside the plastic drum can be easily cleaned using a brush. The remained milk can attached the deep corner of the container.



The preparation of milking equipments should be done in following steps:

1. Cleaning:

a. Cleaning with brush and soap

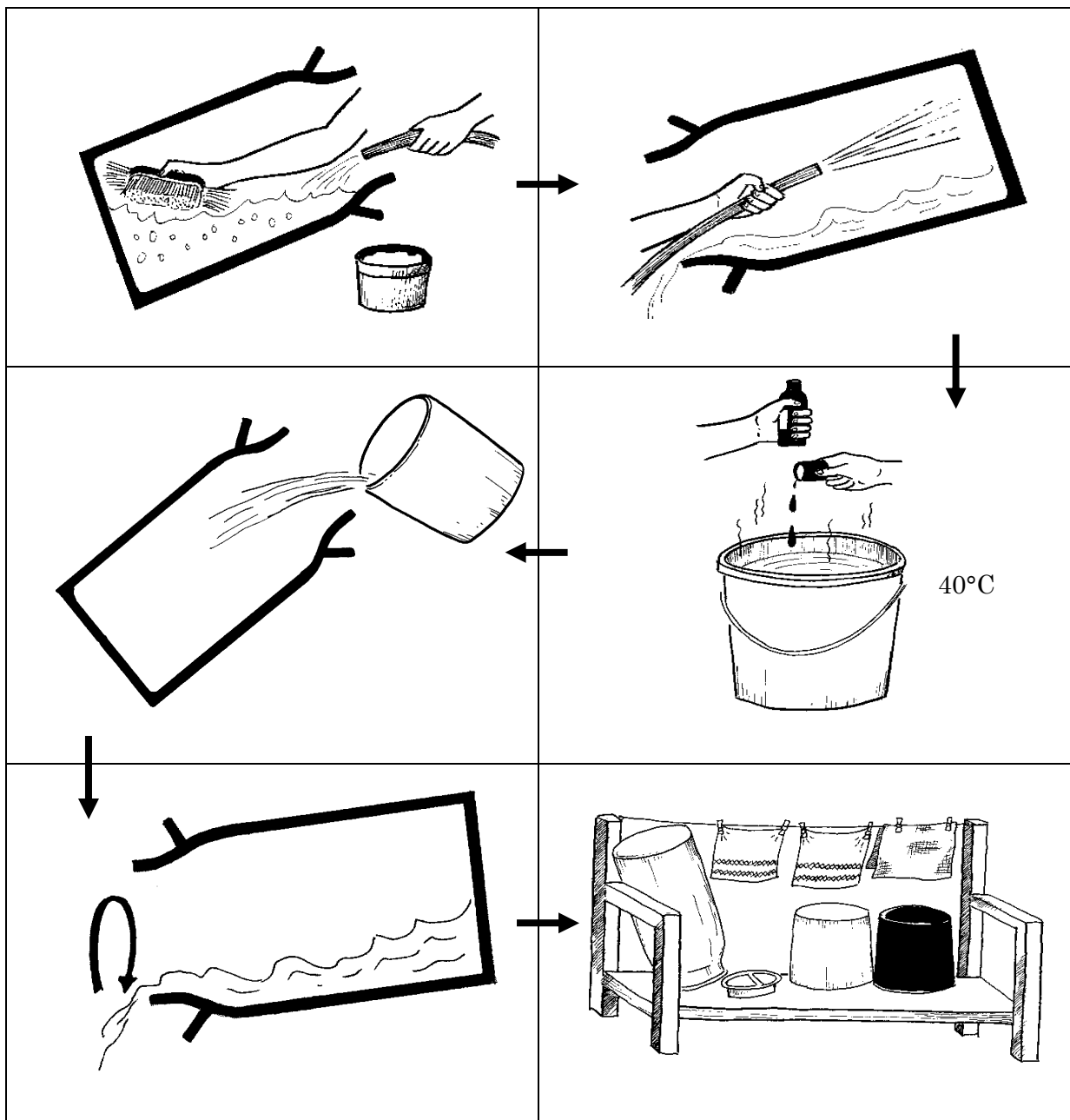
b. Rinsing with clean water

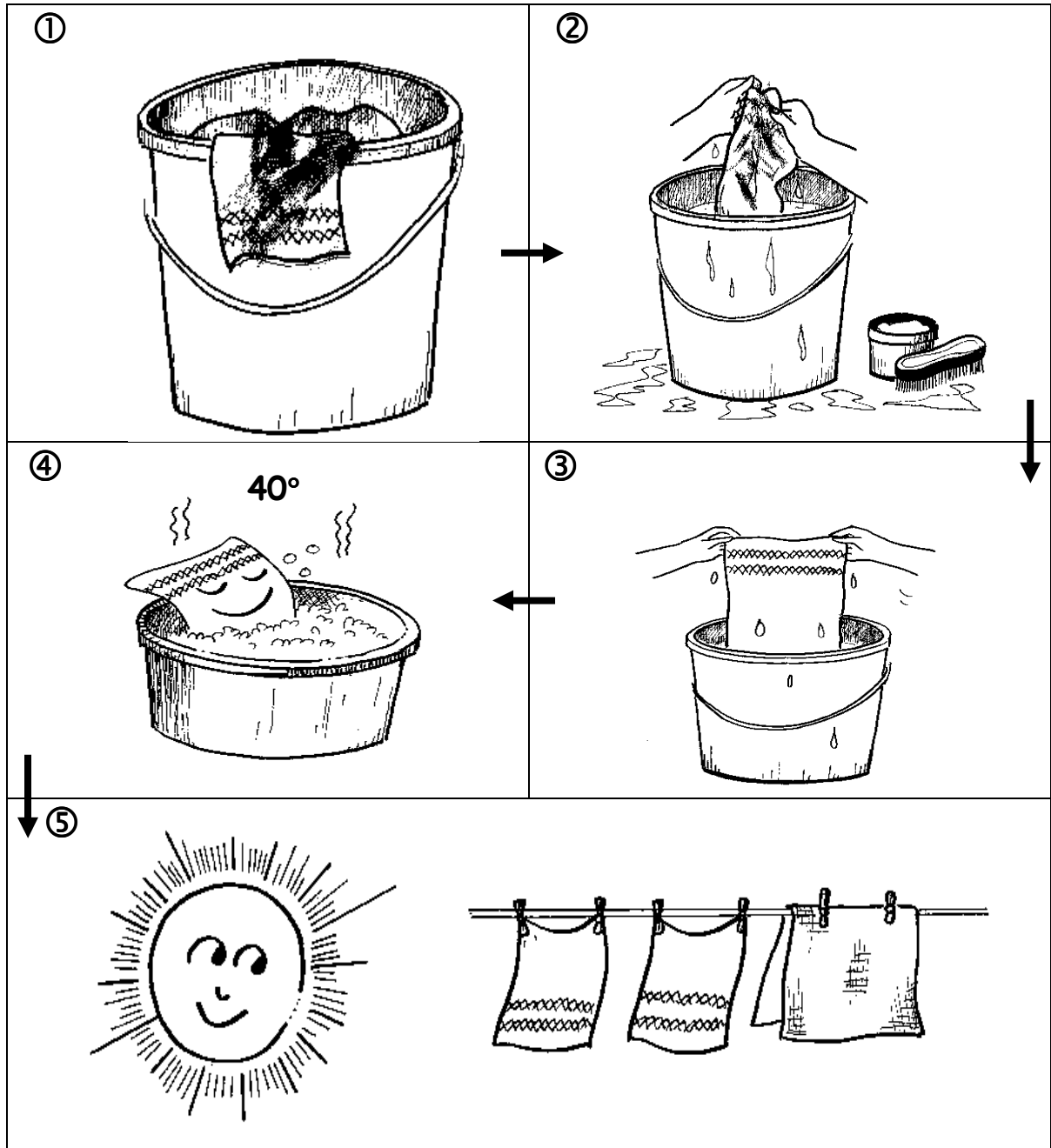
c. Rinsing with 40°C hot water or disinfectant solution. ***Example of disinfectant: “(Sodium hypochlorite)”, dose 200-500 ppm. If the dose exceed more than 500 ppm, the milk become smelled of “” !***

2. Drying of Milking equipments:

The cleaning of wiping cloth and filtering cloth:

1. Keeping the used wiping cloth and filtering cloth in a special bucket (after milking).
2. Washing the clothes with soap.
3. Rinsing the clothes with clean water.
4. Rinsing with 40°C hot water or disinfectant solution.
5. Sun-drying the clothes.

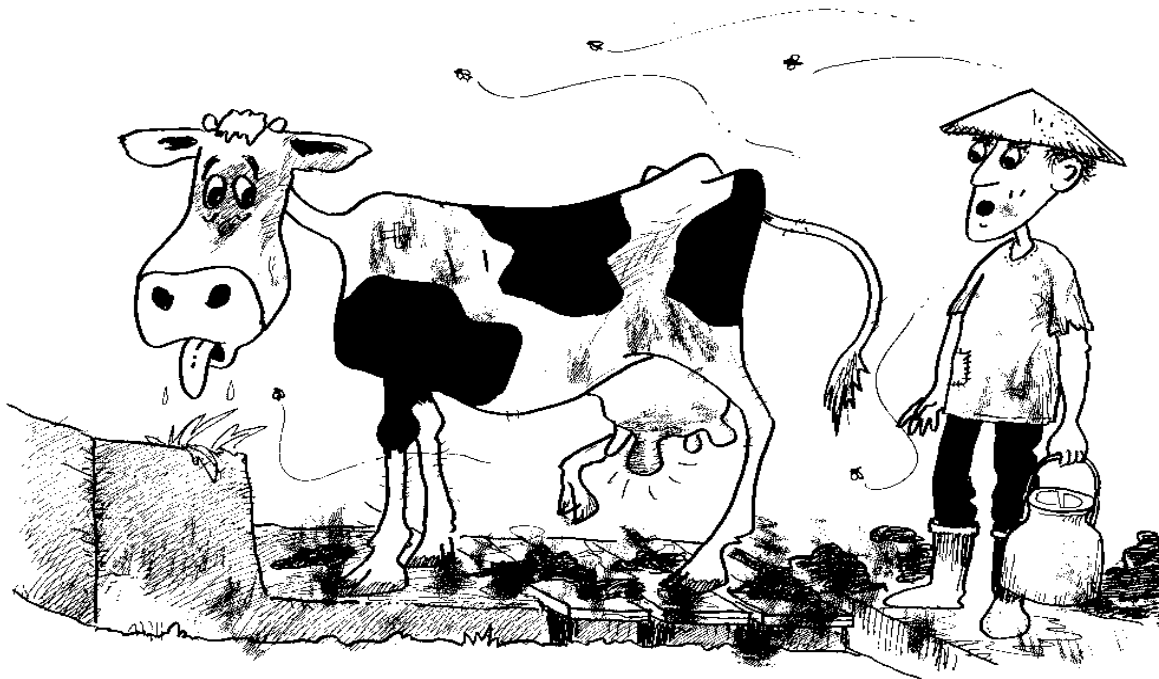




IV. CLEANING OF COW SHED

Dirty cow shed causes many loses, because:

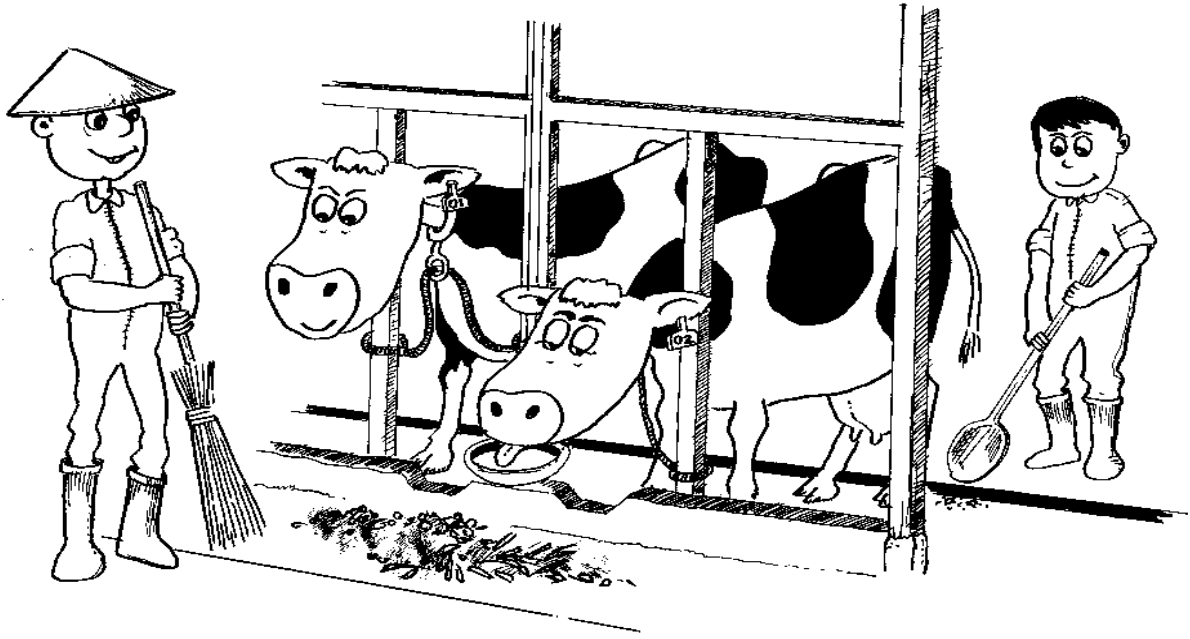
- a. Give bad effects on public health
- b. Give bad effects on the cattle itself. Dirty shed floor with lots of bacteria will make the teat dirty, then cause the “mastitis”.
- c. Reduce the milk quality :
 - Milk infected by bacteria will be easily rotten.
 - Milk will have a bad smell absorbing the shed’s smell.



Based on the mentioned above, the cleanness of the cow-shed should be always kept. The method is as follows:

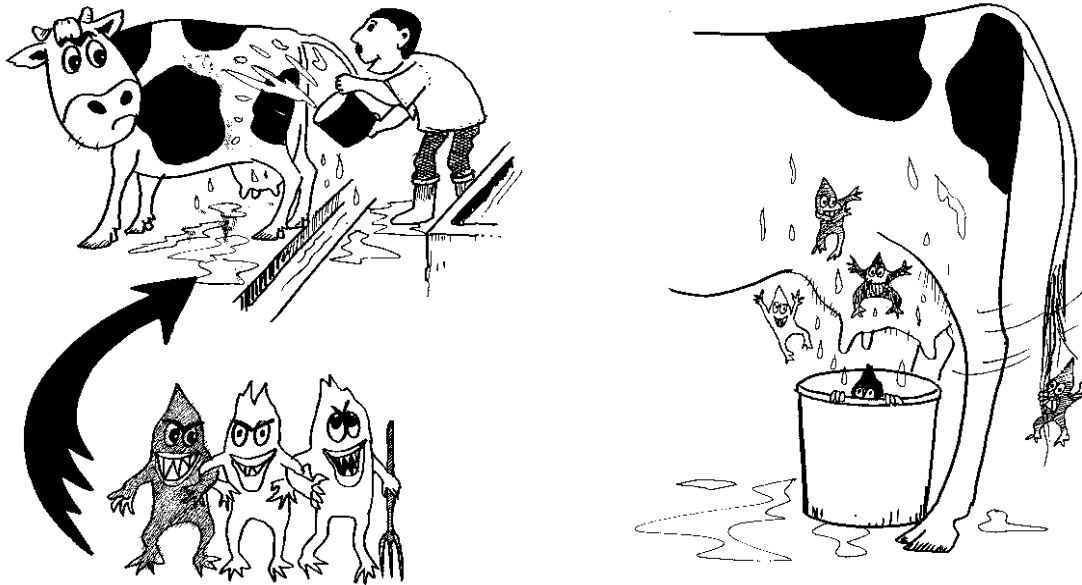
- a. To clean the food basin and water place.
- b. To cleaning the shed floor.
- c. To possess the specified place for storing or discarding the shed’s garbage.

Before, during and after the milking, the operations which raise dust should be avoided.

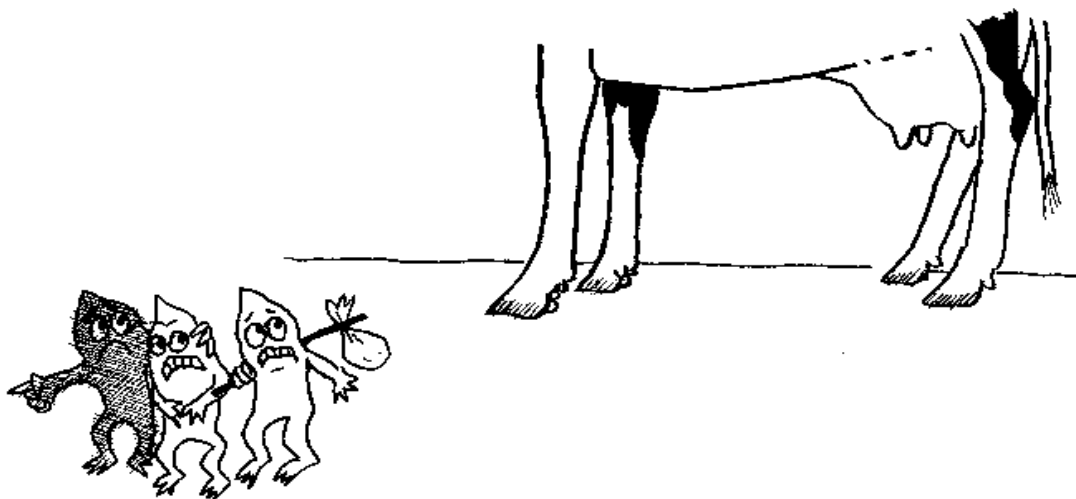


V. CLEANING OF COW'S BODY

The bacteria prefer a wet condition. Wet shed as well as wet cow's body, if milked just after washing the cow's body, will give a large chance to encounter with bacteria. The milk will be easily contaminated with bacteria and the quality will fall down. Also the mastitis might be occurred.



The shed and cow's body should always be dry.



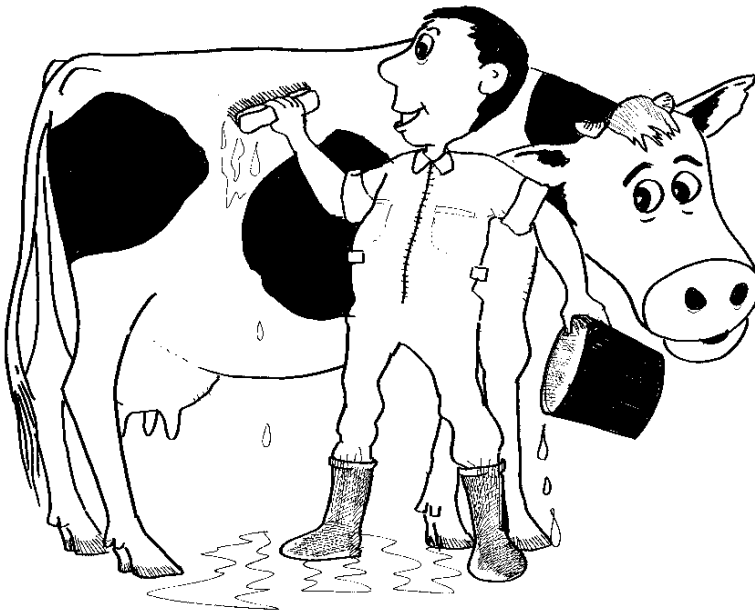
The cleaning of the cow's body would be better after milking. In case the cow should be clean before milking, the following condition should be observed:

a. To clean only the dirty part of the cow's body

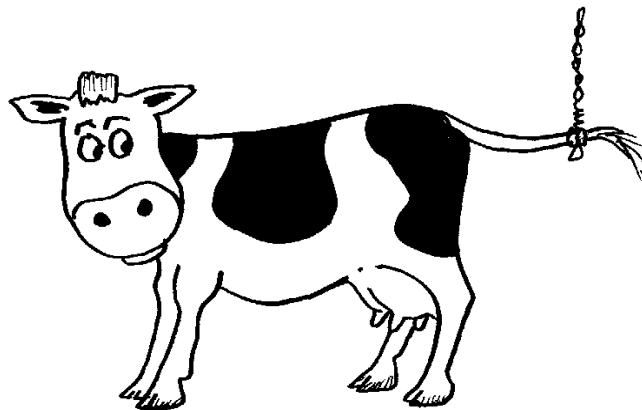
The method is:

- To pour the water only the dirty part of the body
- To brush the dirty part of the body from back to belly, and to remove the free hairs

b. The udder should not be cleaned, except the very dirty case, to prevent too early release of oxytocin.



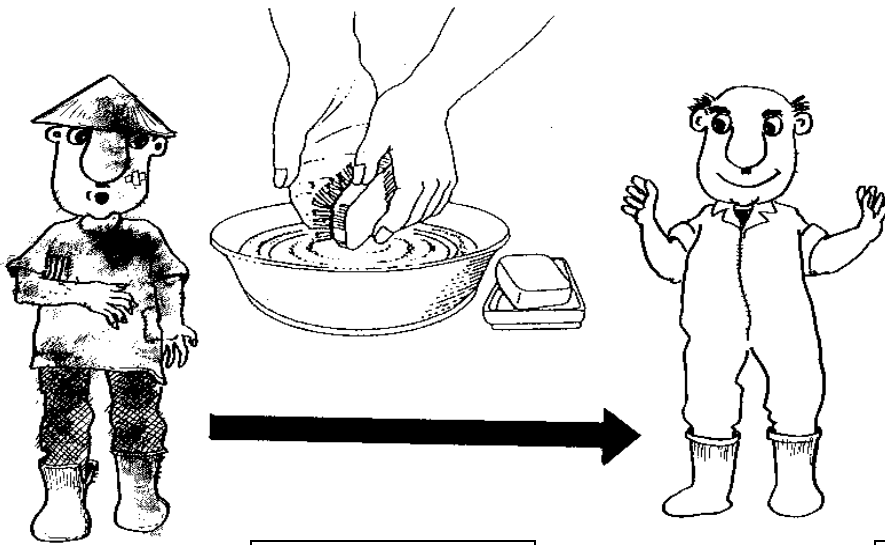
It is better to tie the tail not so as to disturb the milking.


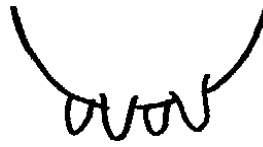
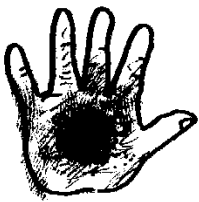



VI. PREPARATION FOR MILKING

Prepare the cleanness of yourselves before milking:

- a. The milking person should be in good health
- b. The nails should be short. The long nail can give injuries to udder or teat
- c. To dress clean clothes
- d. To wash the hands before each milking
- c. When start the milking, the hands should be clean and dry



	Total bacteria within 1ml of fresh milk		Total bacteria within 1ml of fresh milk
Cleaned hands 	1	Cleaned udder with wiping cloth 	1
Not cleaned hands 	2	Not cleaned udder 	10

VII. CLEANING OF UDDER

Cleaning of udder before milking should be limited to the teat and the lower part of the udder. After the cleaning the teat should be dried with clean paper towel.

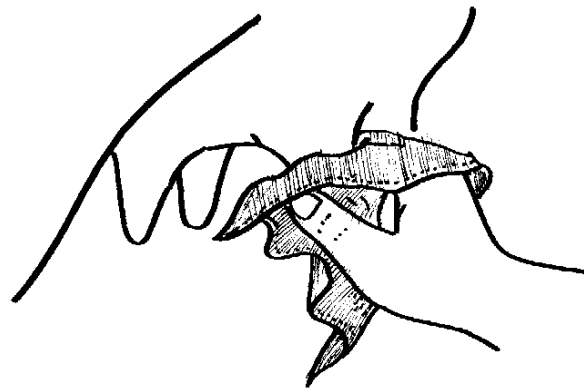
Before, it was recommended that whole udder should be cleaned to stimulate the oxytocin release. But, it is very difficult to clean the whole udder, and dirty water drip from the wet udder could cause the contamination of milk or mastitis. Therefore the cleaning should be the limited area and should be dried before milking.

Equipment and material for cleaning udder:

- a. Bucket for warm water or disinfectant solution
- b. Clean wiping cloth, for example cloth with 50 x 30 cm size.

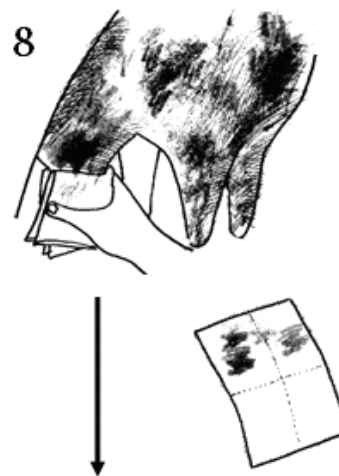
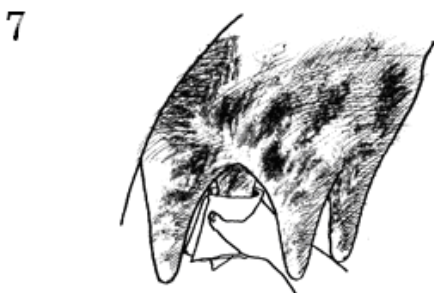
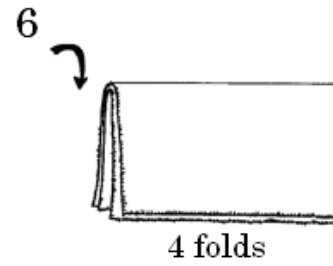
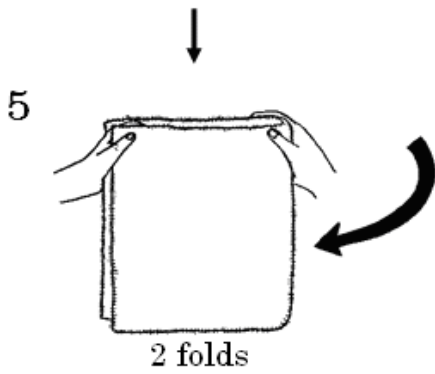
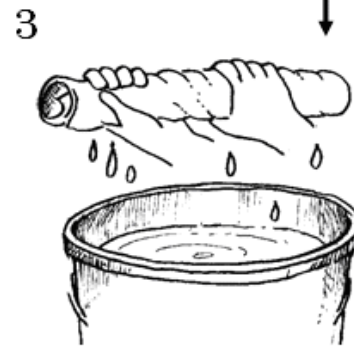
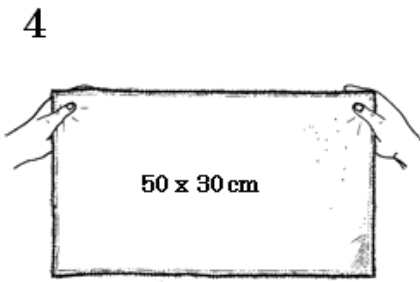
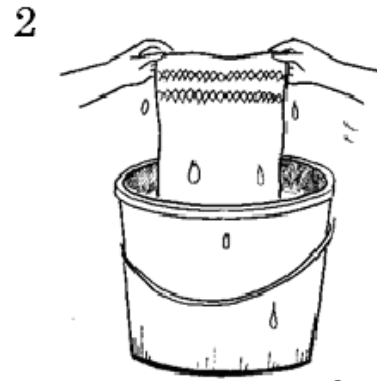
One wiping cloth for one cow.

- c. Paper Towel
- d. Bucket for used wiping cloth Paper Towel

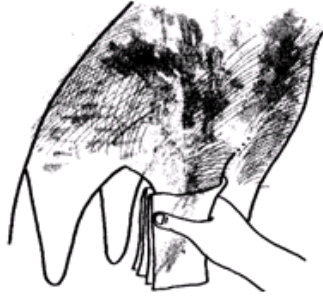


Cleaning method of Udder:

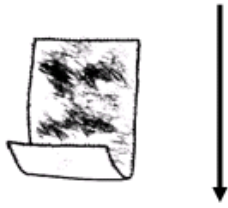
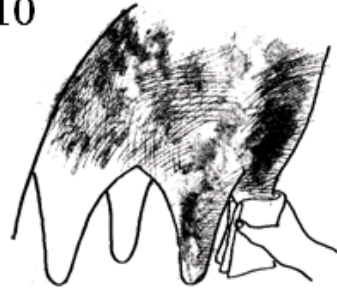
- a. Dip the cloth to warm water or disinfectant solution.
- b. Squeeze the cloth. Don't splatter the squeezed water near around.
- c. Clean the udder with the cloth.
- d. Clean the teats rapidly. Don't pull down the teats.
- e. For cleaning the teats, use the clean (unused) part of the cloth.
- f. Put the used cloth to another bucket. Don't mix with the unused clean cloth.



9



10



11



12



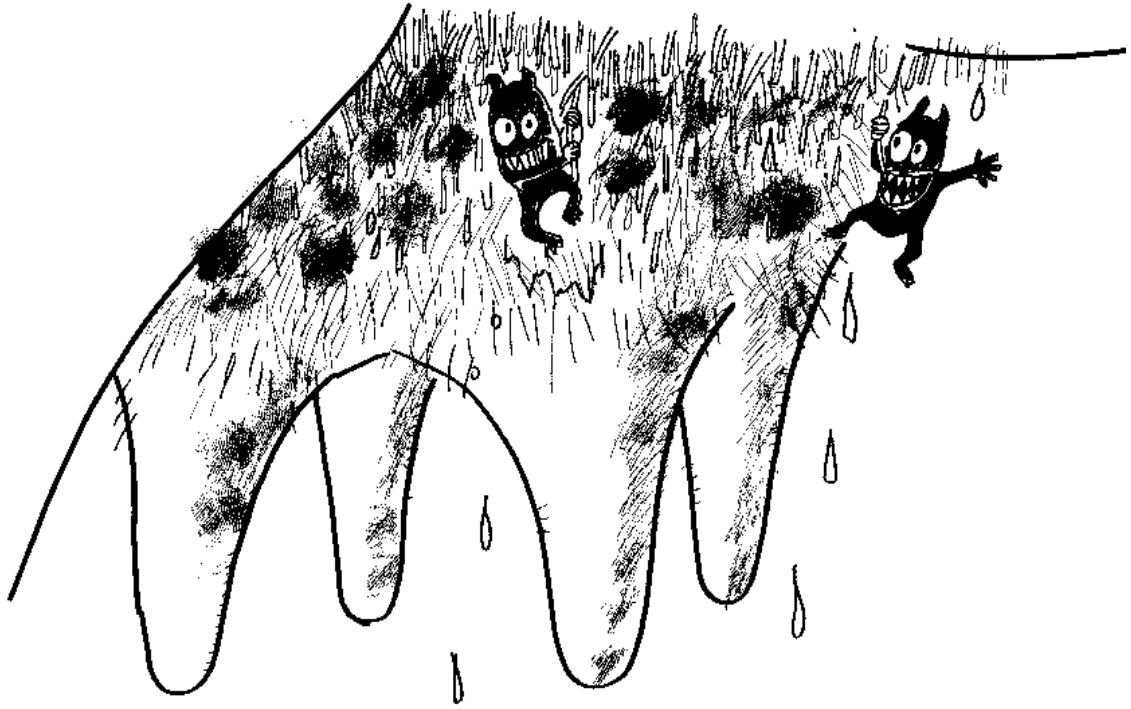
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Long udder hairs are easy to become dirty and full of bacteria. Besides, the udder is difficult to be dried or needs long time for washing. Therefore, the long udder hairs should be trimmed.



VIII. BEGINNING OF MILKING

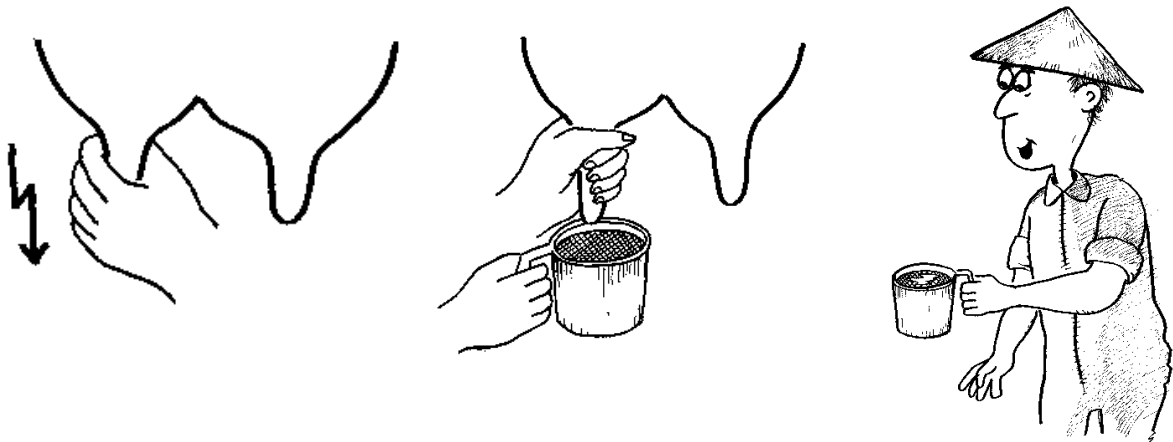
At the beginning of milking, squeeze the milk 3-4 times from each teat. The objectives are:

- To remove the dirty milk. The first squeezing of milk contains higher numbers of bacteria.
- To know the condition of milk.
- Stimulate the flowing-out of milk.

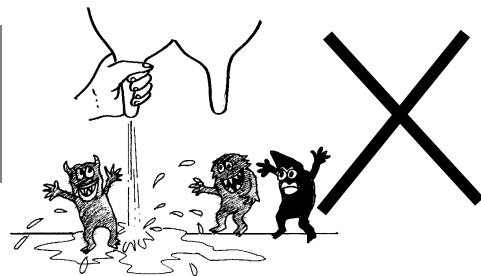
[Strip cup: the small container of black colour is the device to check the first milking.]

Method to check the first milking:

- Put the 3-4 squeezing of milk into the strip cup
- Checking the condition of milk: Is there any colour change, the milk is clear or any abnormality such as clots exists?
- Clean the strip cup, and use for checking other cow. Rotten milk means the cow is suffering mastitis.



Make sure the milk is put into strip cup. Don't discard the milk to the floor.

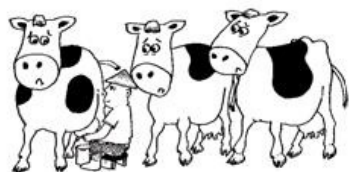
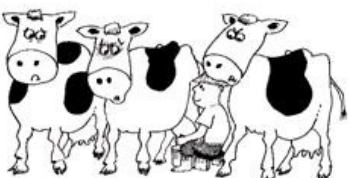
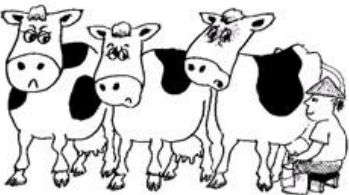
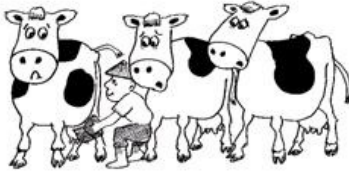
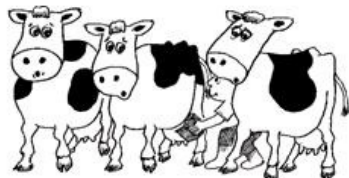
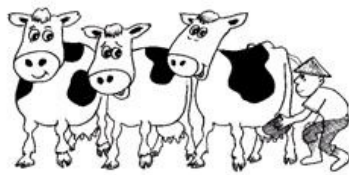


MILKING ORDER

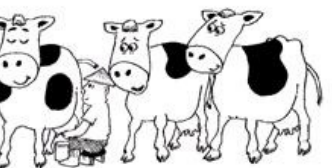
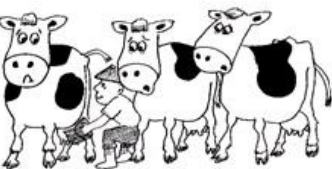
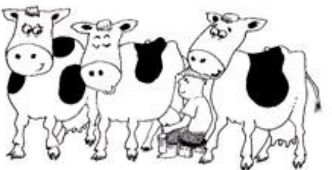
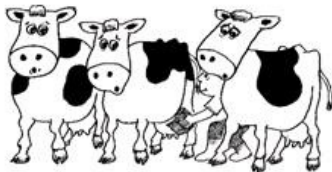
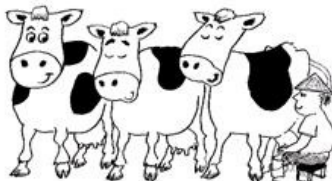
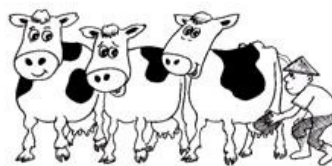
Milking should be started from healthy cows. Cow in mastitis should be milked at last.

The udder cleaning procedure should be followed by immediate milking for each cow, so that oxytocin can work effectively. If the milking cannot follow the cleaning and the time interval exceeds more than 6 ~ 7 min, oxytocin cannot work maximally.

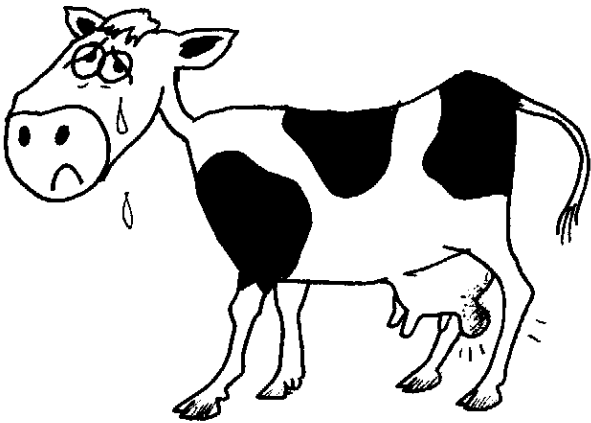
Mistaken Milking Order



Correct Milking order



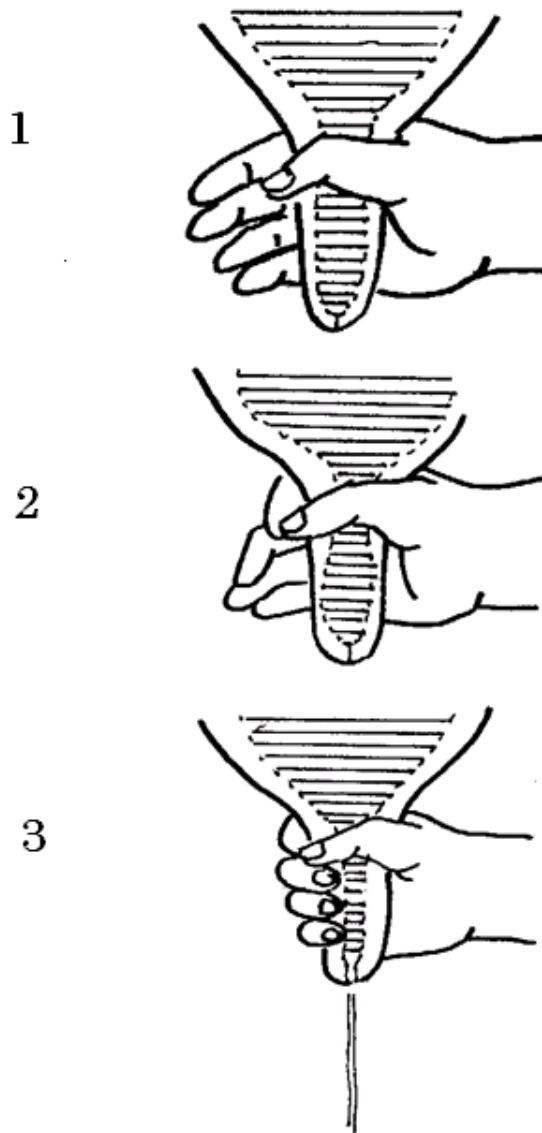
Milk from cows suffering mastitis should be discarded.



IX. RECOMMENDED MILKING METHOD

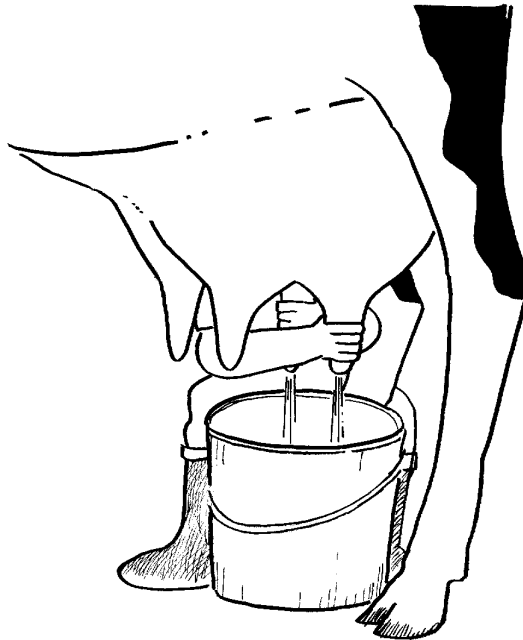
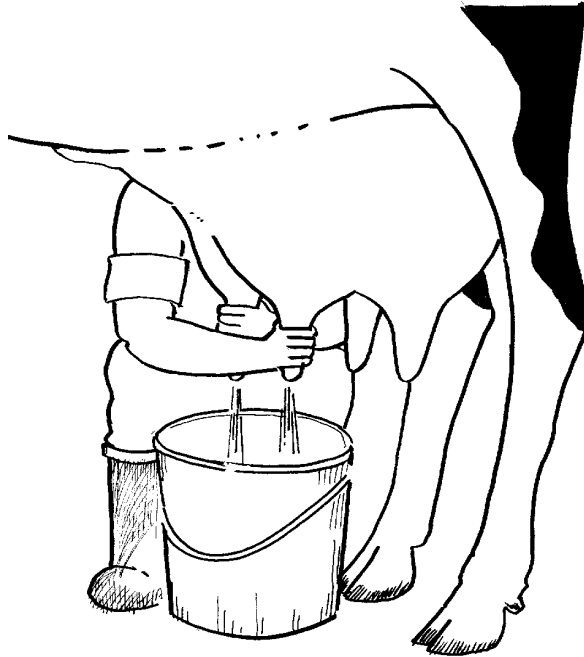
The recommended milking method is to use the whole hand (Full Hand Method). The method is:

- To milk by giving pressure of the finger one by one.
- The hand should be opened each time, so that the milk will refill the teat canal.
- Left and right hand should milk alternatively.
- Fore-quarters should be milked at first.



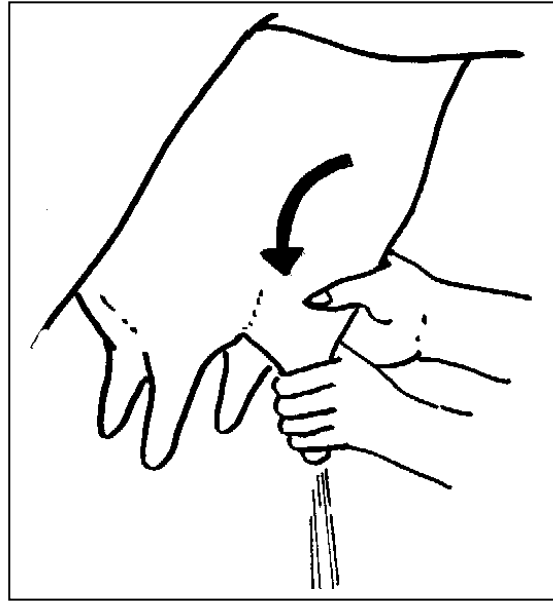
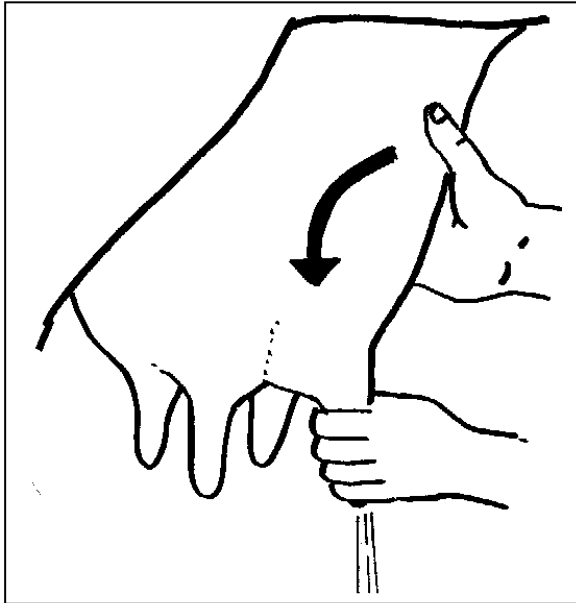
Advantages of Full Hand Method:

- a. The teats don't become longer
- b. The teat don't suffer abrasion
- c. To stimulate udder to produce more milk
- d. No need to use lubricant (vaseline), so that the teat is easier to sterilize with disinfectant.
- e. Infection from mastitis cow can be avoided.



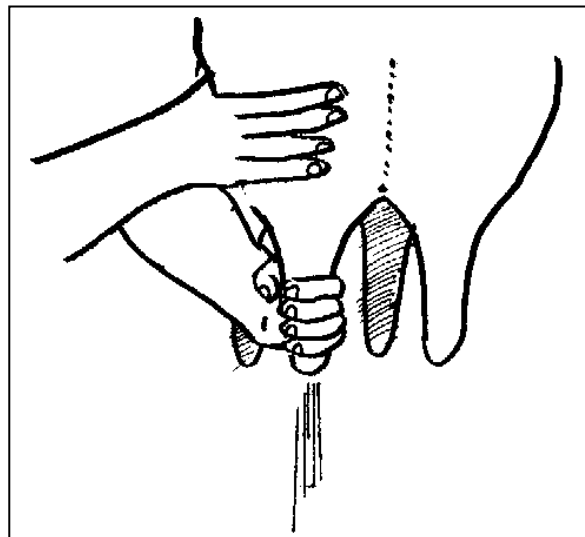
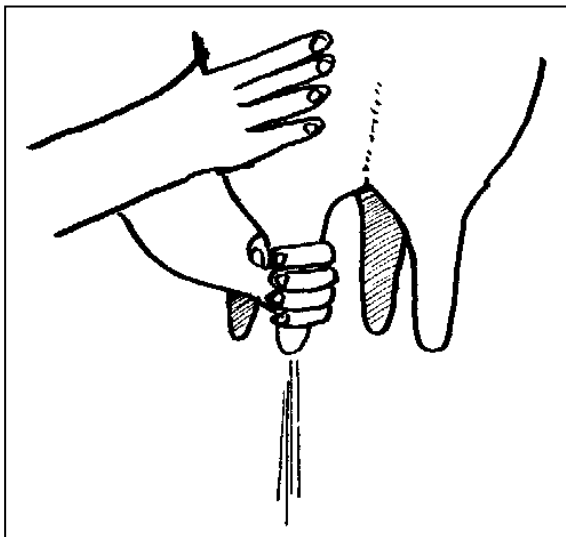
The method to make the right fore-udder empty of milk:

- Massage the udder with right hand. The thumb move to left side. Left hand milks.



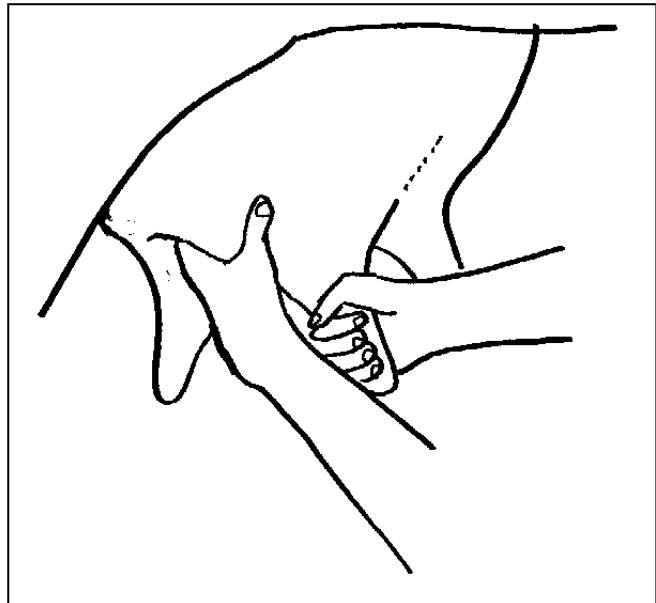
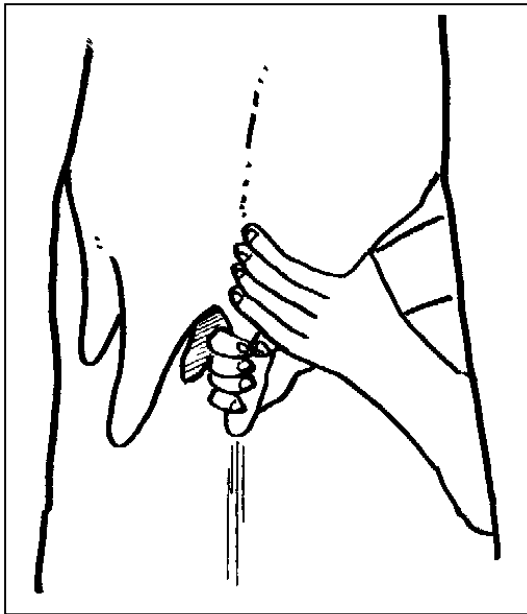
The method to make the left fore-udder empty of milk:

- Massage the udder with right hand from upside to down. The thumb move to left side. Right hand milks.



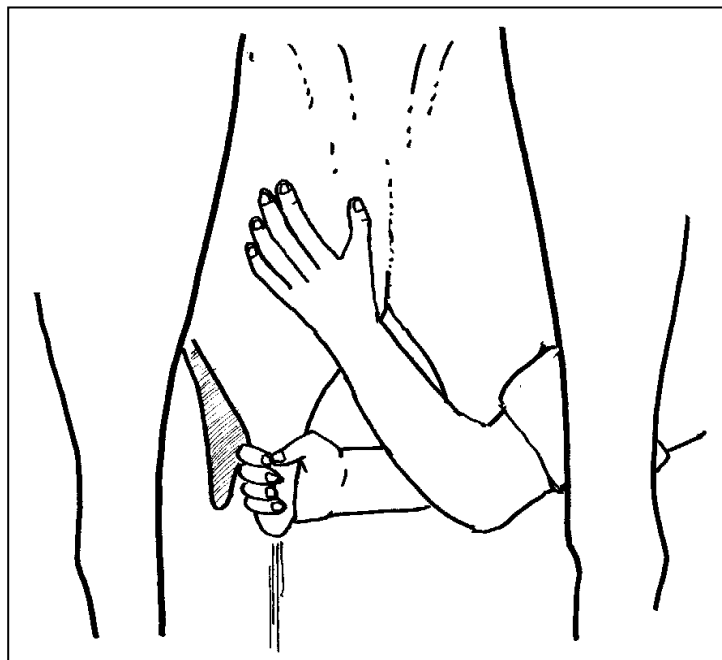
The method to make the right hind-udder empty of milk:

- Massage the udder with left hand. Right hand milks.



The method to make the left hind-udder empty of milk:

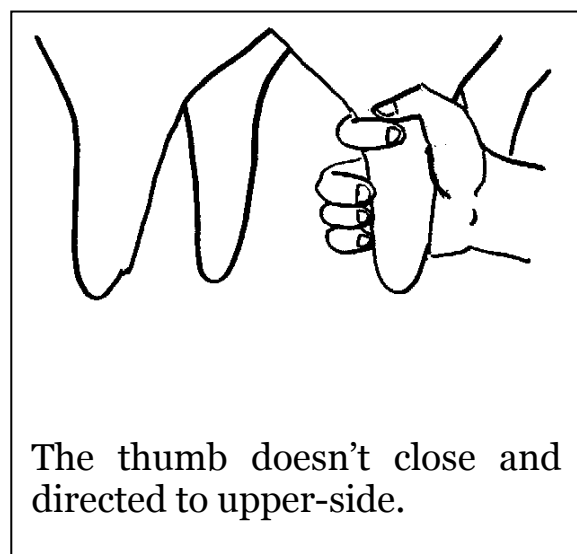
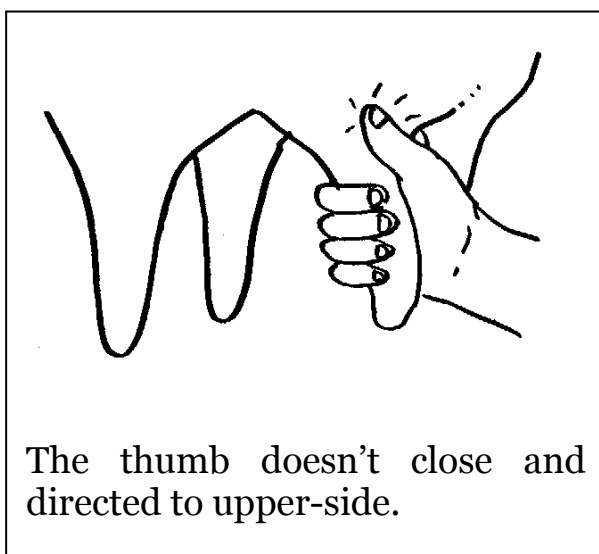
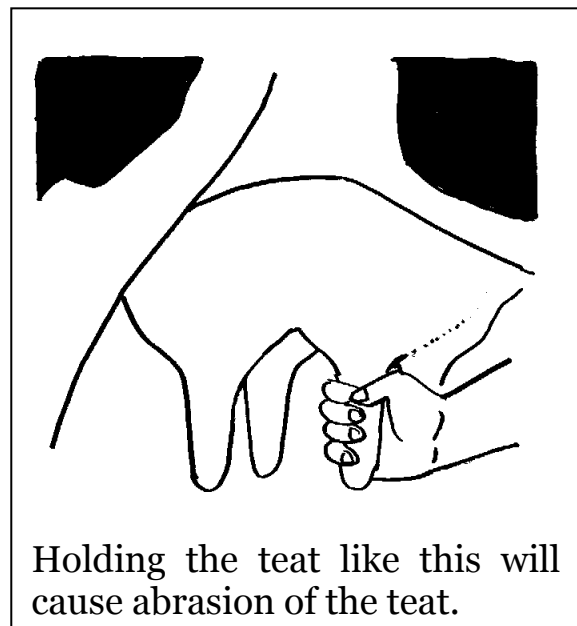
- Massage the udder with left hand from upside to down.
- Right hand milks.



X. NOT-RECOMMENDED MILKING METHOD

Not so good milking method, such as the teat-pulling milking will cause many problems as below:

- a. Cows feel hurt
- b. The teat become longer
- c. The teat will be often abraded and the teat orifice will open. As a result, the cow becomes easy to suffer mastitis.
- d. When Vaseline is continuously used as a lubricant, the bacteria infection cannot be avoided.
- e. The udder often becomes blind.



During the milking it is better not to give them foods. When the cow moves too much, a little food can be given.

