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# Clinical and Implementation of epidemiological informationfungal milkinfection of local breed goats In Baghdad city

Jinan Mahmood Khalaf1 and Tareq Rifaaht Minnat2

1Department of Preventive and Internal Medicine, Faculty of Veterinary Medicine, University of Baghdad , Iraq.

2Department of Preventive and Internal Medicine, Faculty of Veterinary Medicine, University of Diyala, Iraq.

## ABSTRACT

Mastitis in goats is a health problem for animals, in addition to reducing the nutritional value of milk, it changes the chemical composition of the milk, weakens the properties of milk processing, and imposes great economic losses on dairy farms today. This study aimed to classify the fungal factors in samples of goat milk. 170 milk samples were collected from each of the goats with clinical, subclinical and without mastitis, as was obtained from animals of clinical health. Goat milk samples were obtained in this analysis from the first six weeks of lactation while the goats were in Baghdad and its suburbs areas.

Samples (approximately 10 mL) were collected in sterile sample bottles and immediately sent to the laboratory for further testing. Samples were also sent to a laboratory to be tested for mastitis. Centrifugation of milk for ten minutes at 4000 rpm peaked in sediment deposition, which was cultured on SDA by sterile cotton swabs. It was incubated at both 25 ° C and 37 ° C for 5 weeks in Petri dishes. Seventeen (11.1 percent) of a total of 170 goat milk samples tested positive for the presence of fungal agents.

Candida albicans (C.), Candida lusitaniae, Candida parapsilosis, Cryptococcus neoformans, Nocardia spp. , Penicillium spp. , Scopulariopsis brevicaulis, and Aspergillus fumigatus on 3 (1.7 percent) milk tests; 2 (1.1 percent) of samples were positive for Candida (C.) eggs, 2 (1.1 percent) for Candida lucitania, 1 (0.5 percent) for candidiasis, 1 (0.5 percent) for modern Cryptococcus, 2 (1.1 percent). ) For Nocardia spp. (4) 2.3%: No fungal infection was detected in any of the clinical mastitis samples.Finally, in light of the results, the researchers reported

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that bacteria were the main cause of mastitis, but considered that fungi were mostly responsible as pathogens.

## INTRODUCTION

The Goats' industry is expected to further raise the relevance of the future as the geological conditions deteriorate because of global warming (Yangılar, 2013). The adaptation and the conventional anchoring of the goat species to their climate are a solid basis for modern sustainability projects including dairy and meat processing (Raynal-Ljutovac et al., 2008). Owing to the variations in the normal and balanced picture of goat's milk, such as sugar, nutrition, casino, minerals, lactose, basic taste and texture from cow's milk (Jenness, 1980; Raynal-Ljutovac et al., 2008).

There is no doubt that goat milk is a perfect source of health. It may be eaten without harmful consequences by people suffering from cow milk allergies without positive effects on health treatment, physiological processes, the nutrition of children and elderly people and according to some writers (Yangılar, 2013). Goat milk is also important for the diet of healthy animals. Mastitis in goats is an immense concern in animal welfare, alteres milk composition, decreases milk hygiene, impairs milk production and contributes to a high loss of energy leading to a decrease in milk output, reduces milk quality and costs for care (Stuhr and Aulrich, 2010). Three main forms of this disease can be classified: clinical mastitis, subclinical mastitis and persistent mastitis (Bergonier et al., 2003; Contreras et al., 2007; Quinn et al., 2011).

This multifactoral disease is primarily of bacterial origin in milky small ruminants (Bergonier et al., 2003; Contreras et al., 2007; Stuhr and Aulrich, 2010). But other agents also induce mastitis and the diagnosis of mammalian infection consists of stressing the infection's germ. Fungi are major causative agents of Mastitis (Quinn et al., 2011) in ruminants; from mycotic mastitis in goats, many yeasts and moulds were insulated (Al-Majali and Jawabreh, 2003; Bourabah et al., 2013). Mastitis experiments have been based on bovine infections (Bergonier et al., 2003: Aydîn et al., 2009; Tel et al., 2012; Najeeb et al., 2013: Costa et al., 1993; Guler et al., 2005; Karahan and Cetinkaya, 2007; Ekîn et al., 2015) and to a lesser degree on caprine and ovine mastitis. The goal of this research was to classify

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mycotic agents in goats responsible for clinical and subclinical mastitis.

## MATERIALS AND METHODS

**Samples:**

A total of 170 milk samples were collected. Samples were collected between May 2019 and May 2020 from the early stages of lactation. Before sampling, the nipple was cleaned and dried 70% of the alcohol. The first anterior milk flows were released and then 10 mL of milk were collected in sterile tubes in an aseptic manner. Samples were transferred to a laboratory for mastitis and fungi immediately. Tests were done. , All samples were cooled on ice.

**Assessment of clinical and sub-clinical mastitis:**

Palpation, visualization of the udder and evaluation of swelling red, rough or heated to hot touches of the udder were identified with clinical mastitis, a visibly irregular secretion was noticed (Figure 1). (Coles, 1986; Islam et al. 2012). A California mastitis test (CMT) with CMT reagent was tested for sub-clinical mastitis (CMT-Test, Denmark). Reactions to positive reactions were classified as negative, trace and +1 +2,+3 (Larsen, 2000).

Figure 1: local breed goats with clinical mastitis

**Mycological examinations:**

The spring cream and pellet swab (10 min at 4000 rpm) are inoculated on two Sabouraud dextrose agar sequence for the determination of ideal goat milk plate

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techniques (SDA; DM200, Mast Diagnostics, Merseyside, UK). Chloramphenicol (0.05 mg/mL) and cycloheximid (0.5 mg/mL; Sigma- Aldrich, Steinheim, Germany) were combined with a number of other series without supplementation. Petri plates were aerobically incubated for 5 weeks at 25°C and 37°C.

After staining with lactophenol cotton blue the isolates were studied macroscopically and microscopically (LFPM; 1.13741, Merck, Germany). Identifying fungi based on gross (colony colours, textures, reverse colour) and microscopic morphology (colour, form and sporophor structure, amount of septa in spores, etc). (Figure 6, 7). Additional tests were conducted for the assimilation and fermentation of carbohydrate, urease operation on urea agar (CM52; Oxoid, Basingstoke, UK), maize meal agar pigment development (CMA; 7350A, Acumedia, Michigan) 37° C growth on SDA, etc (Larone, 2011; Quinn et al., 2011).

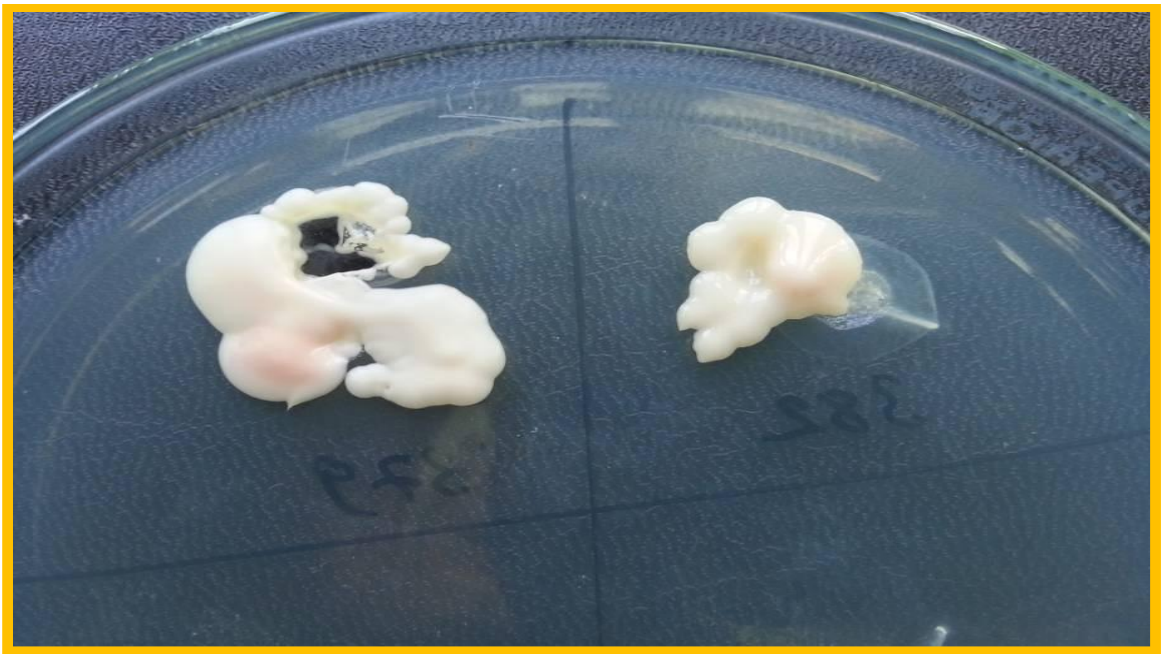


Figure 2: Cryptococcus neoformans. Sabouraud dextrose agar, 25°C, 5 days, surface of colony

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Figure 3: Cryptococcus neoformans. Sabouraud dextrose agar, 25°C, 5 days, reverse of colony

Figure 4: Scopulariopsis brevicaulis. Sabouraud dextrose agar, 25°C, 7 days, surface of colony

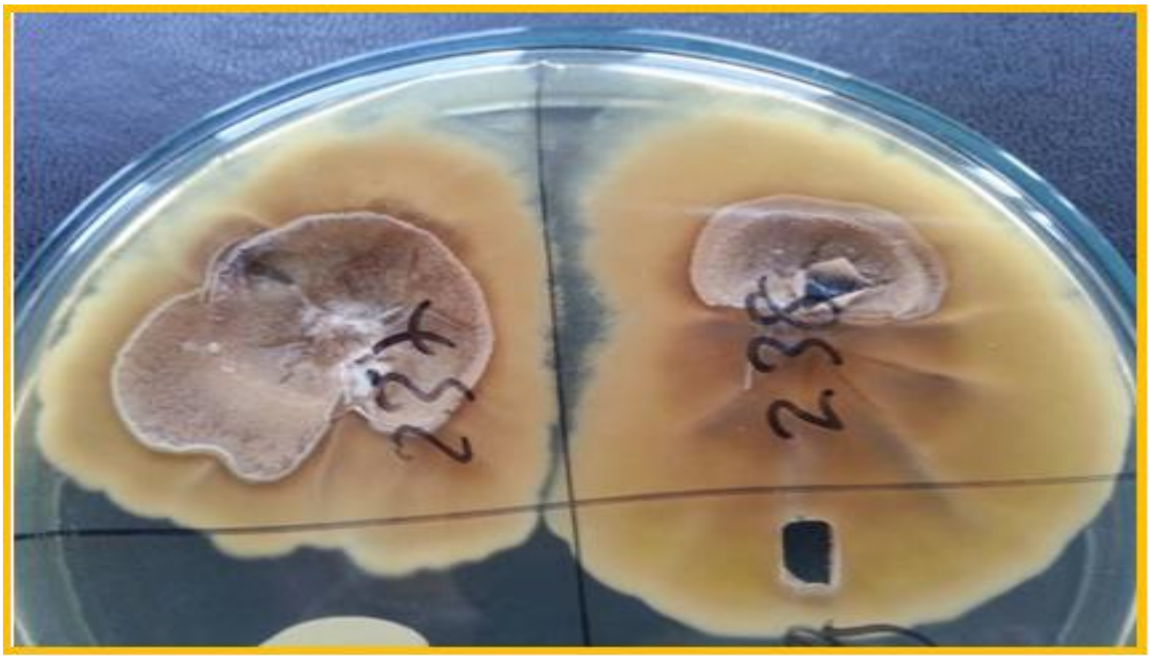

Figure 5: Scopulariopsis brevicaulis. Sabouraud dextrose agar, 25°C, 7 days, reverse of colony

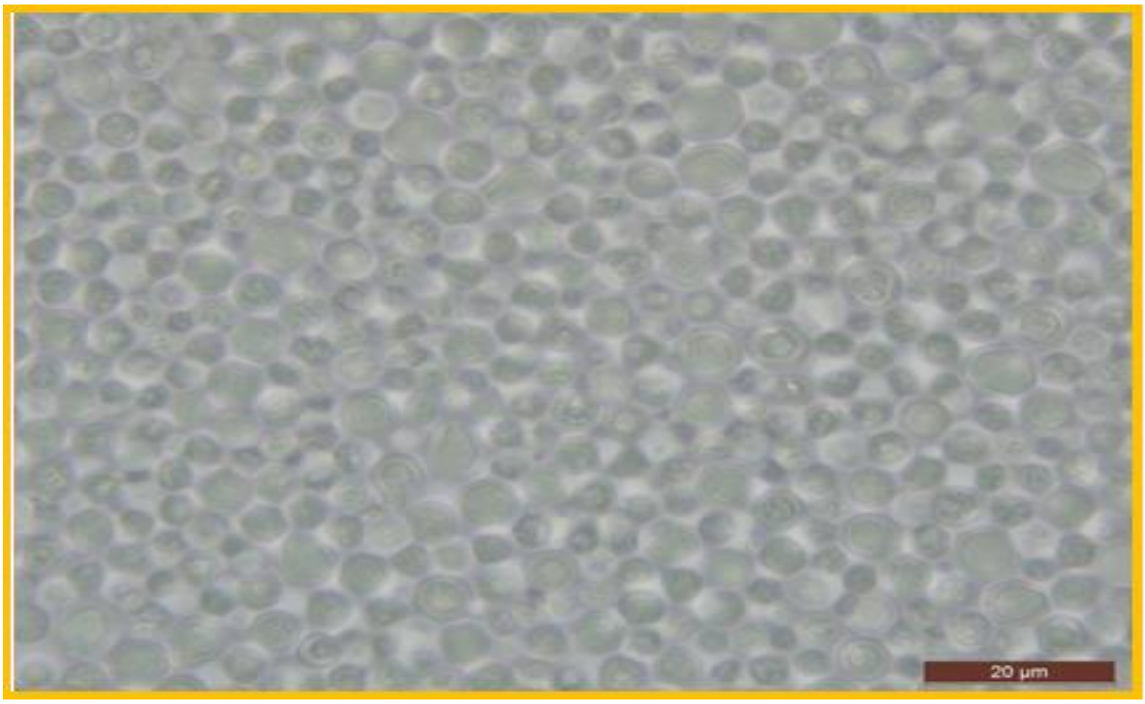


Figure 6: Cryptococcus neoformans (40 x 10(

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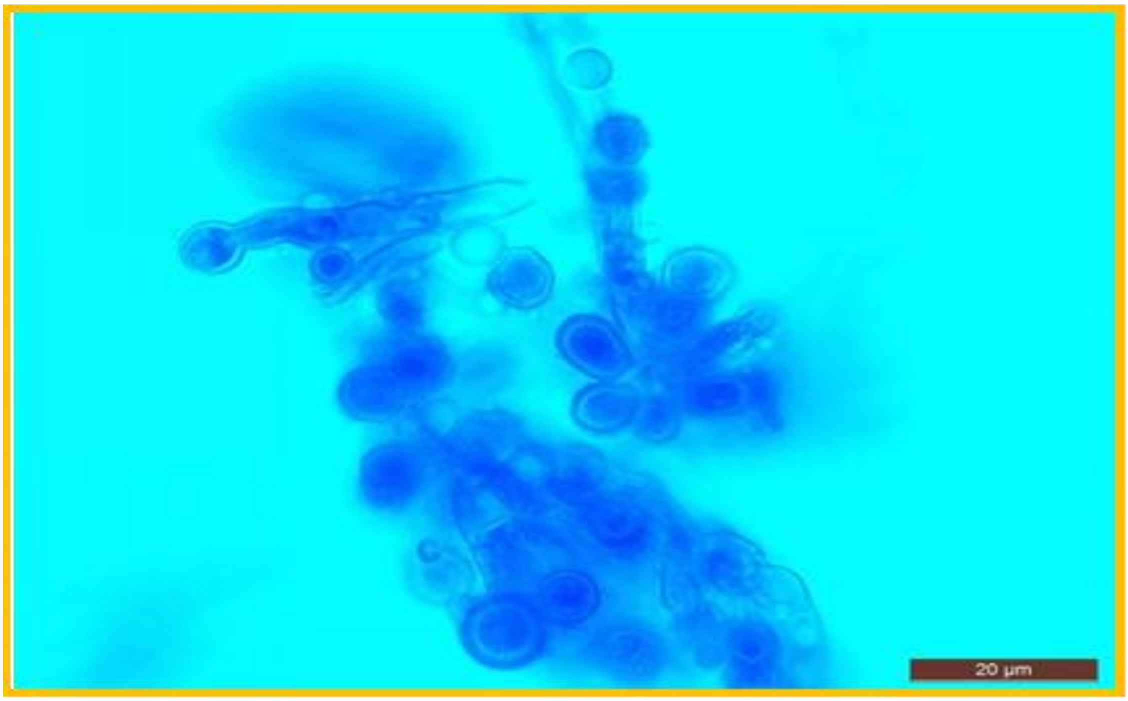


Figure 7: Scopulariopsis brevicaulis (40 x 10(

**RESULTS AND DISCUSSION**

Of 170 goats, 9 (5.2 per cent), 3 (33.3 per cent) and 6 (66.7 per cent) independently were diagnosed as clinical massitis, through clinical diagnosis both by strip-cup examination. A total of 70 (41.1%) goats were deemed to be CMT sub-clinical mastitis and 53.5% were considered to be stable. Of 170 milk samples, 19 (11.1%) were positive for fungus, 10 (52.7%) for subclinical mastitis and 9 (47.3%) for good cattle were cultivated. Fungi is shown to be negative in all clinical mastis samples. In five generations is nineteen mould and yeast isolates (Table 1). For cultivation 3(1.7 percent) milk samples is fine in candia (C.) albicans, 2(1.1%) in c. lusitaniae, 1(0.5%) in s. parapsilosis, 1(0.5%) in c. glabrata, 2(1.1%) in cryptoccus (C.)neoformans, 1(0.5%) in nocardia spp., 4(2.3%) in penicillium spp., 3(1.7%) in s. brevicaulis, 2(1.1%) in aspergillis.

**Table 1/ fungi isolated from the milk sample of the local breed goats.**

| Fungi | C. mastitis (n:9) | S.c mastitis (n:70) | Clinically healthy (n:91) | Total (n:170) |
|---|---|---|---|---|

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| | n | % | n | % | n | % | n | % |
|---|---|---|---|---|---|---|---|---|
| *C. albicans* | - | - | 2 | 2.8 | 1 | 1.1 | 3 | **1.7** |
| *C. lusitaniae* | - | - | 1 | 1.4 | 1 | 1.1 | 2 | **1.1** |
| *C. parapsilosis* | - | - | 1 | 1.4 | - | - | 1 | **0.5** |
| *C. glabrata* | - | - | 1 | 1.4 | - | - | 1 | **0.5** |
| *C. neoformans* | - | - | 2 | 2.8 | - | - | 2 | **1.1** |
| ***Nocardia* spp.** | - | - | - | - | 1 | 1.1 | 1 | **0.5** |
| ***Penicillium* spp.** | - | - | 1 | 1.4 | 3 | 3.2 | 4 | **2.3** |
| *S. brevicaulis* | - | - | 1 | 1.4 | 2 | 2.1 | 3 | **1.7** |
| *A. fumigatus* | - | - | 1 | 1.4 | 1 | 1.1 | 2 | **1.1** |
| **Total** | | | **10** | **14.2** | **9** | **9.8** | **19** | **11.1** |

Mastitis is one of the major diseases of domestic animals triggered by many etiological compounds and is a global health issue in lactation (Bergonier et al., 2003; Stuhr and Aulrich, 2010; Quinn et al., 2011). While the primary microorganisms implicated in this disease are bacterial, fungi have also been accused, and the aetiology of the persistent cause of an udter infection should be borne in mind.

Mycotical mastitis experiments have concentrated on bovine infection (Costa et al., 1993; Guler et al., 2005; Ekin et al., 2015), although there have been just a few findings on goat and sheep infection (Al-Majali and Jawabreh, 2003; Bourabah et al., 2013). In this analysis a specific attention was therefore given in addition to bacterial agents to fungi in goat mastitis. Several tests to assess the incidence of mastitis in small ruminants have been done. Overall, 36%, 33%, and 18% in the US, Great Britain, France, and Spain, respectively, have registered a prevalence of goat mastitis including clinical and subclinical cases (Poutrel and Lerondelle, 1983; Manser, 1986; Contreras et al., 1995; White and Hinckley, 1999).

Moroni et al. (2005) recorded an average sample prevalence of 49.8 percent in

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two goat cattle. In individual goat milk samples from flocks of somatic cell numbers, the incidence of sub-clinical mastitis was diagnosed as 70 per cent by Vasiu et al. (2008). Bourabah et al. (2013) recently recorded a 33.9 percent overall prevalence. Milk extracts from mastitis, subclinical mastitis and seemingly stable animals have been obtained during this research. The overall incidence was 46.4%, while 5.2% was clinical and 41.1% is sub-clinical mastitis. This may be clarified because mastitis is a dynamic disorder involving causative species, environmental conditions and management experiences. Several yeast or yeastlike micro-organism organisms have been isolated from goat mastitis from Candida, Chryptococcus, Rhodotorula, Curvularia or Aspergillus (Singh et al., 1994; Singh et al., 1998; Chhabra et al., 2004; Hassan et al., 2014). A amount of 25 samples from numerous farmhouses, including diseased and seemingly stable cases of sheep and goats is obtained by Hassan et al. (2012). Hassan et al.

In culture, C. albicans had 6 (24%) samples of milk, C. krusie had 2 (8%), C. parapsilosis had 1 (4%) and Rhodotorula (R.) rubra had 3 (12%) positive for goat milk from clinician livestock. In culture, goat's milk samples were positive. In seemingly stable goats two (8%) milk samples were C. albicans, one (4%) milk candidates were geotric (G.), 1 (4%) milk samples was positive and one (4%) milk samples were C. albicans, Trichosporon (T.) was positive.

The findings were 3 (1.7%) for Candia albicans, 2 (1.1%) for C. lusitaniae, 1 (0.5%) for C. parapsilosis, 1 (0.5%) for C. glabrata, 2 (1.1%) for C. neoformans, 4 (2.3%) for Penicilllia spp., and 3 (1.7%) for S. brevicaulis, 2 (1.1%) for A. fumigatus in this study. The results of this study were positive for C. neoformania. These concentrations of alienation are smaller than Hassan et al (2012).

This variations may be related to the various methods of separation or different status of animal immune defense mechanisms. A majority of yeast isolates from Candida genus milk samples (Singh et al., 1998). In the analysis, 7 (28%) of the C. albicans, C. krusie and 1 (4%) for C. parapsilosis were grown, 2 (8%) were milk samples (Hassan et al., 2012). The sample contained 3 (42.8%) C of 7 candida isolates, 2 (28.5%) C. lusitaniae, 1 (14.5%) C. parapsilosis and 1 (14.2%) C. glabrata.

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These results revealed the significance of Candida spp. in goat mastitis etiology. In a variety of animal species, cryptococcosis has been identified. C. neoformans have been isolated from multiple mammals as a causative agent of mastitis (Pal and Randhawa, 1976; El- Far et al., 1987; Menzies and Ramanoon, 2001). In this analysis, 2 (1.1 percent) goats with mastitis was isolated from C. neoformans. This is the first case of goat mastitis in Turkey in which C. neoformans was isolated as the etiological agent.

The milk tests of goats have isolated various saprophytic fungi (Chhabra et al., 2004; Bourabah et al., 2013). A total of 298 milk samples were obtained and analyzed by culture from each half-pad of 149 goats. A. niger and A. nidulans were confirmed to be isolated by 24.7% in samples (Bourabah et al., 2013). Scopulariopsis is a widespread soil saprofit and a large range of substrates have been isolated. Scopulariopsis is commonly associated to human infections by S. brevicaulis, S. brumptii, S. acremonium, S. fusca, S. koningii.

The majority of human S. brevicaulis infections are onychomycosis, but some other infections have been reported in patients with compromised immunity, wounds or procedure including cutaneous inflammation, endocarditis and endophthalmitis (Lee et al., 2012). In this survey, the milk samples collected by the goats with subclinical mastitis and clinically stable animals have been isolated, i.e., penicillium spp. (2,3%), S. breviaries (1,7%) and A. fumigatus (1,1%). This opportunistic fungi have been shown to also impact immune-compromised patients (Lee et al., 2012).

Two samples were positive for S. Brevicaulis in this analysis and may be tested for caprine mycotic mastitis and public health as relevant findings. There were speculations that consumption of goat's milk and milk goods will grow worldwide in the future (Yangılar, 2013). However, raw milk provides for a large number of fungal species with all required nutrients and conditions for development. There are many infectious agents in the etiology of mastitite. Any of the mastitogens are essential to public health. In this analysis, the fungi (C. albicans, C. tropicalis and C. neoformans) are isolated from the mastic milk of the dairy goats (Mahendra and Vijay, 2013). The present study concluded that dairy goats and otherwise stable animals with subclinical mastitis may be harboring pathogeic fungi, which

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has a strong epidemiological significance as a consequence of serious injury to dairy consumers. Moreover, owing to the toxicity of the livestock rations as well the widespread indiscriminate usage of Antibiotics, the incidence of mychotic mastitis will potentially increase in future.

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