

**Clinical bovine mastitis caused by
*Geotrichum candidum***

**Rajesh Chahota, Ramesh Katoch*, Arvind Mahajan,
and Subhash Verma**

*Department of Veterinary Microbiology, College of Veterinary and Animal Sciences,
CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur, India*

CHAHOTA, R., R. KATOCH, A. MAHAJAN, S. VERMA: Clinical bovine mastitis caused by *Geotrichum candidum*. Vet. arhiv 71, 197-201, 2001.

ABSTRACT

Mastitis, which has multiple and complex aetiology, is a common syndrome among bovines and inflicts enormous losses on livestock owners. The mastitis cases are infectious in nature and are usually caused by bacteria, fungi/yeasts and some algae. An interesting case of protracted clinical mastitis in a Holstein-Friesian cow in its third lactation was encountered, with exclusive involvement of *Geotrichum candidum*, an extremely rare in occurrence. *G. candidum*, an opportunistic, keratinophilic yeast-like fungus, was identified by its diagnostic colonial characteristics and microscopic morphology, i.e. rectangular arthrospores (arthroconidia) after staining with lactophenol cotton blue stain (LPCB) in a wet mount, and Gram's stain after heat fixation of the smear. This fungal isolate was also subjected to in-vitro antifungal sensitivity test against cotrimazole, ketoconazole, miconazole, amphotericin-B and nystatin, but was found sensitive only to amphotericin-B.

Key words: amphotericin-B, *Geotrichum candidum*, Holstein-Friesian, mastitis

Introduction

Mastitis among bovines is a common disease, inflicting enormous financial setbacks on farmers. Mastitis has multiple and complex aetiology, but the majority of cases are infectious in nature and usually result from infection by bacteria, fungi/yeasts and some algae. Mycotic mastitis had

*Contact address:

Prof. Dr. Ramesh C. Katoch, Department of Veterinary Microbiology, College of Veterinary and Animal Sciences, HPKV, Palampur-176062, HP, India, Phone: +91 1894 30304; Fax: +91 1894 30511, E-mail: hpau@hpkv.hp.nic.in

been documented to be caused by various genera of moulds and yeasts. However, the most frequently encountered mycobiota are *Candida* spp., *Aspergillus* spp., *Trichosporon* spp., *Cryptococcus* spp., *Saccharomyces* spp., *Penicillium* spp., etc. (CARTER, 1995). The involvement of *Geotrichum candidum* in mastitis, however, is extremely rare (MISHRA and PANDA, 1986; SEDDEK, 1997; KRZYZANOWSKI and SIELICKA, 1996). The present report documents a case of clinical mastitis in a Holstein-Fresian cow in its third lactation. The owner reported a history of protracted mastitic condition despite the administration of different intramammary antibiotics and hydrocortisone preparations. Clinically, the cow had not displayed any feature of systemic infection. The udder was moderately fibrous and slightly warm. The milk from all the quarters was watery with thick flakes, and slightly blood tinged in the right fore quarter.

Materials and methods

Milk samples from all four quarters of a Holstein-Fresian cow in its third lactation were screened for mastitis by California Mastitis Test (CMT) and the bromothymol blue card method. Milk samples were also collected from all four quarters for microbial isolation under strict aseptic conditions. The milk was inoculated on blood agar (BA) both aerobically as well as anaerobically, and on Sabouraud's agar (SA). One set of plates was inoculated at 22 °C and another was set at 37 °C and observed daily for week. The fungus was identified as *Geotrichum candidum* based upon its colonial characteristics and diagnostic microscopic morphology after staining with lactophenol cotton blue stain (LPCB) in a wet mount, and Gram's stain after heat fixation of the smear, as well as its biochemical characteristics (KONEMAN et al., 1997). This fungal isolate was also subjected to *in vitro* antifungal sensitivity profile against clotrimazole, ketoconazole, miconazole, amphotericin-B and nystatin.

Results

Through CMT and the bromothymol blue card method, milk samples from all quarters were found highly positive for mastitis. On inoculated plates the fungal growth was evident on BA and SA after 2 days.



Fig. 1. Mycelia and rectangular arthroconidia of *Geotrichum candidum* in lactophenol cotton blue stain. $\times 450$

The colonies were whitish, flat, moist, with a granular surface and appearing like yeast colonies. Microscopically the fungal mycelia were septate and some were fragmented into rectangular arthrospores (arthroconidia) in both LPCB stained wet mount (Fig. 1) and Gram's stained smear (Fig. 2).

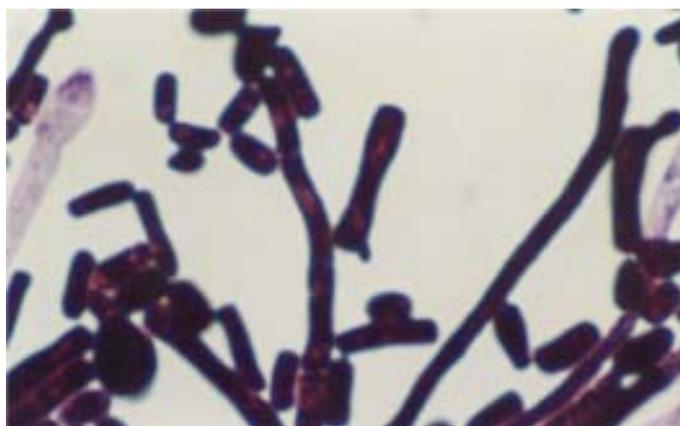


Fig. 2. *Geotrichum candidum* showing characteristic mycelia and rectangular arthroconidia by Gram's staining. $\times 1000$

A small number of colonies of other non-significant bacteria were also observed on BA. The growth of the fungus was more luxuriant at room temperature than at 37 °C. Biochemically, fungus utilized xylose, galactose, and sucrose oxidatively. This isolate was found sensitive only to amphotericin-B.

Discussion

G. candidum is an opportunistic, keratinophilic yeast-like fungus that is widely distributed in nature, i.e. soil, fodder, etc. It is reported to cause systemic mycoses among dogs, cats and humans (MUTINELLU et al., 1986; DRGA et al., 1982). SAMBORSKI et al. (1983) isolated *G. candidum* from placenta of 2.8% aborted cows in Poland. However, there are only a very few reports from around the entire world regarding its incrimination with bovine mastitis. MISHRA and PANDA (1986) found only one case of *G. candidum* out of 135 cases of mastitis in Orissa State, India. Similarly, COSTA et al. (1993) detected only one mastitis milk sample positive for *G. candidum* among a total of 2078 samples screened in Sao Paulo, Brazil. It has been documented that association of *G. candidum* with mastitis is greater in those patients which have been subjected to prolonged irrational antibiotic therapy, as is evident in this case. Moreover, this fungus is widely distributed in nature. Hence, any injury to teat sphinctures, or unhygienic milking, can lead to its entry into the mammary gland, causing subsequent infection, warranting strict disinfection of teats and milking barns.

References

- CARTER, G. R. (1995): Diagnostic procedures in Veterinary Bacteriology and Mycology. 6th ed., (Carter, G. R. and J. R. Cole Jr., Eds.) Academic Press inc., California. pp. 457-467
- COSTA, E. O., C. R. GANDRA, M. F. PIRES, S. D. COUTINH, W. CASTILHO, C. M. TEIXEIRA (1993): Survey of bovine mycotic mastitis in dairy herds in the state of Sao Paulo, Brazil. Mycopathologia 124, 13-17.
- DRGA, J., J. BURANSKY, I. KOCAN, E. CHALUPOVA (1982): Occurrence of yeast in respiratory diseases. Bratislavske-Lekarske-Listy 78, 307-313.

- KONEMAN, E. W., S. D. ALLEN, M. W. JANDA, C. S. PAUL, W. C. WINN (1997): Colour atlas and test book of diagnostic microbiology, 5th ed. Sippircott-Raven Publishers, Philadelphia.
- KRZYŻANOWSKI, J., B. SIELICKA (1996): Characteristics of yeasts isolated from clinical cases of mastitis in cows. *Annales-Universitatis-Mariae-Curie-Sklodowska-Section-DD-Medicina-Veterinaria* 51, 59-64.
- MISHRA, P. R., S. N. PANDA (1986): Some observations on the occurrence of mycotic mastitis in Orissa. *Ind. Vet. J.* 63, 886-888.
- MUTINELLI, F. P., M. GALLO, R. DINATI (1986): Systemic mycoses of the cat and the dog. *Summa* 3, 213-219.
- SAMBORSKI, Z., D. SZUMIGALSKA, J. A. MADEJ, B. SIRLICKA, Z. MICHALSKI (1983): Abortion in cow due to fungal infections of the reproductive tract. *Medycyna-Weterynaryjna* 39, 195-198.
- SEDDEK, S. R. (1997): Bovine mastitis (age, cause and control) in Assiut Governorate. *Assiut-Veterinary Medical-Journal* 36, 149-162.

Received: 5 January 2000

Accepted: 21 August 2001

CHAHOTA, R., R. KATOCH, A. MAHAJAN, S. VERMA: Klinički mastitis uzrokovan gljivicom *Geotrichum candidum*. Vet. arhiv 71, 197-201, 2001.

SAŽETAK

Mastitis u goveda je kompleksne etiologije i nanosi velike gospodarske štete. Najčešće je uzrokovan bakterijama, gljivicama i rijetko nekim algama. U radu je prikazana zanimljiva i veoma rijetka upala vimena krave holštajn-frizijske pasmine uzrokovana gljivicom *Geotrichum candidum*. Gljivica *G. candidum* je keratofilna gljivica slična kvascima. Identificirana je na osnovi karakterističnih kolonija i morfoloških značajki artrospora vidljivih nakon bojenja. Određena je i osjetljivost izdvojene gljivice prema klotrimazolu, ketokonazolu, mikonazolu, amfotericinu B i nistatinu. Osjetljivost je utvrđena samo za amfotericin B.

Ključne riječi: *Geotrichum candidum*, amfotericin B, holštajn-frizijsko govedo, mastitis
