



Bovine mastitis (subclinical and clinical): benefits and risks of treatment with antibiotics

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INTRODUCTION: Mastitis is an inflammatory reaction of the parenchyma of the mammary gland, in response to damage of infectious nature, traumatic or toxic. It's characterized by pathological changes in the mammary gland tissue; and physical, chemical and bacteriological changes in the milk (1). The mastitis is the most common disease of cows and the most important from the economic viewpoint (2). Currently it's believed that some of the pathogens causing mastitis (Staphylococcus and species Streptococcus) show resistance to macrolides, lincosamides and beta-lactam, sensitives to beta-lactamase (3). Such resistance could make the treatments that currently apply for mastitis will are less effective in controlling the disease and as a result could be a lack of efficacy of treatment due to the presence of resistant germs in farms.

OBJECTIVES

The objective of this study is to quantify the presence of mastitis on dairy farms in Catalonia and analyzing the methods used for the prevention and treatment; trying to assess how drug treatments are applied, and what can be the consequences of these for the possible appearance antimicrobial resistance.

MATERIALS I METHODS

The sample used in this study was 5 dairy farms located in the province of Girona, these were obtained randomly, but all have agreed that careful monitoring of experts in quality parameters of milk. For the study has developed a survey that was used to make a visit to each of the farms. In each farm we collect data and information necessary to assess the general characteristics of structure and managing the farm, the frequency of occurrence of mastitis, treatment applied and results obtained. This work has been influenced by the low amount of the sample, making it difficult to extract solid and conclusive data, but can provide information on the trend.

RESULTS I DISCUSSION

Table 1. Number of animals according to their state productive, liters production per suckler cow and present cow, the average somatic cell count, major diseases for different farms.

Nº farm	1	2	3	4	5	Average
Number of cows:						
- Suckler cows	750	730	447	97	536	512
- Dry cows	85	30	47	10	66	47,6
Production:						
- Suckler cows	34,5	36,7	36,8	30	32,8	34,16
- Present cows	30,9	35,4	33,2	23	28,9	30,28
Somatic cell count (SCC)	242	193	223	350	284	258,4
Pathologies (%):						
Cases of mastitis	23,35	45,91	30,77	2,06*	42,54	34,48
- New cases	76	87,7	77	-	70	78
- Repeated cases	24	12,3	23	-	30	22
Metritis:	35	15	-	2,06*	0,75	13,20
Lameness:	49,4	7,12	-	4,41*	43,10	26,01
Ketosis:	25	2,8	-	-	2,80	10,20

* The data of 4 farm aren't reliable because it didn't have computerized database. For this reason these values aren't included in the total average.

The results observed in Table 1, showing the high importance of this disease in dairy farms. It also notes that 75% of farms surveyed have on average SCC denoting possible infection of animals with more than 200,000 cells / mL in milk tank (4), and those with the lowest number of farms SCC have lower milk production per animal (Table 1).

Table 2. Observed the drugs that have been used in preventive and curative treatments of mastitis by different farms of this study and percentage of animals treated.

Application	Active ingredient	Farm	% treated cows
IM	Amoxicillin + Clavulanate potassium + Prednisolone	1	29,84
IM	Lincomycin + Neomycin	2,3,5	66,33
IM	Cephalexin + Kanamycin	4	3,82
I	Enrofloxacin	1,2,3,5	69,01

IM= intramammary I= injected

Table 3. Active ingredient administered at the beginning of drying at different farms surveyed, with the respective percentages of treated animals.

Treatment	Active ingredient	Farm	% treated cows
Sealant	Subnitrat bismuth	1,2,3,4,5	100
Antibiotic	Ampicillin + cloxacillin	1,3	47,50
	Cefquinona	2	27,16
	Benzylpenicillin benethamine + Framycetin sulfate + Penethamate iohidrato	4	3,82
	Cephapirin benzathine	5	21,52

In the present study, farms apply treatments based on a previous culture that shows the infecting organism, it could make some treatments aren't carried justified (4).This farms neither perform rotation of these antibiotics. According to the hypothesis of the reservoir, suppressing the use of antibacterial drugs, the resistance should reverse (5).

One of the other factors stated at work which affects the incidence of mastitis is the milking routine. The milking of surveyed farms can be considered correct, coinciding almost entirely on the guidelines proposed in the literature (6). The only thing missing in routine, it is the realization of forestripping, and this may delay the detection of mastitis at the beginning of the process

Table 6. Observed the animal manure, the bedding material used in the various farms, the density of the patios, the presence and condition of the nursing side and the relationship fodder concentrate diets, for different farms.

Nºfarm	1	2	3	4	5
Stabling					
- Lactation	Cubicle	warm bed	Cubicle	Cubicle	warm bed
- Dry	warm bed	warm bed	warm bed	Cubicle	warm bed
Bedding material	Dry stools	Straw	Straw	Straw	Straw
Density:	Correct	Correct	Correct	Correct	Sides corrects, Sides whit excess
Calving side:	Yes, correct	Yes, correct	No, dry side	Yes, incorrect	Yes, incorrect
Nursing side:	Sí, correct	No	No	Sí, incorrect	No
Relationship fodder/concentrate (% de MS):	40/60	40/60	70/30	70/30	40/60

Regarding food, there are studies that conclude that there is a higher incidence of mastitis percentage in farms with more concentrated in diet (7). In this case, the farms with lower percentage of concentrated in diet are the worst farm object and the second successful farm in SCC. It would be necessary having more sample size to verify the effect of the diet .

In the present study have also compiled some elements of the environment where the animals live . Observed in Table 4 shows that four of the five farms have the same bedding material (straw), but differ in the incidence of mastitis , a variation of which 193,000 cells / mL 350,000 cells / mL . The reason for the difference is partly explained management applied to bed. Increasing hygiene in beds and routine checkups to monitor the temperature of the material fermentation, are good methods to reduce the incidence of mastitis .

A comparison of 2 and 5 farms; two farms applying the same treatment for clinical mastitis and have similar general characteristics: same ratio fodder : concentrate, similar values with respect to the housing (same bedding material, with a correct density, with specific area of parts and without nursing), where one of the only differences was clean patios and animals ; could reveal, that most pathogens that causing clinical mastitis could be environmental and these found in dirt beds; and therefore , one of the very important points for control of mastitis is maintaining hygiene in farms.

CONCLUSIONS

Mastitis is a major disease in dairy farms. Mastitis incidence is influenced by many factors: the environment where live the animals, among which stands out the design of the facilities and hygiene, stress, milking routine and milking hygiene and the treatment applied. The treatments of the disease aren't selective and are always the same. This raises the possibility of emergence of resistance, although the current data don't ensure that the rotation reverted antibiotic resistance or halt the growth of these.

The fact that many farms the responsibility of milking, detecting and application of mastitis treatment falls on workers, raises the need for staff training, and encourage the correct actions.

The incidence of resistance and the real possibility of not treating animals waiting for a healing by action of immunity, focusing its efforts on maintaining a high level of hygiene to prevent the production of environmental pathogens, are issues that require more research.

BIBLIOGRAPHY:

- 1) Wellenberg, G. J., Poel, W.H.M. van der, Oirshot, J.T. Viral infections and bovine mastitis: a review. Veterinary Microbiology. 88, 27-45 (2002).
- 2) García, P., Martínez, B., Rodríguez, A. Nuevas alternativas en el tratamiento de las mamitis en el ganado vacuno. Tecnología aroalimentària: Boletín informativo de SERIDA. nº5. 55-58 (2008)
- 3) Ruiz, J.D., Ramírez, N., Arroyave, O.. Determinación de concentracions inhibitorias mínimes a algunos antibióticos de las bacterias asila des de glándula mamaria bovina en San Pedro de los Milagros, Antioquia. Revista Col Cience PCC vol. 14: 2, Pàg 143-154 (2001)
- 4) Dodd, F. H. i Booth, J. M. Mastitis y producción de Leche. Sanidad del ganado vacuno lechero. A.H. Andrews. ACRIBIA, Zaragoza. 239-267. S.A. (2004).
- 5) Errecalde, J.O. Uso de antimicrobianos en animales de consumo. Incidencia del desarrollo de resistencias en salud pública.FAO (2004)
- 6) Kruze, J. La rutina de ordeño y su rol en los programas de control de mastitis bovina. Archivos de medicina veterinaria. v.30 n.2 (1998)
- 7) Hamilton, C., Emanuelson, Ulf., Forslund, K., Hansson, I., and Ekman, T .Mastitis and related management factors in certified organic dairy herds in Sweden. Acta Vet Scand. 17; 48:11 (2006)