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**Short Communication:**

# Sero-survey of Anti-Foot and Mouth Disease Virus Antibodies in Sheep and Goats in Khartoum State, Sudan

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**ملخص البحث**

لدراسة وبائية مرض الحمي القلاعية في المجترات الصغيرة بولاية الخرطوم، تم إجراء مسح مصلي في الضأن و الماعز آخذين في الإعتبار المجترات الصغيرة التي تربي مع الأبقار في نفس الحظيرة أو المنطقة. جمعت مائتا و اثنا عشر عينة مصل دم وتحليلها بتقنية المقايسة المناعية المرتبطة بالإنزيم (Liquid-phase blocking ELISA)، أسفرت النتائج عن وجود اضداد لأربعة أنماط مصلية وهي (A, O, SAT1 and SAT2) في الضان و الماعز على السواء. وجد أن النمط المصلي A هو السائد في الضان و الماعز (48.9% و 59.3% علي التوالي)، يليه النمط المصلي O (35% و 49.2% علي التوالي)، و اخيرا الأنماط المصلية ل SAT .

**Summary**

**Foot and mouth disease (FMD) was investigated into sheep and goats in Khartoum State to determine the prevalence of anti-FMDV serotypes antibodies in these small ruminants. Two hundred and twelve blood serum samples were collected from different localities in Khartoum State, focusing on those co-exist with cattle in the same** habitat **to determine the prevalence rate of FMD serotypes. Sera were tested using Liquid Phase Blocking ELSIA (LPBE) that revealed the presence of anti-FMDV serotypes antibodies (A, O, SAT1 and SAT2). FMD virus serotype A was the most prevalent antibodies in sheep and goats (48.9% and 59.3% respectively) followed by antibodies to serotype O (35% and 49.2% respectively) and then (SAT) serotypes.**

Foot and mouth disease (FMD) is a global disease that is considered as one of the most contagious and economically serious diseases of cloven-hoofed animals (Murphy *et al*, 1999; OIE, 2004). The disease is enzootic in Africa and all FMDV sero-types, were isolated from the continent except the Asian serotype (Kitching, 1998).

FMD is a severe disease in cattle but it is mild or inapparent in sheep and milder in goats (Kitching and Hughes, 2002). The role of sheep and goats in the epizootiology of FMD is controversial. Some reports have indicated that sheep and goats do not contribute to a great extent in the persistence or spread of the virus (Anderson *et al*, 1976). However, recent studies have indicated that sheep and goats are responsible for the spread of FMDV in Europe, Middle East, Africa, Asia and South-East Asian countries (Barnett and Cox, 1999; Uppal, 2002).

FMD is enzootic in the Sudan; four serotypes (A, O, SAT1 and SAT2) were isolated only from cattle (Abu ElZein, 1983) and antibodies to A, O and SAT1 serotypes were detected in sheep and goats. These three serotypes were only detected in sheep at Omdurman locality. However, there is no report of apparent clinical signs in small ruminants in the Sudan, though they may undergo an inapparent or sub-Clinical course with FMD (Abu ElZein, 1987).

The population of sheep and goats in Khartoum State approximately 2 million heads. (Anon, 2004). Most of them co-exist with cattle in the same habitat.

This study was carried out to determine the prevalence of to anti FMDV serotypes antibodies in sheep and goats in Khartoum state.

The survey was conducted in 2005 and covered some large animal congregation in Khartoum State including El-Sabeel and El-Azhari (Khartoum), El-Rodwan, Jabal Toriya and El-Sarha (Omdurman) and Ed-Babiker, Mahlab-2, Mohammed Abd Elwahab's Farm, El-Kiryab, El-Zakyab and Siddig's Farm (Khartoum North).

Two hundred and twelve serum samples were collected from goats (118) and sheep (94) one-year-elder. They were stored at -20 until used. Anti-FMD virus serotypes antibodies were detected using Liquid Phase Blocking ELSIA (LPBE ELISA). Sera were tested against serotypes A, O, SAT1 and SAT2. The test was conducted according to Hamblin *et al* (1986).

Screening of sheep and goats sera by LPBE revealed anti FMDV serotypes O, A, SAT1 and SAT2 antibodies in both sheep and goats.

In sheep, 35.11% (33/94), 48.94 % (46/94), 14.89% (14/94) and 9.57% (9/94) of sera were positive for serotypes FMDV O, A, SAT1 and SAT2, respectively. In goats 49.15% (58/118), 59.32% (70/118), 14.41% (19/118) and 21.19% (25/118) of the sera were positive for FMDV sero-types O, A, SAT1 and SAT2, respectively (Fig. 1).

The role of small ruminants in the epizootiology of FMD is controversial. Anderson *et al* (1976) showed that indigenous sheep and goats in Kenya were occasionally exposed to infection with FMDV indicated by high titres of specific antibodies, however, no virus was isolated from them and they did not contribute to the persistence or spread of FMD. On the contrary, recent studies rebut these findings and affirm that small ruminants may play a significant role in the epizootiology of FMD (Barnett and Cox, 1999; Kitching and Hughes, 2002; Uppal, 2004). Another finding, that complicates the role of small ruminants in the epizootiology of FMD is that, some of FMDV strains, which replicate for some time in small ruminants, may become adapted to sheep and they might have variable virulence to cattle and pigs, (Barnett and Cox, 1999).

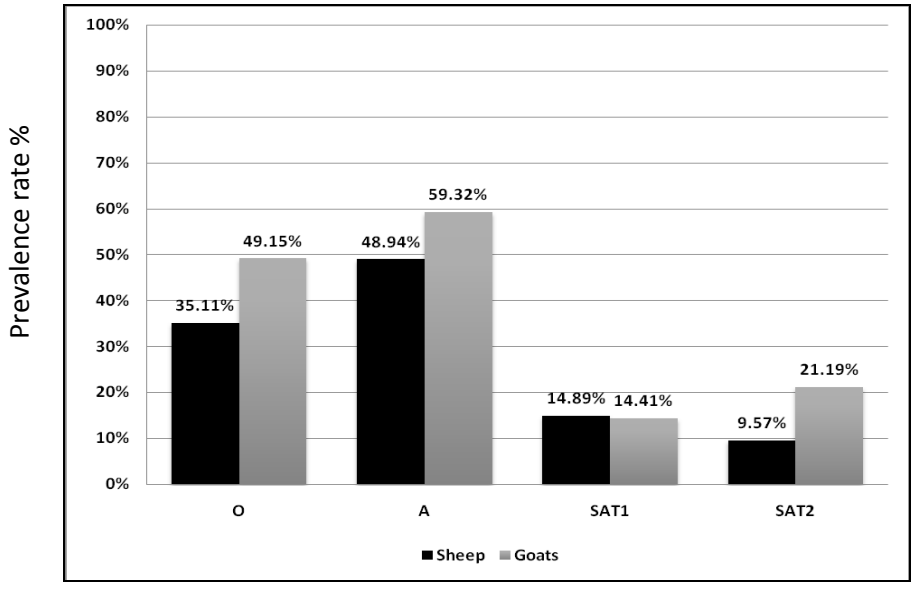


**Fig. 1: Prevalence rates of four anti-FMDV serotypes antibodies in sheep and goats in Khartoum state in 2005.**

Generally, the susceptibility of sheep and goats to infection with FMDV serotypes depends on the animal breed, virus strain (Kitching and Hughes, 2002) and sometimes environmental conditions (Geering, 1967). It is worth to mention that, no reports on

clinical signs of FMDV infection in Sudanese indigenous sheep and goats eco-types. Small ruminants may undergo inapparent infection (Abu Elzein, 1987) during FMD outbreaks. Some owners observed that goats and sheep become dull and isolated and there was a decrease in milk production and feed consumption. These findings reflect the difficulties of diagnosis of FMD in goats and sheep that depends on clinical signs only.

In the current study, the percentage of positive sera for each serotype was different in sheep and goats (Fig. 1). In both, sheep and goats, serotype A was the most prevalent followed by serotype O then serotypes SAT1 and SAT2, in sheep and SAT2 and SAT1 in goats, respectively. These findings are different from the latest survey conducted in the small ruminants where serotype O was the most prevalent followed by A and SAT1 and no antibodies to SAT2 were detected in small ruminants (Abu ElZein, 1987). SAT2 serotype virus antibodies was detected for the first time in sheep and goats in the Sudan; the first report of this serotype was isolated from cattle in 1977 in the Blue Nile Province (Abu ElZein, 1979; Crowther, 1979). The distribution of these serotypes is different from one area to another in Khartoum State.

Information on FMD outbreaks in Khartoum State is meagre. Therefore, elucidation of the role of sheep and goats on the epizootiology of FMD is difficult. However, this study may reflect give in sight, some light on the disease occurrence in Khartoum State. Our findings coincide with those of Raouf *et al* (2008) in his sero-screening of cattle in this State. The free movements of animals and co-exist with other ruminants in the same habitat, mainly cattle, may contribute to their outbreak occurrence. In addition, it is advisable to control FMD outbreak by restricting movement of small ruminants for two weeks after infection as sheep and goats are involved in the transmission of FMDV during early stage of the disease. This occurs especially in the first seven days after infection, as they act as carriers (Barnett and Cox, 1999). Therefore, they should be included in the vaccination programme (Kitching and Hughes, 2002)

Research is required to study the role of sheep and goats in the epizootiology of FMD in Sudan, especially their susceptibility to the FMDV sero-types present in the country and their role in the spread of infection.

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