



## **Detection of bovine viral diarrhoea virus antibodies in cows and buffaloes milk in Mosul, Iraq**

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### **Abstract**

The objective of the present work was to detect specific antibodies against Bovine Viral Diarrhoea Virus (BVDV) in cows and buffaloes milk in Mosul, Iraq, using indirect ELISA test. Hand stripped milk samples were collected from 184 clinically normal animals, which were selected randomly from different herds, including 92 adult cows and buffaloes. Results indicated that 24 cows (26.0%) and 20 buffaloes (21.7%) were seropositive, respectively. It was concluded that milk can be used as a screening media for detection of infected herds with BVDV.

**Keywords:** BVDV; cattle; buffaloes; indirect ELISA; milk

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### **Introduction**

Bovine virus diarrhoea virus (BVDV) has become an important infectious agent in cattle and is associated with a wide range of clinical signs. The epidemiological studies revealed that this infection lead to serious economic losses in cattle production (Houe, 1999).

BVDV is a single-stranded RNA pestivirus (*Flaviviridae*), and closely related to the viruses instigators of border disease and classical swine fever, as well as the human hepatitis C virus (Yapkić et al., 2006). It has many different manifestations in a herd, depending on the herd immune and reproductive status (Brownlie et al., 2000). Transient diarrhoea, mixed respiratory infection, infertility or abortion and mucosal disease are the most common clinical signs of the disease and can be seen simultaneously in a herd (Lindberg, 2003). Due to its various manifestations and subclinical form in many herds, the significance of the disease has not been understood until recently, when diagnostic methods were improved (Hilbe et al., 2007).

Milk derived from persistently infected (PI) cows usually contain antigens of the BVDV, therefore it may be considered as a source of virus for calves fed unpasteurized waste milk from sick or treated cows, as

it is practiced commonly on large calf-raising operations (Moerman et al., 1993). However, colostrum from cows with persistent or acute infection may or may not contain infectious BVDV, depending on presence of cross-neutralizing antibodies (Beauudeau et al., 2001).

Based on ancestry breeding values, the average milk production from the BVD-carrier PI individuals should be equivalent to the normal non-PI herd mates, however, first lactation milk-fat, protein and volume output were reduced in BVDV carrier PIs (Niskanen et al., 1991).

A newborn calf becomes seropositive by suckling colostrum from an antibody-positive dam (Brownlie, 1990). Brodersen (2004) reported that colostral antibodies can mask the presence of viral antigen in the blood or in the peripheral blood leukocytes of young PI animals (less than three months age or even older). Nevertheless, practically all older PI animals are virus-positive and antibody-negative when they are infected only with one genotype and subtype of BVDV (Sandvik, 2005). The main limitation of virus isolation from sera of PI animals younger than 3 months is that maternal antibodies interfere with growth of BVDV in cell cultures (Zimmer et al., 2004). Antibodies against

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BVDV could be an indicator of immune response rather than an indicator of a protective immunity (Chase et al., 2004).

BVDV were recently detected in Mosul, Iraq (Alsaad et al., 2012). Therefore, the aim of this study was to find BVDV antibodies in individual milk samples obtained from clinically normal cows and buffaloes in Mosul, Iraq.

## Materials and Methods

### Animals

The study was conducted on one hundred eighty four clinically normal animals, which were selected randomly from different herds, including ninety two adult cows and ninety two adult buffaloes. Animals were between three to seven years old. Experimental animals were either reared indoor or grazing during the day light. None of the tested animal had been vaccinated against BVDV. Individual hand stripped milk samples were taken in a volume of 25 mL in sterile plastic tubes. Samples were kept at -20 °C for further analysis.

### Indirect ELISA

Commercial indirect ELISA kit for the detection of specific antibodies was used (SVANOVA Biotech AB, Uppsala, Sweden). Indirect ELISA technique was applied according to manufactures instruction. The corrected optical density (COD) level was calculated before interpretation of the results by subtracting the optical density (OD) for the control antigen from sample OD ( $OD_{\text{sample}} - OD_{\text{control}} = \text{COD}$ ). The percent of positive values  $\geq 7$  and  $< 7$  were interpreted positive and negative, respectively.

## Results

Results indicated that 24 cows (26.0 %) and 20 buffaloes (21.7 %) were ELISA-positive respectively for specific antibodies against BVDV as shown in table 1.

## Discussion

BVDV is an important bovine pathogen that may have negative impact on reproductive performance, increases morbidity and mortality (Baker, 1995). Approximately 95% of the animals that become infected with the BVDV do not develop signs of disease that are directly caused by the virus, however, BVDV infection causes the animal resistance to other infections (Yapkić et al., 2006). The reduction in the resistance mostly falls below the threshold of a secondary disease challenge and sickness results, these infections quite often are not recognized as being initiated by the BVDV (Chase et al., 2004). Persistently

infected animals are considered the most important sources of infection. Continually excretion of high amounts of virus via nasal discharge, saliva, semen, urine, feces, tears and milk is usual in PI animals (Fray et al., 2000).

**Table 1: Detection of specific antibodies against BVDV by indirect ELISA technique in individual milk samples obtained from cows and buffaloes**

| Animal    | No of samples | Seropositive | Seroprevalence (%) |
|-----------|---------------|--------------|--------------------|
| Cows      | 92            | 24           | 26.0               |
| Buffaloes | 92            | 20           | 21.7               |

The age distribution of BVDV seropositive animals in cows and buffaloes clearly demonstrates the presence of PI animals and that the herds have been exposed to BVDV in the past (Ghazi, et al., 2008).

Our results are according with those reported by other authors (Niskanen et al., 1991; Niskanen, 1993; Paton et al., 1998; Stahl et al., 2002; Thobokwe et al., 2004). Above mentioned authors reported that milk samples can be used for dairy herds screening for different viral infections, such as infectious bovine rhinotracheitis (IBR), enzootic bovine leukosis and BVDV. Therefore, screening herds for BVDV on milk is one way in which non-infected and infected sub-populations can be identified. Moreover, milk testing is primarily intended to detect the presence of PI cows in the lactating herd where cows will shed a small amount of BVD virus in their milk for a short period (several days), but PI animals continually shed larger amounts of the virus (Radwan et al., 1995). In contrast, it has been mentioned that although bulk-milk testing is useful as a screening tool for the lactating herd, it will not fully screen the operation for the presence of BVD, since PI animals are more likely to be found in the young stock than in the lactating herd (Niskanen et al., 1989; Kampa et al., 2004).

## Conclusions

An ELISA test for BVDV antibodies can be used to detect the presence of BVDV. Therefore, the milk can be used instead of serum in ELISA for detection. BVD virus was widely distributed in the dairy cows and buffaloes herds in Mosul, Iraq.

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