*Indian Journal of Animal Sciences* 65(6): 648-649, June 1995

# Immunogenicity of inactivated goat-pox vaccine in Black Bengal goats

C BHATTACHARYA[1] and N C NAG[2]

*Bidhan Chandra Krishi Viswavidyalaya, Nadia, West Bengal* 741 252

Received: 23 December 1993

The present study deals with the immunogenic assessment of vaccine prepared from vero cell-culture-adapted goat-pox virus 'Uttarkashi' strain.

The vaccine was prepared using 15 times passaged goat-pox virus (GPV) 'Uttarkashi' strain in vero cell-line. Goat-skin-passaged GPV 'Uttarkashi' strain having a titre of $GID_{50}$/0.2 ml served as challenge infection. Mice, rabbits and Black Bengal goats of 6 months to 1 year of age were utilized in safety and potency tests, and for the preparation of known positive antigen and hyperimmune serum. For the study 72 Black Bengal goats of 3-4 months of age were selected in and around Calcutta and Burdwan district, West Bengal.

Aluminium hydroxide gel-adsorbed GPV vaccine was prepared by inactivation with β propiolactone (BPL). It was added in a final concentration of 0.05% in viral suspension and mixed quickly. The mixture was kept in a refrigerator with occasional agitation for 48 to 72 hr. At the end of this period, the viability of the virus was tested in cell-culture as well as by intradermal inoculation in the flank region of a seronegative goat. After viral inactivation the resultant fluid was mixed with gel and stirred for 72 hr at 4°C with the help of a magnetic stirrer for viral adsorbtion and thereafter stored at 4°C. The sterility and safety tests were performed as per the standard procedure (Anonymous 1985).

Four Black Bengal goats employed in potency test were inoculated, each with 1 ml vaccine, subcutaneously in the caudal fold. Two unvaccinated goats were also kept as control. They were challenged on day 22 with pathogenic GPV 'Uttarkashi' strain as per the technique of Prasad and Datt (1973) and kept under close clinical observation for 1 month.

In the caudal fold of each of the 72 Black Bengal goats of 3-12 months of age, 1 ml of vaccine was inoculated subcutaneously. The goats were divided into 12 groups, each containing 6 animals. Serum samples were collected from different groups on days 14, 21, 35 and 49 post-vaccination. The samples were inactivated at 56°C for 30 min. The pooled sera of each group were used for detecting humoral immune response by CIE (Sharma *et al.* 1988), indirect fluorescent antibody test (Sarkar *et al.* 1980) and serum neutralization test (Plowright 1962, Karber 1931). Pre-vaccination sera were also tested similarly.

The vaccine was sterile and safe when tested in mice, rabbits and goats. No untoward reaction or rise of temperature was observed.

The vaccinated goats were solidly protected when challenged. There was no evidence of local reaction on the site of

Present address: [1]Research Scholar, [2]Professor, Department of Veterinary Microbiology.

inoculation, neither any rise of temperature or symptoms of generalization. The unvaccinated goats died of goat-pox. Our findings correlate with the observations of Prasad and Datt (1973) and Yadav *et al.* (1986). They used β-propiolactone as inactivant. By CIE, IFAT and SNT tests the highest seroconversion was noticed on day 21. In CIE test, the serum samples of 41.66, 75.50 and 16.66% gave positive result on days 21, 35 and 49 post-vaccination respectively. No precipitating band was detected from 0-day samples. Our observations are also in agreement with those reported by Goswami and Soman (1988 a, b) and Pal and Soman (1992) while working with goat-pox vaccine inactivated by formalin.

With IFAT, undiluted serum revealed the antibody in 75, 100, 100 and 83.33% samples on days 14, 21, 35 and 49 post-vaccination respectively. Pre-vaccination sera showed no antibody.

In SNT, after 14 days of post-vaccination, the antibody titre was 101 which started increasing and reached its maximum (224) on day 21. At the end of day 35 this value started decreasing. It was 203 and 101 on days 35 and 49 respectively. The pre-immunization sera showed no antibody titre.

Precipitation antibody was detected by CIE in vaccinated goats. This corroborates the findings of Goswami and Soman (1988 a, b). Percentage of positivity was slightly higher than observed by Yadav *et al.* (1986). The antibody response detected by IAFT in the present study was similar to that recorded by Davies and Oetema (1978). Immune response recorded with SNT corroborated the results of Davies and Oetema (1978) and Mallick and Das (1989). SNT was the most sensitive test as compared to IFAT and CIE.

ACKNOWLEDGEMENT

We thank Professor D K Das Gupta, Vice-Chancellor, Bidhan Chandra Krishi Viswavidyalaya, for help.

REFERENCES

Anonymous. 1985. *Annual Scientific Report.* Division of Virology, Indian Veterinary Research Institute, Mukteswar - Kumaon, UP.

Davies F G and Oetema G. 1978. The antibody response in sheep infected with Kenyan sheep and goat-pox viruses. *Journal of Comparative Pathology* **88**: 205-10.

Goswami T K and Soman J P. 1988. Immune responses of goats to goat-pox vaccine. *Indian Veterinary Journal* **65**: 1-5.

Goswami T K and Soman J P. 1988. Development and evaluation of an inactivated goat-pox vaccine. *Indian Journal of Animal Sciences* **58**: 200-203.

Karber G. 1931. Beitragzur Koollektiven be hand lung pharmacology gischer Reihenversuche. *Archives of Experimental Pathology and Pharmacology Kil.* **162**: 480-83. (*fide* Buxton and Fraser 1977.)

Mallick B B and Das S K. 1989. Nonspecific immunostimulation against viruses. 2. Field use to prevent goat-pox virus infection. *Indian Journal of Animal Sciences* **59**: 307-17.

Pal J K and Soman J P. 1992. Further trials on the inactivated goat-pox vaccine. *Indian Journal of Virology* **8**: 86-91.

Plowright W. 1962. The application of monolayer tissue culture techniques in rinderpest research. 1. Introduction. Use in serological investigation and diagnosis. *Bulletin Official International Epizootics* **57**: 1-23.

Prasad I J and Datt N S. 1973. Observations on the use of live and inactivated vaccines against goat-pox. *Indian Veterinary Journal* **50**: 1-10.

Sarkar P, Singh S P, Pandey A K, Kathuria B K and Kumar S. 1980. Application of fluorescent antibody test in the diagnosis of sheep-pox and study of sheep-pox multiplications in cell-culture. *Indian Journal of Animal Sciences* **50**: 428-33.

Sharma B, Negi B S, Pandey A B, Bondopadhyay S K, Shankar H and Yadav M P. 1988. Detection of goat-pox antigen and antibody by the CIE test. *Tropical Animal Health Products* **20**: 109-13.

Soman J P, Singh R P and Jha G J. 1985. Occurrence of malignant goat-pox in Bihar and conformation of the causal virus. *Indian Veterinary Journal* **62**: 907-21.

Yadav M P, Pandey A B, Negi B S, Sharma B and Sankar H. 1986. Studies on inactivated goat-pox vaccine. *Indian Journal of Virology* **2**: 207-21.