

## Subclinical mastitis prevalence in the southern Albanian region

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**Abstract** – Mastitis is a pathology widely extended in dairy cattle throughout the world and causes high economic losses to the dairy farms. It also deteriorates the welfare of animals and exposes consumers to unhealthy and low-quality products. Mastitis is classified as clinical or subclinical; clinical mastitis is characterized by visual clinical signs that are manifested in animal udder and milk appearance. The subclinical form of this disease is difficult to diagnose due to a lack of clinical signs. The only way to be detected is by measuring somatic cells with specific tests. A broad regional survey was conducted in the south Albanian region (Fier, Berat, Korçë, Gjirokastrë, and Vlorë district) to estimate the prevalence of subclinical bovine mastitis. In total, 215 cows from different farm sizes were screened for subclinical mastitis. Milk samples were screened with the California Mastitis Test (CMT). A cow with at least one udder quarter that resulted after screening in +1, +2, or +3 was estimated as positive for subclinical mastitis. Analysis of collected samples demonstrates an overall prevalence of subclinical mastitis of 59% in the southern Albania region. Fieri resulted in the district with the highest subclinical mastitis prevalence, with 68%. The results indicate the necessity of new strategies for mastitis control and prevention.

**Keywords** – Subclinical Mastitis, Prevalence, Udder, Milk, Bovine.

### I. INTRODUCTION

Mastitis is one of the costliest diseases in the dairy industry [1]. This is due to losses in milk production, lower product quality, and expenses in treatment and prevention. This pathology is also seen to deteriorate animal reproductive parameters [2]. Worldwide, estimated economic losses from clinical mastitis range from 61 to 97 euros. From subclinical mastitis, economic losses are estimated to go to 197 euros for cows annually [3].

This pathology is manifested in clinical and subclinical form. Clinical mastitis is relatively easy to diagnose due to clear clinical signs such as redness, heat, hardness, and swelling. Changes manifested in foremilk from an animal with clinical mastitis are blood, flakes, clots, or a watery appearance [4], [5]. Subclinical mastitis is not manifested with clinical signs, making it difficult to be detected and only able to be diagnosed with additional laboratory methods [6]. During the subclinical form, the main changes occur in qualitative and quantitative milk composition, with an increase in the number of somatic cells and milk acidity and a decrease in the quantity of lactose, casein, and other milk components. Milk yield is reduced in cows with the subclinical form, which is directly proportional to somatic cell number. These losses may

be particularly important if a subclinical mastitis occurs early in lactation and persists as a chronic infection throughout lactation [6], [7].

Causative agents of this pathology are mostly bacteria, which are classified as environmental and contagious bacterial agents [8], [9]. *Streptococcus agalactiae* and *Staphylococcus aureus* are localized in teat skin or inside the udder and can be transmitted from one cow to another under unhygienic milking conditions, causing contagious mastitis [5], [10]. Bacteria like *Streptococcus uberis*, *Escherichia coli*, and *Klebsiella* cause environmental mastitis. The bedding of cattle stalls is the main source of environmental pathogens, as well as pre-milking teat preparation, water puddles, skin lesions, teat trauma, and flies, which also serve as sources of infection [5], [8], [11].

Until now, there were no prevalence studies of subclinical mastitis in the southern region of Albania. This survey was designed to study subclinical mastitis prevalence in this part of Albanian territory. Dairy farms were randomly selected, and lactating cows were screened for subclinical mastitis using CMT.

## II. MATERIALS AND METHOD

For the realization of the project, a cross-sectional epidemiological study was carried out, where 21 randomly selected farms in 5 districts of southern Albania were screened with CMT for subclinical mastitis detection. A total of 215 lactating cows were analysed.

The criteria for calculating the sampling size were 95% confidence, a 25% expected prevalence parameter, and 10% precision. The epidemiological formula for calculating sample size was:

$$n = (z^2 * p * q) / d^2: z = \text{confidence level}, n = \text{sample size}, p = \text{expected prevalence}, q = 1 - p, d = \text{precision}$$

### A. California Mastitis Test (CMT)

From each quarter of the udder, 2-3 streams of milk were placed in each of the four cups on the CMT paddle. To equalize milk volume in the fourth paddle cup, the paddle was inclined at a 36–60° angle. After that, an equal amount (2 mL) of CMT reagent manufactured in Germany by Kerbl (Ref. No. 154), commercially available in Albania, was added to each cup. A gentle circular motion was applied to the mixtures in a horizontal plane for 15 seconds. The result of CMT was based on the nature of coagulation and viscosity of the mixture, which show the severity of the infection. The result was graded and scored based on the thickness of the gel formed by the CMT reagent and milk mixture. The results were classified into four scales, as follows: negative (–), the mixture remained fluid; weak positive (+1), a distinct precipitate was formed but with no tendency to gel formation; positive (+2), the mixture forms an immediate viscosity with small gel formation; strong positive (+3), a distinct gel formation is evident with a tendency to adhere. A table was drawn to enter the data after CMT was performed at each farm.

### B. Data analysis

Data collected were recorded into a Microsoft Office Excel 2016 spreadsheet while data analysis was done using MetLab statistical program. Descriptive statistics was used to calculate prevalence of subclinical mastitis and frequencies at quarter level. Prevalence was calculated as portion of positive animals over the total of animals analysed.

## III. RESULTS

The results obtained from our data show that Fieri is the district with the highest prevalence, with 68%. The district of Gjirokastrë had the lowest prevalence, with 34%. In other districts of Berat, Korçë, and Vlorë, mastitis prevalence was, respectively, 65%, 64%, and 55% (Table 1). The overall subclinical mastitis prevalence in the southern Albania region was 59% (Fig. 1).

Table 1. Prevalence of Subclinical mastitis in each district expressed in percentage.

District	Subclinical Mastitis Prevalence
<b>Fier</b>	68%
<b>Berat</b>	65%
<b>Korçë</b>	64%
<b>Gjirokastër</b>	34%
<b>Vlorë</b>	55%

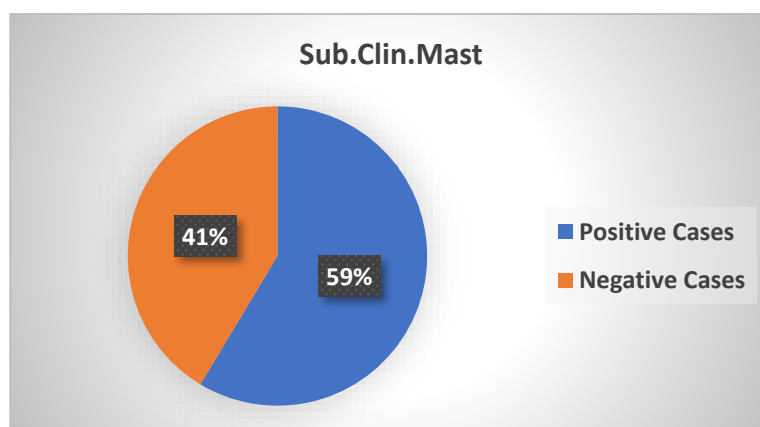


Fig. 1 Overall Subclinical mastitis prevalence in the southern Albania region.

#### IV. DISCUSSION

Subclinical mastitis is a highly frequent pathology in the dairy industry. Until this day, there are no data related to the prevalence of this pathology in the southern Albanian region. According to the results, Fier is the district with the highest subclinical mastitis prevalence; this could be explained by the higher number of intensive dairy farms situated in this area. It is known that cattle managed in intensive conditions have a higher risk of being affected by subclinical mastitis [7]. The overall prevalence also demonstrates a relatively higher prevalence of subclinical mastitis in the southern Albanian region; this could be highly related to the lack of mastitis prevention measures.

#### V. CONCLUSION

Subclinical mastitis has a higher prevalence in the southern Albania region. This indicates that measurements should be taken for prevention and control of this pathology.

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