Identification of *Mycobacterium avium* subsp *paratuberculosis* infection in industrial dairy farms of Hamedan

Mahmoodi Koohi, P.[1]; Sadeghi-nasab, A.[2]; Mohammadzadeh, A.M.[1]; Sharifi, A.[3]; Bahari, A.A.[2] and Mosavari, N.[4]

Received: 11.11.2016 Accepted: 16.05.2017

Abstract

John's disease is a chronic intestinal infection which is caused by *Mycobacterium avium* subspecies *paratuberculosis* (Map) and imposes huge economic losses to farms. The aim of the present study was to detect infection by this bacterium in industrial farms of Hamedan. During the years 2015-2016, 150 fecal samples from apparently healthy and suspected cattle were collected and examined using direct microscopic and Nested-PCR assays. The results obtained from examination of fecal samples with Ziehl-Neelsen (ZN) staining showed that 8 samples (5.33%) were infected with the causative agent of the disease. While, using Nested-PCR assay, 39 (30.23%) and 9 (42.86%) samples were found to be positive in apparently healthy (n=129) and suspected cattle (n=21), respectively. However, no significant difference was statistically observed between the numbers of positive cases in these two groups (P>0.05). Thus, 48 (32%) out of 150 fecal samples were totally infected with *M. avium* subsp. *paratuberculosis* which relatively shows a high infection rate. Therefore, it is suggested to eliminate infected animals and take proper management and hygiene measures in order to control the infection and prevent its prevalence to other animals and herds. To our knowledge, the present study is the first report which confirms paratuberculosis in industrial farms of Hamedan.

Key words: Paratuberculosis, *M. avium* subsp. *paratuberculosis*, Nested-PCR, Cattle, Hamedan

1- Assistant Professor, Department of Pathobiology, Faculty of Veterinary Science, Bu-Ali Sina University, Hamedan, Iran
2- Assistant Professor, Department of Clinical Sciences, Faculty of Veterinary Science, Bu-Ali Sina University, Hamedan, Iran
3- PhD Graduated of Bacteriology, Faculty of Veterinary Science, Bu-Ali Sina University, Hamedan, Iran
4- Associate Professor, Reference Laboratory for Bovine Tuberculosis, Razi Vaccine and Serum Research Institute, Agricultural Research, Education and Extension Organization, Karaj, Iran
Corresponding Author: Mahmoodi Koohi, P., E-mail: mahmoodi_pezhman@yahoo.com

Refrences

Collins, M.T.; Kenefick, K.B.; Sockett, D.C.; Lambrecht, R.S.; McDonald, J. and Jorgensen J.B. (1990). Enhanced radiometric detection of *Mycobacterium paratuberculosis* by using filter-concentrated bovine fecal specimens. Journal of Clinical Microbiology, 28: 2514-2519.

Douarre, P.E.; Cashman, W.; Buckley, J.; Coffey, A. and O'Mahony, J.M. (2010). Isolation and detection of *Mycobacterium avium* subsp. *paratuberculosis* (MAP) from cattle in Ireland using both traditional culture and molecular based methods. Gut Pathogens, 2:11.

Haji Hajikolaei, M.; Ghorbanpoor, M. and Solaymani, M. (2006). The prevalence of *Mycobacterium paratuberculosis* infection in ileocecal valve of cattle slaughtered in Ahvaz abattoir, southern Iran. Iranian Journal of Veterinary Research, 7(2): 77-80.

Hassani Tabatabaei, A.M. and Firouzi R. (2005). Animal diseases due to bacteria, 2nd edition, number 2492, University of Tehran Press, Pp: 414-422.

Merkal, R.S. (1973). Laboratory diagnosis of bovine paratuberculosis. Journal of the American Veterinary Medical Association, 163: 1100-1102.

Millar, D.; Ford, J.; Sanderson, J.; Withey, S.; Tizard, M.; Doran, T. and Hermon-Taylor, J. (1996). IS900 PCR to detect *Mycobacterium paratuberculosis* in retail supplies of whole pasteurized cows' milk in England and Wales. Applied and Environmental Microbiology, 62(9): 3446-3452.

Mohammadian, B. and Abasnia, M. (2015). A study on the prevalence of *Mycobacterium avium paratuberculosis* in three breeds of sheep at Ahvaz abattoir. Iranian Veterinary Journal, 11: 103-109.

Nassiri, M.R.; Jahandar, M.H.; Soltani M.; Mahdavi, M. and Doosti, M. (2012). Identification and strain determination of *M. paratuberculosis* (MAP) by PCR and REA methods based on IS900 and IS1311 insertion segments. Journal of Agricultural Biotechnology, 4: 83-96.

Sadati, R.; Jafarpour, M.; Mirinargesi, M.; Nazemi, A. and Barghi, A. (2012). Prevalence of *Mycobacterium avium* subsp. *paratuberculosis* in Dairy Cattle Bred in Northern Iran by Nested-PCR. Global Veterinaria, 8(3): 259-263.

Seyyedin, M.; Tadjbakhsh, H. and Zahraei Salehi, T. (2010). Identification of *Mycobacterium avium subsp paratuberculosis* in fecal samples of Holstein-Friesian cattle using molecular and cultivation methods. Journal of Veterinary Research, 65: 135-140.

Slana, I.; Bartos, M.; Roubal, P.; Babak, V. and Pavlik, I. (2009). *Mycobacterium avium* subsp. *paratuberculosis* and *M. a. avium* detected by culture, IS900 and IS901 highly sensitive PCR in bulk tank milk from dairy herds in the Czech Republic between 2002 and 2004. Czech Journal of Food Science, 5: 372-378.

Stabel, J.R. and Bannantine, J.P. (2005). Development of a nested PCR method targeting a unique multicopy element, ISMap*02*, for detection of *Mycobacterium avium* subsp. *paratuberculosis* in fecal samples. Journal of Clinical Microbiology, 43: 4744-4750.

Tohidi Moghadam, M.; Sarv, S.; Moosakhani, F. and Badiie, A. (2010). Detection of *Mycobacterium avium* subsp. *paratuberculosis* in milk and fecal samples in dairy cattle by PCR and Nested-PCR. Journal of Animal and Veterinary Advances. 9(24): 3055-3061.

Whittington, R.J. (2009). Factors affecting isolation and identification of *Mycobacterium avium* subsp. *paratuberculosis* from fecal and tissue samples in a liquid culture system. Journal of Clinical Microbiology, 47: 614-622.

Whittington, R.J. and Sergeant, E.S.G. (2001). Progress towards understanding the spread, detection and control of Mycobacterium avium subsp. paratuberculosis in animal populations. Australian Veterinary Journal, 79: 267-278.