ANTIBODY TITRE STUDY ON TRIVALENT FOOT AND MOUTH DISEASE VACCINE

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ABSTRACT

Present study was conducted on twenty cross bred cows based on evaluation of the antibody titre due to inoculation of oil adjuvant trivalent (O, A, Asia-1 vaccine strains) FMD vaccine employing Serum Naturalisation Test (SNT). The result showed a rise of SNT antibody titre at 30 days post vaccination (dpv) to protective level (2.01 $\log_{10}$, 1.95 $\log_{10}$, 1.75 $\log_{10}$ 30 dpv in these serotypes O, A and Asia- 1 respectively) for all the three serotypes under study. The selected cows showed 72%, 88% and 72% protection for O, A and Asia- 1, respectively.

KEY WORDS : FMD Vaccine, Oil Adjuvent, Serum Neutralisation Test, Cows

INTRODUCTION

Foot and mouth disease (FMD) is a highly contagious disease affecting cloven-hoofed animals. FMD can rapidly spread in susceptible populations causing severe economic losses to dairy business as a result of lost fertility, productivity and mortality of young livestock (Ko *et al.* 2009). The vaccination of FMD of a large proportion can lead to the protection of the entire population due to a “herd effect” that slows down circulation of a pathogen in the immunized population. The present study aims at evaluation of sero conversion of commercially available vaccine against different strain of FMD virus.

MATERIALS AND METHODS

The present study was conducted at Shri Gopal Gaushala, Naugachia, (Bhagalpur) Bihar. Total 20 apparently healthy crossbred cows of age group 4 to 8 years were randomly selected for seroconversion study. Cows were kept on identical feeding and managemental regimen of Gausala. An average humidity, temperature and rain fall of the period from July 2011 to September 2011 were 90.53%, 31.26^{0}C (max), 25.26^{0}C (min) and 257.49 mm respectively (KVK Sabour, Bhagalpur). All cows were dewormed (Fenbendazole at 10 mg/kg body weight) 15 days before vaccination. Commercially available oil adjuvant vaccine (Batch no.New oil FOT E 01/10; Indian Immunologicals, Hyderabad), comprising of three strain of FMD vaccine virus O, A and Asia-1, was administered deep intra-muscularly. The vaccinated cows were bled through jugular vein puncture method, before and after vaccination. About 5 ml of blood was collected from each animal in clean sterile dry screw capped vial at 0 day, 30th day and 60th day intervals. The blood samples were allowed to clot for one hour and centrifuged at 2500 rpm for 10 minutes. Sera were aspirated by Pasteur pipette in seperate clean dry vial and were kept at - 20^{0}C for further use. The sera were subjected to serum neutralization test as per the Ferreira, (1976). The standardised serum neutralization antibody titre (SNT) for sero negative serum for O, A and Asia-1 serotypes was $\log_{10}$ 0.61, whereas the seroprotective values were $\geq$1.77, $\geq$1.15 and $\geq$1.6, respectively.

RESULTS AND DISCUSSION

The vaccinated cows showed no local or general reaction and no change in the body temperature. The pre vaccination neutralizing antibody titres of oil adjuvant from all serum samples were 1.81$\log_{10}$, 1.20 $\log_{10}$ and 1.30$\log_{10}$ for strain O, A and Asia- 1, respectively ‘0’ days post vaccination (dpv). The mean antibody titre by SNT reached to 2.01 $\log_{10}$, 1.95 $\log_{10}$ and 1.75 $\log_{10}$ 30dpv in three

serotypes O, A and Asia- 1 respectively. The serum neutralization test (SNT) is the reference test to detect antibodies against FMDV (De Clercq *et al.*, 2008). Antibody titre reached to the maximum mean titre (2.01 $\log_{10}$) within serotype O. The result revealed that SNT titres for New Oil FOT E 01/10, corroborates with the results obtained by Madbouly *et al.* (2000), who reported that oil emulsion FMD vaccines give best result and can promote long lasting immunity. The clear upward shift was recorded only at 30 dpv. During subsequent period (60 dpv) serum neutralizing antibody titre declined.

The percentage of protection of cows against different strain of FMD virus was 48%, 32% and 28% at 0 dpv and 72%, 88% and 72% at 30 dpv, having protective SNT titre for O, A, Asia -1, respectively. But at 60 dpv the percentage of protected animals decline up to 42%, 71% and 20% for aforesaid strain of FMD Virus. FMD vaccinated group antibodies showed gradually decreasing trend at 60 dpv in all vaccinated groups as compared to 30 dpv . In cattle, it is generally considered that protective immunity in 85% of susceptible animals is sufficient to prevent the spread of FMD. Emulsified vaccines based on mineral oils have been reported to provide a high level of immunity for a prolonged period (Bahnemann and Mesquita, 1987). The mode of action of oil adjuvant is attributed to depot formation at the site of injection, a vehicle for transport of the antigen throughout the lymphatic system, and slow antigen release with the stimulation of antibody-producing cells (Barnett *et al.*1996). The variability of the titre at 30 dpv and further at 60 dpv might be related to factors like humidity, temperature, rain fall, farm condition, animals of different age and parity, treatment against internal and external parasites, supplementation with feed concentrate, dates of previous vaccination, vaccinators, previous infection of FMD either clinically or, sub-clinically and transhumane. The response of animals to vaccination cannot be considered independent since all the animals in one herd live under similar husbandry conditions.

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