

# Preventing mastitis

**HOW TO DETECT AND WIN  
THE FIGHT AGAINST IT**



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# Preventing mastitis

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# Preventing mastitis

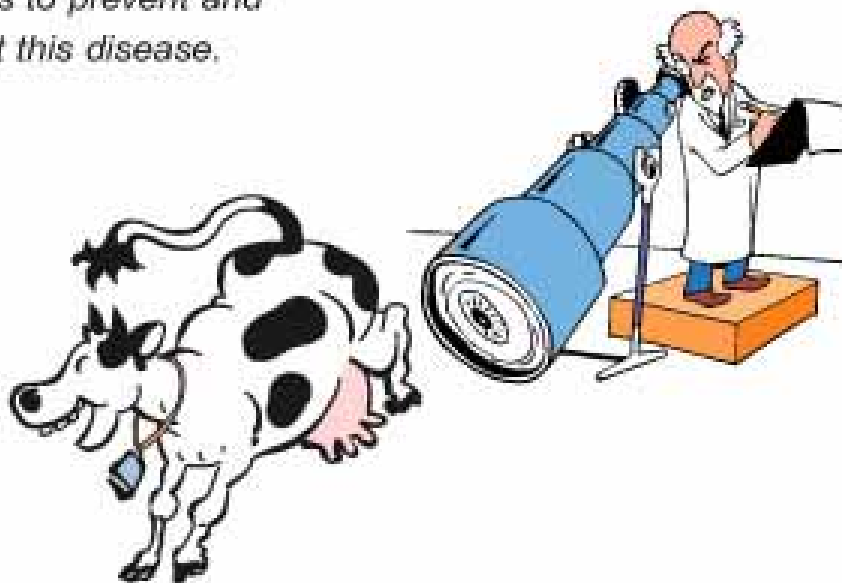
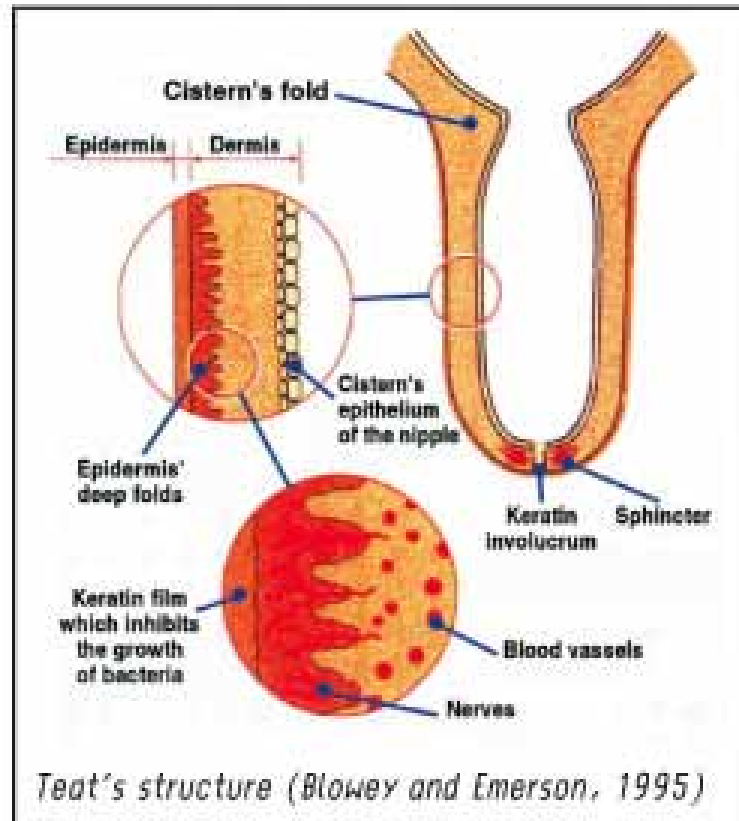
*In the past few years, as both structural and productive conditions to which cows have undergone became more and more pushed, we've witnessed an ever increasing growth of sub-clinical mastitis leading also to substantial economic loss.*

*We shall ascribe these losses mainly down to: a drop of the milk yield, rejected milk, veterinary costs, decreased selling price.*

*An effective way to get round all this is represented by an early diagnosis of the disease.*

*This handbook is not intended to be a scientific treatise about mastitis.*

*Its main purpose is that of providing useful information concerning causes consequences of mastitis, as well as suggesting ways for the operators to prevent and timely detect this disease.*



# Preventing mastitis

## MONITORING THE SITUATION IN YOUR DAIRY FARM

1) CLINICAL MASTITIS? ...VERY FEW CASES!!



2) SUB-CLINICAL MASTITIS?...  
MANY MORE CASES THAN YOU CAN IMAGINE!!



# Preventing mastitis

We shall define mastitis as a very complex pathology which affects the mammary system; it is characterized by alterations of the glandular tissue and/or alterations in the milk's physical-chemical features.

Many-fold factors can bring on such symptoms; likewise, its symptoms can vary as for the degree of intensity. Furthermore, its symptomatology and effects may present different periods of persistence.

The breaking factor is represented by the interaction among animals, micro organisms and environment.

*Interactions among animals, microorganisms and environment*



## HOW WE CAN CLASSIFY IT

According to the surveyed symptoms we can classify mastitis as follows:

- **SUB-CLINICAL**

Characterized by the alteration of the milk composition which cannot be visually surveyed; it can be detected through lab analysis such as content control in somatic cells and bacteriological test of the milk.

- **CLINICAL**

It's characterized by clear alterations of mammary gland as well as by alterations in both quantity and quality of milk yield. Such alterations may appear as fibrin frustules and as serous aspect of the milk.

Such a form can develop either from a sub-clinical stage of the disease or it can develop as a primary condition and therefore being classified as catharral or parenchymatous.

*Mastitis and his various stage*



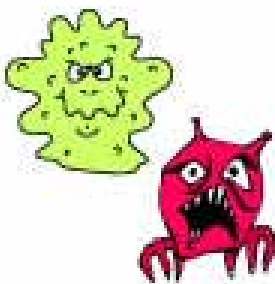
# Preventing mastitis

*Mastitis in its various stages*

*Contagious bacteria*



*Environmental bacteria*



In its catharral form the inflammation will affect the cistern's mucous membrane of the nipple, of the udder and that of the galactophorous ducts.

Usually, only a single quarter is damaged thus suffering a substantial drop of the milk yield.

In the 60's and 70's, the *Streptococcus agalactiae* has represented the main cause of such a pathology, while at the present time, many forms are caused by *Staphylococcus aureus*, environmental streptococcus and by negative coagulase staphylococcus (NCS).

Its parenchymatous form is characterized by the single quarter's inflammation which affects alveoli, ducts, connective tissue with repercussions in both lymphatic and blood circulation. The cause is the Gram negative microorganism (*Escherichia coli*, *Klebsiella* spp, *Serratia* spp and the like) releasing endotoxins.

The single quarter grows in volume, being also hard, warm, aching, swollen with a clear decrease of the milk yield, which, at times can turn into a total agalactia thus affecting the entire udder.



# Preventing mastitis

According to a recent classification by the International Dairy Federation (1999), we can distinguish **3 DIFFERENT FORMS OF MASTITIS:**

*The disease: its stages and development*

## 1. LIGHT

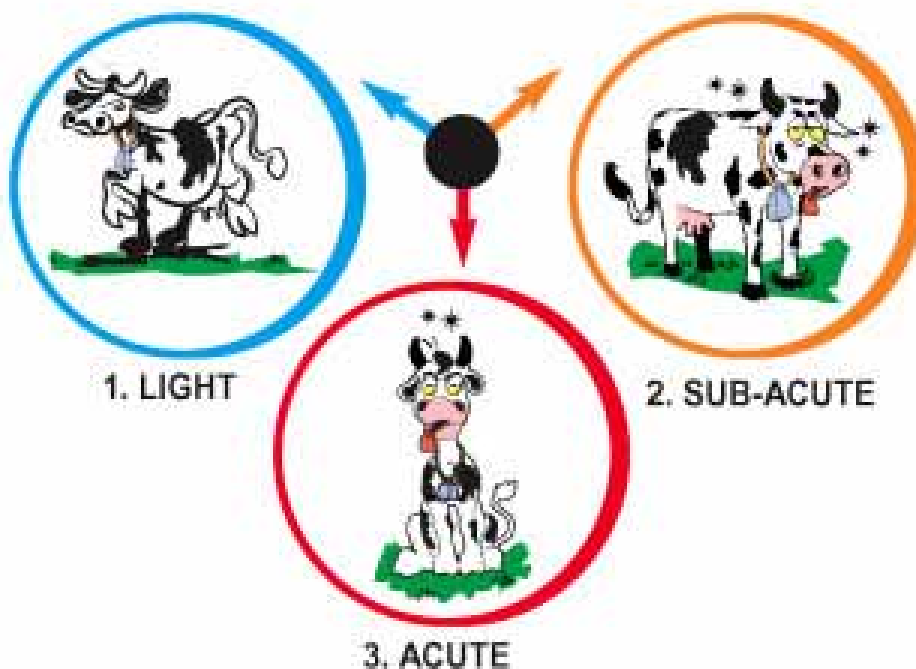
Its duration is short, the single quarter is normal and does not present any clinical pictures.

## 2. SUB-ACUTE

Presenting the same characteristics of the light form of mastitis, short duration, a light alteration concerning the milk yield can be noticed.

## 3. ACUTE

It features an inflammation of the udder, a sudden onset, the single quarter being warm and aching, swelling; a substantial drop of the milk yield. It's characterized by a short course (12 to 24 hours), the symptoms are very clear (congestion and surface vessels' spraying) and occur together with a complete halt of the milk yield.



# Preventing mastitis



Who causes such infections

## WHAT CAUSES MASTITIS

The microorganisms causing mastitis can be classified according to their transmission methods: either contagious, environmental and opportunist, or in relation to their pathogenicity, thus distinguishing between major pathogenic microorganisms and minor pathogenic microorganisms.

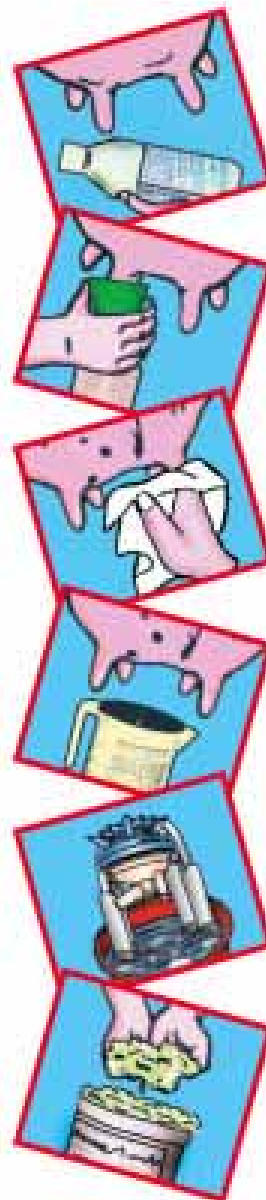
## BACTERIA

### CONTAGIOUS BACTERIA:

- ✕ *Streptococcus agalactiae*
- ✕ *Staphylococcus aureus*.

The disease is transmitted from the infected animal to the sound animal and again from the infected single quarter to the sound single quarter of the same animal, this through the milk itself.

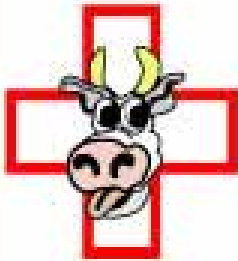
Its spreading mainly occurs during the milking, transmitting from one animal to another by the



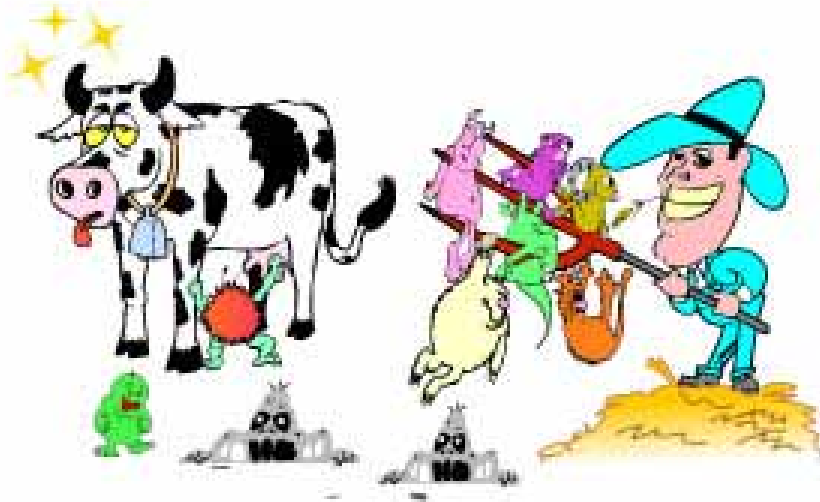


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Enforcing sanitary measures



be carried out mainly by the enforcing of strict sanitary measures or, simply, by modifying the company management. An effective monitoring of such mastitis organisms can be carried out mainly by the enforcing of strict sanitary measures or, simply, by modifying the company management.



The perfect habitat for the opportunist bacteria



## OPPORTUNIST BACTERIA:

**X** *Negative coagulase staphylococcus (NCS)*

Their favorite habitat is on the udder and teat's skin; they cause the infection by taking advantage of possible problems occurring to the anatomic, physical and immune defenses of the mammary gland.

Such infections can also be the result of mechanical milking troubles (vacuum fluctuation, over milking), poor udder setting for milking, lack of proper teats' disinfection, immoderate and non-functional anti-biotic treatment in lactation. Also in this case, the period of its clinical stage is short, though, at times, very serious.

These micro organisms the most frequently isolated species and can represent a serious problem for single dairy farms, this on account of their conditioned pathogenicity.

Opportunist bacteria



# Preventing mastitis

It's common knowledge that proper management and maintenance of the milking equipment and prophylaxis along with mastitis control are all strictly correlated.

Nevertheless, this so very important mutual relation is often underestimated.

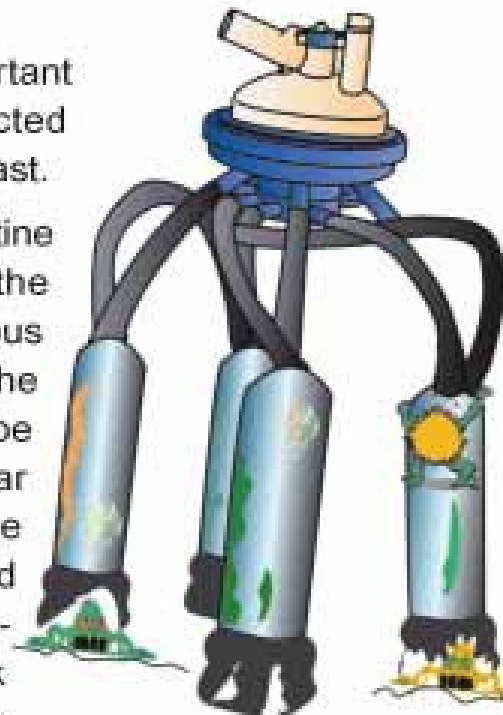
Problems occurring to the milking machine can favour mastitis onset, this by two main courses:

- ✘ diffusion of contagious mastitis organisms (*Staphylococcus aureus* and *Staphylococcus agalactiae*) either from one animal to another or in the same animal, from infected quarters to sound quarters;
- ✘ decrease of immune defenses against both entry and proliferation of micro organisms (opportunistic and environmental ones).

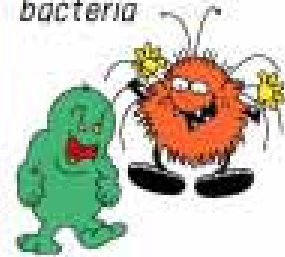
In the first case, the main carrier of infection is represented by the milk of infected animals. This milk, through the milk entries, can infect the teats of sound animals.

Therefore it is very important to isolate the infected subjects and milk them last.

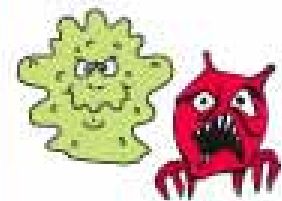
An incorrect milking routine can thus facilitate the spreading of contagious mastitis organisms. The milk entries need to be replaced on a regular basis, otherwise the danger of mastitis' spread can dramatically increase. In fact, old milk entries can offer a very



*Contagious  
bacteria*



*Environmental  
bacteria*



*The importance to  
milk the cows  
following the  
correct sequence*

*Old entries =  
transmission of  
bacteria +  
teat's stress*

## Preventing mastitis

comfortable shelter to countless infected micro organisms' colonies.

Once the contagious mastitis organism have reached their settlement, by taking advantage of the sphincter's slackening, the micro organisms penetrate into the udder, thus easily infecting the nipples of many other subjects. In order to avoid this situation, it is important to strictly observe the scheduled replacement of the milk entries. Postponing such an intervention is but a deceptive saving, on the contrary this will eventually turn out to be a loss.

How often should a milk entry be replaced? Ask our experts and remember to inform them about the milk entry's model you're currently using along with milking duration Your dairy farm applies.

The infection can hit also when microorganism pass from an infected quarter to sound quarters, thus causing an intra-mammary infection. The cross-flow occurs when the air, flowing in the milk entry causes an air and a milk particles wave from a milk inlet to another, through the claw.

Therefore, the milk particles can serve as a vector for the microorganisms by passing the infection among milk quarters of the same animal. Unfortunately, preventing air from filtering through the milk inlets is not easy, though, it is possible to make use of proper devices fit to serve as obstacles to air and milk filtering among quarters.

MILPRO claws are equipped with a special flow controller which also the function of keeping the milk incoming from the single quarters separated thus removing the danger brought about by the cross-flow.

As to the immune defenses' reduction, the inducing factors are to be traced back to over vacuum

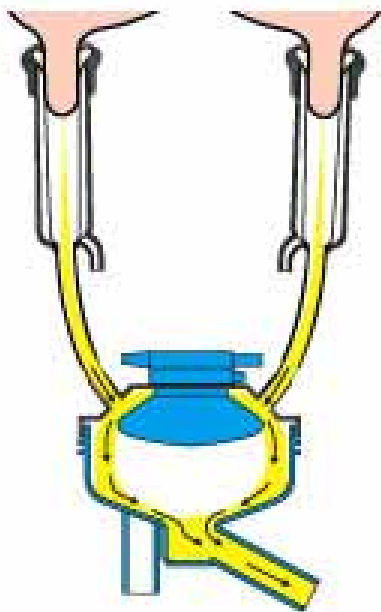
*The cross-flow increases inflammation*

*The benefits of the Milpro claw*

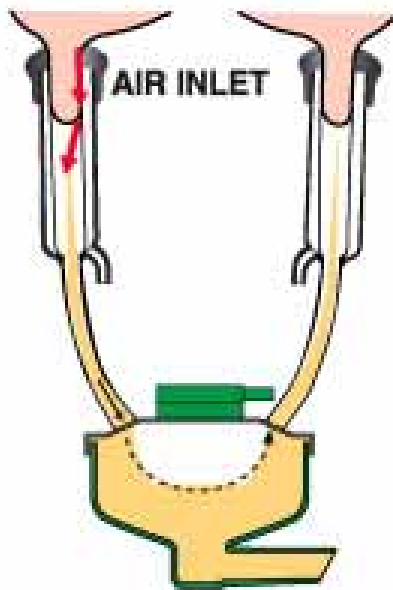
*Vacuum control and the pulsator...*



# Preventing mastitis



MILKLINE CLAW



CLAWS BY OTHER BRANDS

fluctuation which can lead to the inflammation of nipples that, eventually, negatively affect the immune reactivity against pathogenic microorganisms.

These inconveniences can be traced back to a bad functioning of either the vacuum regulator or the pulsator.

Also in this case, it is fundamental to have your plant checked on a regular basis.

Likewise, the plant filters should be cleaned and replaced regularly. It is essential to follow the interventions scheduled in order to replace those parts that are likely to wear and tear in time (gaskets, rubber tubes, etc.).



Should you have any doubts on the matter, a Milkline expert will always be available so to provide information and suggestion in relation to the proper maintenance of Your plant equipment.

*The importance of claws*



*...the pulsator*



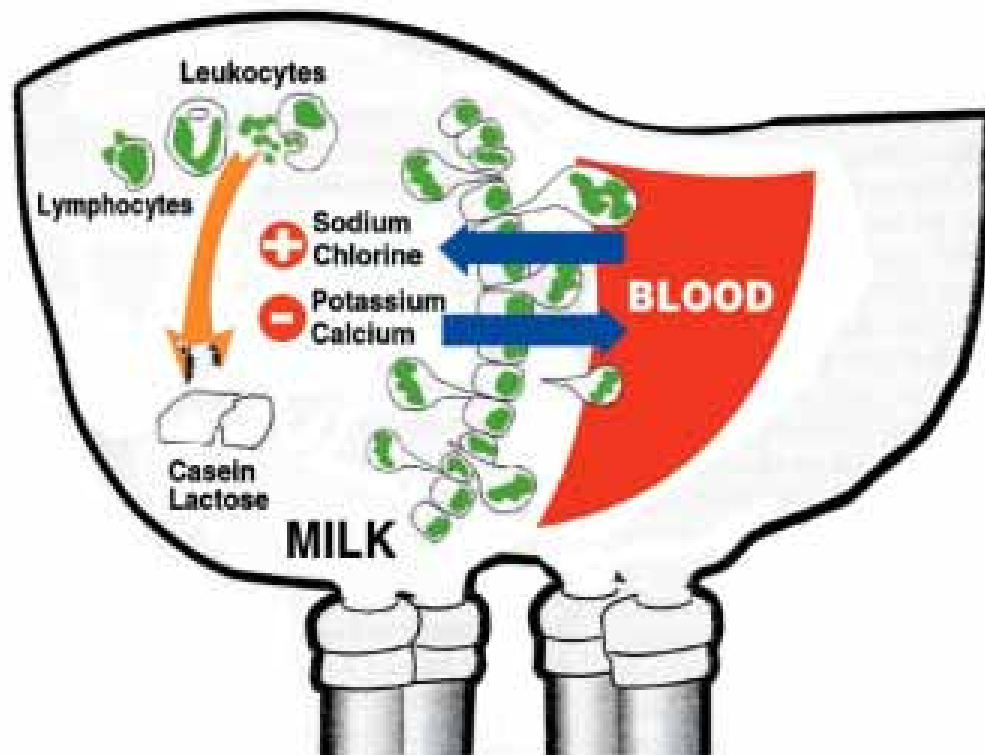
*Periodical check of Your plant*

*Customer service*

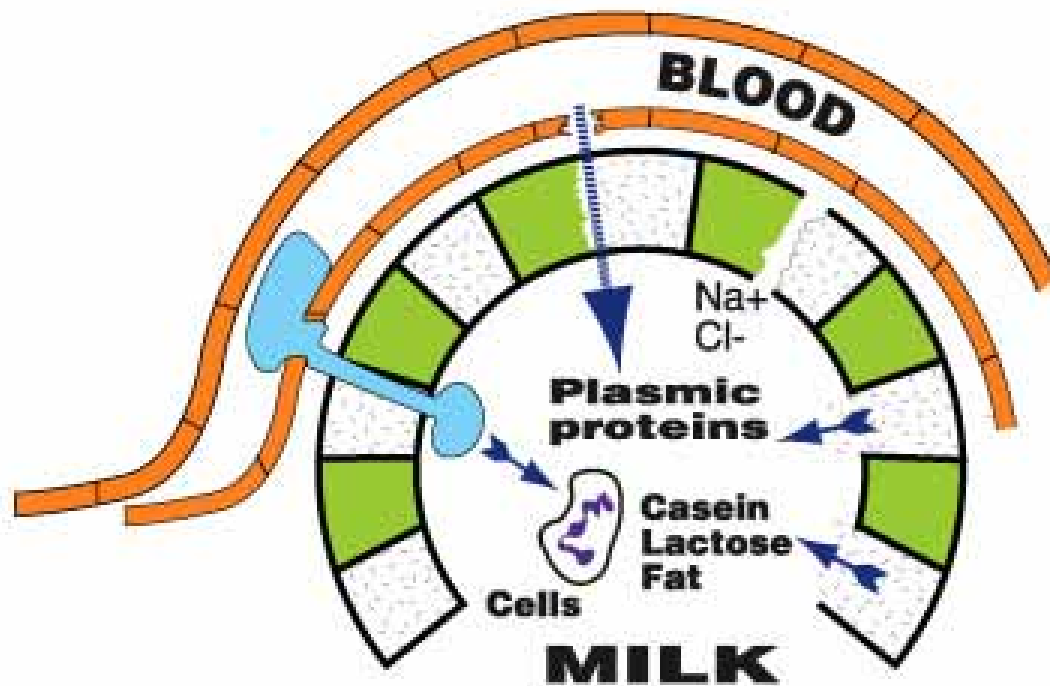


# Preventing mastitis

## WHAT HAPPENS TO YOUR MILK?



From "P.L.M." - December 1999



From "Obiettivi e Documenti Veterinari" - issue n.6/1988



# Preventing mastitis

Mastitis causes different alterations in the milk composition, such alterations are more or less known, but they all lead to an immediate economic damage due to a decrease of fat, casein, lactose, calcium and potassium content.

As we witness the decrease of these factors, at the same time, an increase of gamma globulins, blood's serum albumins along with sodium and chlorine contents.



Therefore, a growth of ionic contents is the direct after-effect of the damage mastitis causes to the udder's glandular tissue. The ionic contents can be surveyed through conductivity. For this reason, by measuring the milk conductivity, we can detect the mammary gland's inflammatory stage.

The single quarter's conductivity test is the most reliable among the methods currently available, this because it allows the comparison of values that, in a the same subject, under normal conditions should prove to be identical.

Composition of the milk...



Ionic contents...



## Preventing mastitis

...Economic damages



Antibiotics in the milk...



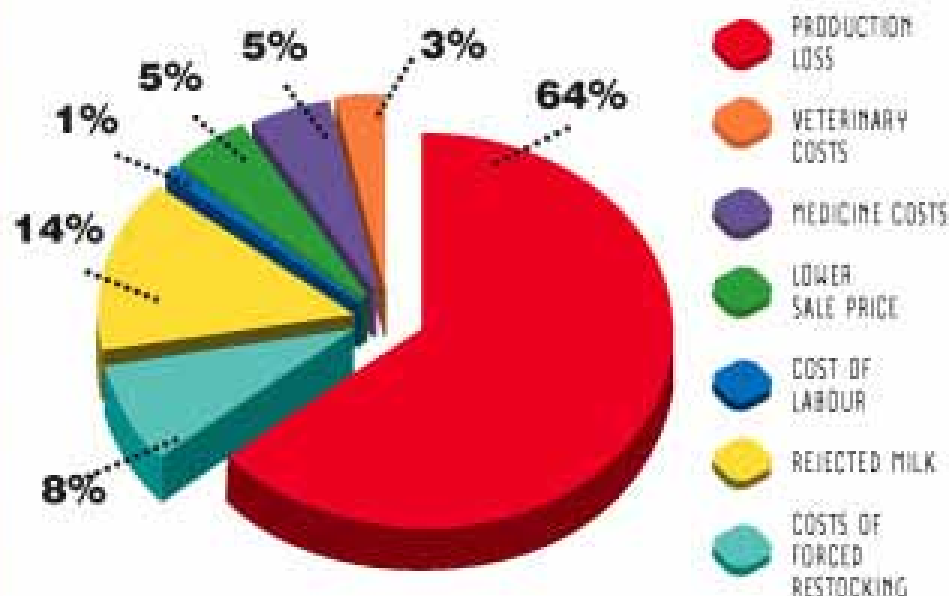
A few estimates...

Mastitis, in its different stages, causes damages of many sorts; specifically, mastitis is to be considered as one of the main causes of economic losses for a dairy farm.

Such losses are to be traced back to reduced milk yield, physical and chemical alterations of the milk main contents, but mainly milk production rejects, on account of the treatments the infected subjects go through.

The very antibiotic residuals of the milk can negatively affect both the consumer (allergies) and the technological cheese making process.

Mastitis not only can cause a drop in production, but it can also increase the animals' restock rate. The loss of milk production alone, causes in our Country, an economic damage equal to 315 billion lire, to this we must add the restocking costs and the costs the dairy industry must face which in the year 1987 reached the total amount of 765 billion lire. According to a recent survey carried out in the United States, each clinical case costs no less than 250.000 Lire!!



A report on mastitis' costs, from "MMC"- 1987



# Preventing mastitis

Milpro System has been engineered to automatically detect all the changes occurring to the mammary gland.

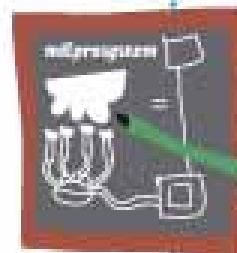
The system is integrated in the milking unit; it is composed by a claw and a control unit set to measure the milk conductivity for each single quarter.

The sensors will measure the milk conductivity during milking. They are located inside a deflector (patent pending) positioned inside the claw.

As explained above, mastitis causes an increase of the ionic content which leads to an increase of conductivity in the milk. In most cases, the infection begins by affecting one or two udder quarters. Therefore, milk conductivity will increase only in the infected quarters.

This is the reason why the Milpro System has been engineered to perform a careful evaluation of the difference in conductivity occurring among single quarters.

*What Milpro System features*



*The purpose of Milpro System*



VERONAFIERE

102° FIERAGRICOLA



# Preventing mastitis



The Milpro System can establish both which one of the four quarters has been infected and provide information about the stage of the infection.

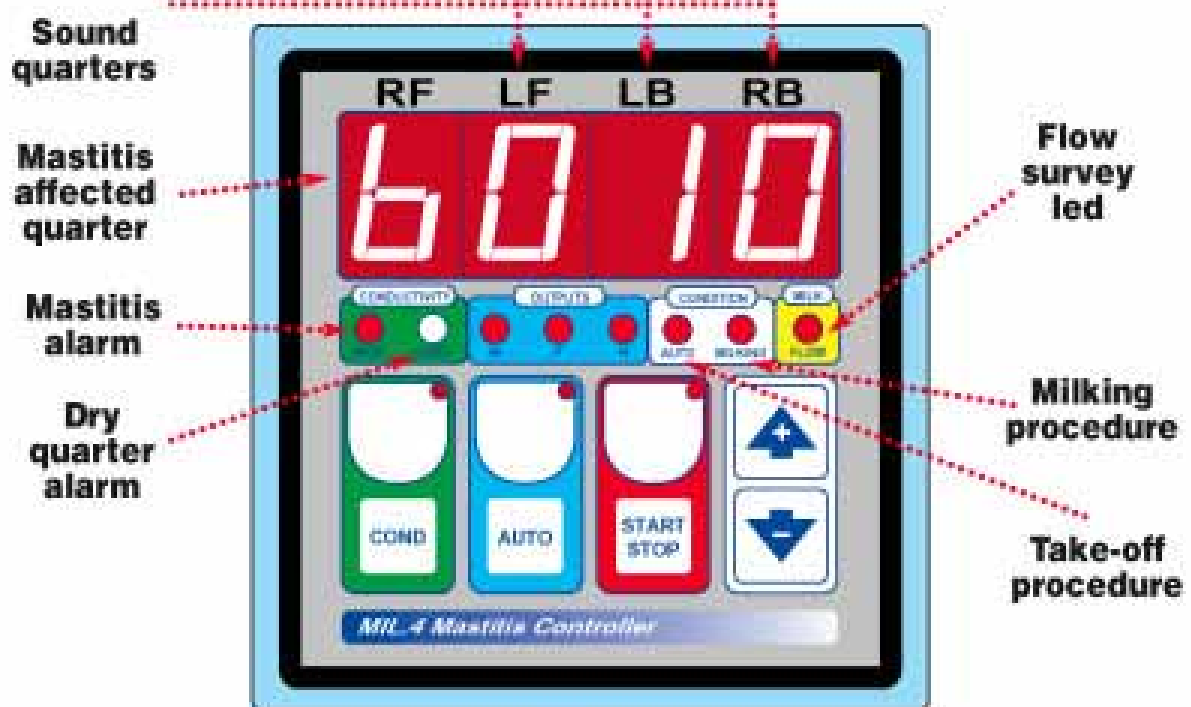
During milking, just by pressing a button, the operator can survey the mastitis points. To each quarter a given amount of marks is assigned. The higher it scores the more serious is the inflammation.

The figures range from 0 to 9. If the figures displayed range anywhere from 0 to 4, the situation can be considered "normal", while, should the figures range anywhere from 5 to 9, an increasing mastitis inflammation is occurring.

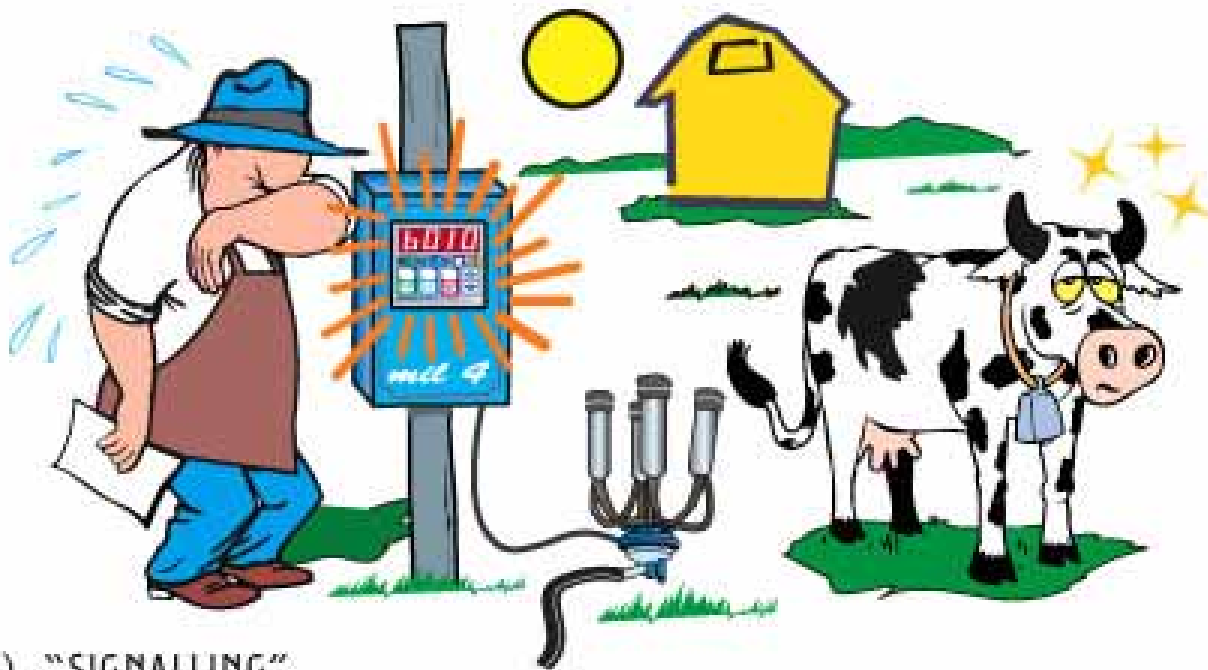
When the disease is in its sub-clinical stage, prophylactic treatments often help avoid using of antibiotics.

The setting in of clinical and sub-clinical mastitis can be avoided by performing strict and constant controls.

## OPERATIONS PANEL



## Preventing mastitis



- 1) "SIGNALLING".
- 2) "SURVEY" the milking operations subsequent to the signalling so to inspect the inflammation development, therefore perform the emptying of the signalled quarter or quarters.



- 3) "EVALUATE" the inflammation's development and, eventually, shouldn't any improvements occur, treat the disease according to the procedures specified by your veterinarian.



## Preventing mastitis



- 4) **"CONGRATULATIONS!"** You are now aware of the problem and know how to face it and solve it. Thanks to the Milero System you will have a sound herd and your dairy farm will be able produce high quality milk.





# Preventing mastitis



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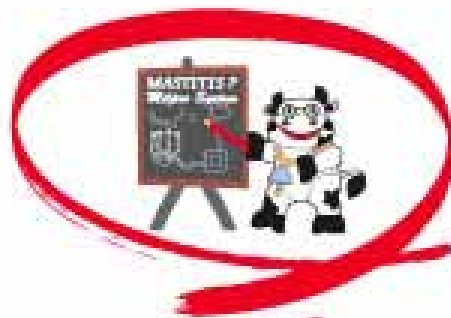


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