

Evaluation of the Seroprevalence of *Akabane* and *Bluetongue* viruses using competitive-ELISA in dairy cattle from industrial herds, Semnan suburb, Iran

Mohajer, F.¹; Sheikh, Y.¹; Staji, H.²; Keyvanloo, M.³ and Hashemzadeh, H.⁴

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Abstract

A cross-sectional survey was carried out to determine the seroprevalence of *Akabane* (AKA) and *Bluetongue* (BT) viruses in dairy herds in Semnan suburbs, Iran. Serum samples were collected from a total of 184 dairy cattle and tested for antibodies against *AKAV* and *BTV* using competitive-ELISA. The prevalence rates of *AKAV* and *BTV* antibodies in examined cattle were 23.3% (0-75% between herds) and 0%, respectively. The prevalence rates of *AKAV* antibodies were significantly associated with milking status (milking or heifer) and abortion history, being higher in milking animals in comparison to heifers (31.3%) and animals without abortion history than previously aborted cattle's (34.2%). The study revealed that *AKAV* infection is present in dairy herds of Semnan suburbs and this calls for control strategy to be noticed by veterinary services while *BTV* seems to have less importance in cattle herds of Semnan region.

Key words: *Akabane*, *Bluetongue*, Seroprevalence, ELISA, Dairy cattle

1- DVM Graduated, Faculty of Veterinary Medicine, Semnan University, Semnan, Iran

2- Assistant Professor, Department of Pathobiology, Faculty of Veterinary Medicine, Semnan University, Semnan, Iran

3- Assistant Professor, Department of Clinical Sciences, Faculty of Veterinary Medicine, Semnan University, Semnan, Iran

4- Expert, Veterinary office of Semnan Province, Semnan, Iran

Corresponding Author: Staji, H., E-mail: hstaji@semnan.ac.ir

References

- Agerholm, J.S.; Hewicker-Trautwein, M.; Peperkamp, K. and Windsor, P.A. (2015). Virus-induced congenital malformations in cattle. *Acta Veterinaria Scandinavica*, 57(1): 54.
- Ahi, M.R.; Pourmahdi Borujeni, M.; Hajikolaie, H. and Seifi Abad Shapouri, M.R. (2015). A Serological Survey on Antibodies against Akabane Virus in Sheep in Southwest of Iran. *Iranian Journal of Virology*, 9(2): 20-25.
- Ahourai, P.; Gholami, M.; Kargar, R.; Khedmati, K.; Aslani, A.; Rahmani, F. and Zarrin-Naal, E. (1992). Bovine congenital arthrogryposis and hydranencephaly outbreaks attributed to Akabane virus infection in Iran. *Archives of Razi Institute*, 42/43: 51-56.
- Balmer, S.; Vöggtlin, A.; Thür, B.; Büchi, M.; Abril, C.; Houmard, M. et al. (2014). Serosurveillance of Schmallenberg virus in Switzerland using bulk tank milk samples. *Preventive Veterinary Medicine*, 116(4): 370-379.
- Barkallah, M.; Gharbi, Y.; Hassena, A.B.; Slima, A.B.; Mallek, Z.; Gautier, M. et al. (2014). Survey of infectious etiologies of bovine abortion during mid-to late gestation in dairy herds. *PloS one*, 9(3): e91549.
- Cabalar, M. and Dagalp, S.B. (2006). Seroprevalence of Bluetongue and Akabane diseases in dairy cattle in South-East Turkey. *Slovenian Veterinary Research* 43, (10): 296-297.
- Cabell, E. (2007). Bovine abortion: aetiology and investigations. *In practice*, 29(8): 455-463.
- Coverdale, O.; Cybinski, D. and George, T.S. (1978). Congenital abnormalities in calves associated with Akabane virus and Aino virus. *Australian Veterinary Journal*, 54(3): 151-152.
- Hubálek, Z.; Rudolf, I. and Nowotny, N. (2014). Arboviruses pathogenic for domestic and wild animals. *Advances in Virus Research*, 89(89): 201-275.
- Karaoğlu, T.; Özgünlük, I.; Demir, B.; Oezkul, A. and Burgu, I. (2007). Seroprevalence of culicoides-borne disease in cattle in European Turkey. *Ankara Üniversitesi Veteriner Fakültesi Dergisi*, (54): 121-125.
- Kato, T.; Shirafuji, H.; Tanaka, S.; Sato, M.; Yamakawa, M.; Tsuda, T. and Yanase, T. (2016). Bovine arboviruses in *Culicoides* biting midges and sentinel cattle in Southern Japan from 2003 to 2013. *Transboundary and Emerging Diseases*, 63(6): 220-228.
- Khezri, M. and Azimi, S.M. (2013). Epidemiological investigation of bluetongue virus antibodies in sheep in Iran. *Veterinary World*, 6(3): 122-125.
- Kirkland, P.D. (2002). Akabane and bovine ephemeral fever virus infections. *Veterinary Clinics of North America: Food Animal Practice*, 18(3): 501-514.
- Kojouri, G.; Davoodi, Z. and Momtaz, H. (2015). Serological and Molecular Detection of Akabane Virus in Iran. *Iranian Journal of Applied Animal Science*, 5(3): 737-740.
- Mahdavi, S.; Khedmati, K. and Pishraft Sabet, L. (2006). Serologic evidence of bluetongue infection in onehumped camels (*Camelus dromedarius*) in Kerman province, Iran. *Iranian Journal of Veterinary Research*, 7(3): 85-87.
- Mars, M.; van Maanen, C.; Vellema, P.; Kramps, J. and van Rijn, P. (2010). Evaluation of an indirect ELISA for detection of antibodies in bulk milk against bluetongue virus infections in the Netherlands. *Veterinary Microbiology*, 146(3): 209-214.
- Martin, S.W.; Meek, A.H. and Willeberg, P. (1987). *Veterinary epidemiology: principles and methods*: Iowa State University Press, Ames IA. Pp: 23-73.
- Momta, H.; Nejat, S.; Souod, N.; Momeni, M. and Safari, S. (2011). Comparisons of competitive enzyme-linked immunosorbent assay and one step RT-PCR tests for the detection of bluetongue virus in south west of Iran. *African Journal of Biotechnology*, 10(36): 6857-6862.
- Mozaffari, A.A.; Khalili, M. and Yahyazadeh, F. (2012). A serological investigation of bluetongue virus in cattle of south-east Iran. *Veterinaria Italiana*, 48(1): 41-44.
- Navai, S. and Mesghali, A. (1968). *Ceratopogonidae* (Diptera) of Iran: II. More records of *Culicoides* Latreille, 1809. *Journal of Natural History*, 2(2): 241-246.

- Noaman, V.; Shirvani, E.; Hosseini, S.M.; Shahmoradied, A.; Heidari, M.R.; Raiszadeh, H. et al. (2013). Serological surveillance of bluetongue virus in cattle in central Iran. *Veterinaria Italiana*, 49(2): 141-144.
- Paweska, J.; Venter, G. and Mellor, P. (2002). Vector competence of South African culicoides species for bluetongue virus serotype 1 (BTV-1) with special reference to the effect of temperature on the rate of virus replication in *C. Imicola* and *C. Bolitinos*. *Medical and Veterinary Entomology*, 16(1): 10-21.
- Reddington, J.; Reddington, G. and MacLachlan, N. (1991). A competitive ELISA for detection of antibodies to the group antigen of bluetongue virus. *Journal of Veterinary Diagnostic Investigation*, 3(2): 144-147.
- Shoorijeh, S.J.; Ramin, A.; Maclachlan, N.; Osburn, B.; Tamadon, A.; Behzadi, M. et al. (2010). High seroprevalence of bluetongue virus infection in sheep flocks in West Azerbaijan, Iran. *Comparative Immunology, Microbiology and Infectious Diseases*, 33(3): 243-247.
- Singh, E.L.; Eaglesome, M.; Thomas, F.; Papp-Vid, G. and Hare, W. (1982). Embryo transfer as a means of controlling the transmission of viral infections. I. The invitro exposure of preimplantation bovine embryos to akabane, bluetongue and bovine viral diarrhea viruses. *Theriogenology*, 17(4): 437-444.
- Tsuda, T.; Yoshida, K.; Yanase, T.; Ohashi, S. and Yamakawa, M. (2004). Competitive enzyme-linked immunosorbent assay for the detection of the antibodies specific to Akabane virus. *Journal of Veterinary Diagnostic Investigation*, 16(6): 571-576.