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SURVEY ON PREVALENCE RATE OF FUNGAL SPECIES IN CATTLE MASTITIS AT SOME DAIRY FARM AROUND TABRIZ CITY

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ABSTRACT

Mastitis is the inflammation of the mammary gland. The most common aetiological factors are bacteria followed by mycoplasmas, viruses, fungi, and algae. Studies on fungal infections of the mammary gland in cows are increasingly common due to their growing incidence. So, the aim of this study was conducted on prevalence rate of fungal species in cattle mastitis at some dairy farm around Tabriz city. The material consisted of 80 milk samples collected from cows with clinical and subclinical mastitis from herds in around Tabriz city. 15ml of milk was collected from each animal and transported to laboratory under ice. The majority of microorganisms (60%) belonged to *Aspergillus* and the majority of yeast was *Candida spp*. (51%). The most commonly isolated species were Candida krusei (8.66%) and Candida kefyr (7.33%) whereas *Candida utilis* was least common –one species (0.67%). Higher incidence of mycotic mastitis during this period is likely to be associated with the effects of numerous unfavourable factors.

Keywords: Fungal, Cattle, Mastitis, Tabriz.

INTRODUCTION

Mastitis is the inflammation of the mammary gland. Mastitis in cows is caused by about 150 microorganisms, many of which are pathogenic for humans. The most common aetiological factors are bacteria followed by mycoplasmas, viruses, fungi, and algae. The studies on fungal infections of the mammary gland in cows are increasingly common due to their growing incidence. It is widespread in dairy herds and associated with a

significant reduction in milk yield resulting in increased costs of production and deteriorated quality of milk and milk products [1]. Mastitis is characterized by partial or complete damage to udder tissues which is usually a consequence of microbial infection. A wide variety of microorganisms have been implicated as causative agent of bovine mastitis including bacteria and fungi [2]. Seriousness of mycotic infection of mammary glands depends upon the species of the fungus involved as well as the percentage of infectivity. Treatment of mycotic mastitis is a challenge as many of these fungi do not respond to the antibiotics therapy rather they use some of the antibiotics like tetracycline as their source of energy [3]. In routine mastitis therapy antibiotics are used more often and much emphasis is not given on the antifungal therapy. Due to this reason most of the mastitis cases not only become incurable but also act as a source of infection for other lactating animals in the herd. Therefore it has become necessary to know about the fungal spp. playing role in mastitis, which could be differentially diagnosed and pinpoint therapy should be given to the animals. Though there are many reports of fungal involvement in bovine mastitis around the globe, still very little work is done in Iran. Present study was undertaken to know the prevalence of fungal infections and the species involved in clinical and sub-clinical mastitis.

MATERIALS AND METHODS:

The material consisted of 80 milk samples collected from cows with clinical and subclinical mastitis from herds in around Tabriz city. 15ml of milk was collected from each animal and transported to laboratory under ice. Milk samples were examined for color, consistency and pH. The samples were streaked on Saboraud's dextrose agar plates. The plates were incubated at 37°C and examined for growth at 24, 48 and 72 hours and at weekly intervals for 4 weeks after which the plates showing no growth were considered negative [4]. The colonies were picked up and re-streaked on another SDA plate to get the pure cultures. These fungal isolates were studied for their cultural and morphological characteristics. The morphological characteristics were noted after staining with Gram's and Lacto phenol cotton blue stain. Bacteriological examinations were carried out according to standard procedures using the API system [5]. The genera and species of fungi were identified by the API 20C AUX system.

RESULTS

As it was demonstrated, different species of bacteria were the main aetiological agents of

mastitis in cows. They were found in 73.36% of milk samples. Fungi were isolated from 12.07% of examined samples; 14.57% of cases were negative (Table1).

Table 2 presents the species of fungi isolated from the infected udder secretions. The majority of microorganisms (60%) belonged to *Aspergillus* and the majority of yeast was *Candida spp*. (51%). The most commonly isolated species were Candida krusei (8.66%) and Candida kefyr (7.33%) whereas *Candida utilis* was least common –one species (0.67%).

Table 1: Aetiological agents of cattle mastitis in 2014

Microorganisms	Number	%
Fungi	**10**	**12.07**
Bacteria	**59**	**73.36**
No growth	**11**	**14.57**
Total	**80**	**100**

Table 2: Genera and species of fungi isolated from cases of cattle mastitis.

Genera	Species	Number	%	Percentage of all samples tested
Aspergillus	***Fumigates***	**28**	**18.66**	**2.27**
	Niger	**32**	**21.33**	**2.93**
Trichophyton	***Verrucosum***	**20**	**13.33**	**1.33**
Cladosporium	***Carrionii***	**16**	**10.66**	**1.23**
Candida	***Candida krusei***	**13**	**8.66**	**1.11**
	Candida kefyr	**11**	**7.33**	**0.90**
	Candida lusitaniae	**9**	**6**	**0.80**
	Candida famata	**5**	**3.33**	**0.33**
	Candida rugosa	**4**	**2.66**	**0.19**
	Candida albicans	**2**	**1.33**	**0.09**
	Candida tropicalis	**2**	**1.33**	**0.09**
	Candida glabrata	**2**	**1.33**	**0.09**
	Candida utilis	**1**	**0.67**	**0.05**
Trichosporon	***Trichosporon mucoides***	**2**	**1.33**	**0.09**
Rhodotorula	***Rhodotorula mucilaginosa***	**2**	**1.33**	**0.09**
Cryptococcus	***Cryptococcus laurenti***	**1**	**0.67**	**0.05**
Total		**150**	**100.00**	**11.64**

Table 3: Incidence of mycotic mastitis in particular months

Month	Number	%
January	**14**	**9.33**
February	**13**	**8.66**
March	**27**	**18**
April	**26**	**17.33**
May	**17**	**11.33**
June	**20**	**13.33**
July	**4**	**2.66**
August	**8**	**5.33**
September	**1**	**0.66**

October	**3**	**2**
November	**10**	**6.66**
December	**7**	**4.66**
Total	**150**	**100.00**

DISCUSSION

The presented findings show that fungi infections account for a low percentage of all udder infections and inflammations of the mammary gland in cows, and are consistent with the results of other authors. The literature data reveal that infections caused by fungi in Belgium constitute less than 6% (14), in Italy – 4.4%, together with mixed infections – fungi and bacteria – 9.3% (19), in Denmark 1.4% (1), and in tropical countries 12%-17.3% [6, 7 and 8]. Fungi as an etiological agent of mastitis have also been reported by various workers [9, 10].

Earlier studies carried out between 1982 and 1992 showed that about 6% of mastitis cases were caused by fungi [11]. According to the present study, the percentage of fungi inducing mastitis increased to 7.07%. It seems that increasingly wide use of antibiotics in recent years is the key factor contributing to higher incidence of udder mycosis. Our observations concerning higher incidence of mycotic inflammations in cows treated with antibiotics confirm the earlier results of other authors [12, 13 and 14]. The multiplication of fungi during antibiotic therapy is stimulated by the elimination of antagonistic bacterial flora, decreased amounts of vitamin A in the glandular tissue and epithelium, and irritating effects of antibiotics.

The most common aetiological factors of mycotic mastitis are the following genera of fungi: *Candida*, *Cryptococcus*, *Rhodotorula*, *Trichosporon*, *Torulopsis*, and *Geotrichum* [10, 11, 15, 16, 17, 18, 19 and 20]. In tropical countries, more species of fungi, as well as mildew fungi (*Aspergillus*, *Penicillum*, *Epicoccum*, *Phoma*, and *Alternaria*) are found in the infected mammary secretions [16]. Our studies confirmed the findings reported by other authors, who demonstrated that *Candida* were the most commonly isolated aetiological agents of mycotic mastitis in cows and the most frequent and abundant species included *Candida krusei* and *Candida kefyr* (11, 12, 14, 15 and 21). The overall infectivity of Aspergillus spp was 60%. Other researchers have also reported Aspergillus spp as a causative agent of bovine mastitis [22 and 23]. As Aspergillus spp. is a common pathogen of human skin this high incidence of may be attributed to possible transmission during milking. A higher percentage of isolation of

fungi from clinical cases and subclinical cases reveal that the incidence of fungal mastitis is increasing which may be due to unhygienic conditions of the animal sheds supporting the growth of fungal spores and hyphae in the vicinity of lactating animals. Thereby, increasing the probability of fungal spores and yeast cells to enter into the udder parenchyma which provides the best environment for the growth of these fungi [12 and 24].

Higher incidence of mycotic mastitis during this period is likely to be associated with the effects of numerous unfavourable factors. Besides the prolonged intra-udder administration of antibiotics, increased incidence of udder mycosis results from mineral-vitamin deficiencies, antioxidant deficiencies accompanied by energy imbalance, as well as changeable weather. All of the mentioned adverse conditions decrease the resistance and susceptibility of cow udders to inflammations.

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