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Post Outbreak Profile of Peste des petits ruminants (PPR) Virus Antibodies in Relation with Vaccination in Recovered Goats

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Abstract

Peste des petits ruminants (PPR) disease was confirmed in a herd of goats (n=45) at an organized form. The disease was controlled by administration of symptomatic treatment. Disease confirmation was done by detection of both antigen and antibodies using enzyme linked immuno-sorbent assay (ELISA). Following clinical recovery in diseased animals, all the animals were vaccinated with the PPR vaccine. Serum samples were collected with monthly interval and analyzed for the detection of antibodies against PPRV using competitive ELISA (cELISA). Mean percent inhibition (PI) values of all the goats post-vaccination ranged 61-85 at first month but remained 80-93 afterward. All the animals developed the antibodies titers one month post-vaccination and remained high even one and half year post-vaccination.

Keywords: Peste des petits ruminants (PPR) virus, antibodies detection, recovered goats, vaccination

Introduction

Transboundary Animal Diseases (TADs) have been described as "those diseases that are of significant economic, trade and/or food security importance for a considerable number of countries; which can easily spread to other countries and reach epidemic proportions; and where control/management, including exclusion, requires cooperation between several countries" (FAO 1996). These mainly fall within the former List A of diseases of the Office International des Epizooties (OIE). They include a number of virus diseases such as rinderpest, peste des petits ruminants (PPR), foot and mouth disease (FMD), Rift Valley fever (RVF) and lumpy skin disease (LSD) as well as bacterial diseases such as contagious bovine pleuropneumonia (CBPP) (Rossiter and Al-Hammadi, 2009).

Peste-des-petits ruminants (PPR) are an acute and highly contagious viral disease of small ruminants. Clinically it is characterized by pyrexia, ocular and nasal discharges, erosive stomatitis and diarrhea. The morbidity and mortality can be as high as 100% and 90%, respectively. The disease is considered as one of the main constraints in improving the productivity of the small ruminants in the regions where it is endemic (Shaila et al., 1989).

A specific PPR homologous vaccine, produced from Nig/75/1 strain of PPR virus (Diallo et al. 1989) was established by Food and Agriculture Organization (FAO) for only use in emergency. It is necessary to look at the response to vaccination so as to propose an efficient vaccination programme. The aim of the present study was to determine the post-outbreak profile of PPRV antibodies in relation to vaccination in recovered goats.

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Materials and Methods

Outbreak description

Peste des petits ruminants (PPR) disease was investigated in a herd of goats (n=45) at an organized form. The major characteristics of the disease were high morbidity with mortality, fever, cough, nasal discharges and diarrhea. Disease was recognized by both antigen and antibodies detection using ELISAs. Immuno-capture ELISA (Ic-ELISA) was used for the detection and confirmation of PPR antigen samples while competitive ELISA (cELISA) was used for PPR antibodies confirmation. The kits for these ELISAs were procured from Biological Diagnostic Supplies Limited (BDSL), Pirbright, UK.

Following clinical recovery in diseased animals, all the animals were vaccinated with the PPR vaccine (Jovac-Jordan) while five was kept as unvaccinated. Serum samples were collected from twenty animals with monthly interval and analyzed for the detection of antibodies against PPRV using competitive ELISA (cELISA).

Determination of antibodies

The competitive ELISA was conducted to determine the distribution of antibodies against PPRV pre and post vaccination. The PPR competitive ELISA kit (collectively produced by Biological Diagnostic Supplies Ltd, Flow Laboratories and Institute for Animal Health Pirbright, Surrey, England) was used for this purpose. The kit is based on a standard competitive enzyme linked immunosorbant assay (cELISA) principle to determine the presence of anti-PPR antibodies in serum (Libeau et al., 1992).

The ELISA micro-plates were read using an immuno-skan reader with an inference filter of 492 nm. The reader was connected to a computer loaded with ELISA data interchange (EDI) software, which was used to automate the reading and calculation of percent inhibit (PI) values.

Results and Discussion

Serum samples were also collected with monthly interval and analyzed for the detection of antibodies against PPR. All the animals developed the antibodies titers one month post-vaccination and remained high even eighteen months post-vaccination (Table-1).

As the goats have faced the various levels of disease conditions so they were having a wide range of antibodies (PI= 20-67). Mean PI values of all the goats post-vaccination were 76.10 at first month but increased after second month onwards (Figure-1). The developed antibodies titers remained high even eighteen months post-vaccination while in the control group the titer increased slowly and maintained a low PI value as compared to animals with vaccination.

Khan et al., (2009) performed a study on the PPR vaccine in sheep and goats and samples were collected at 10, 30 and 45 days post-vaccination. The samples were subjected to cELISA to determine the presence of antibodies against PPRV. Mean PI values in sheep at 10, 30 and 45 days post-vaccination were recorded as 37, 65 and 91 respectively, whereas in goats these values were 43, 78 and 86 respectively. The results of our study are in congruent with these findings but we observed for a longer period post-vaccination. Our findings are in congruent with Rashid et al., (2010) who evaluated a locally produced vaccine and found it to be safe and produced high serological titers within 21 days post vaccination. They also claimed that the serological titers remained high for one year post vaccination.

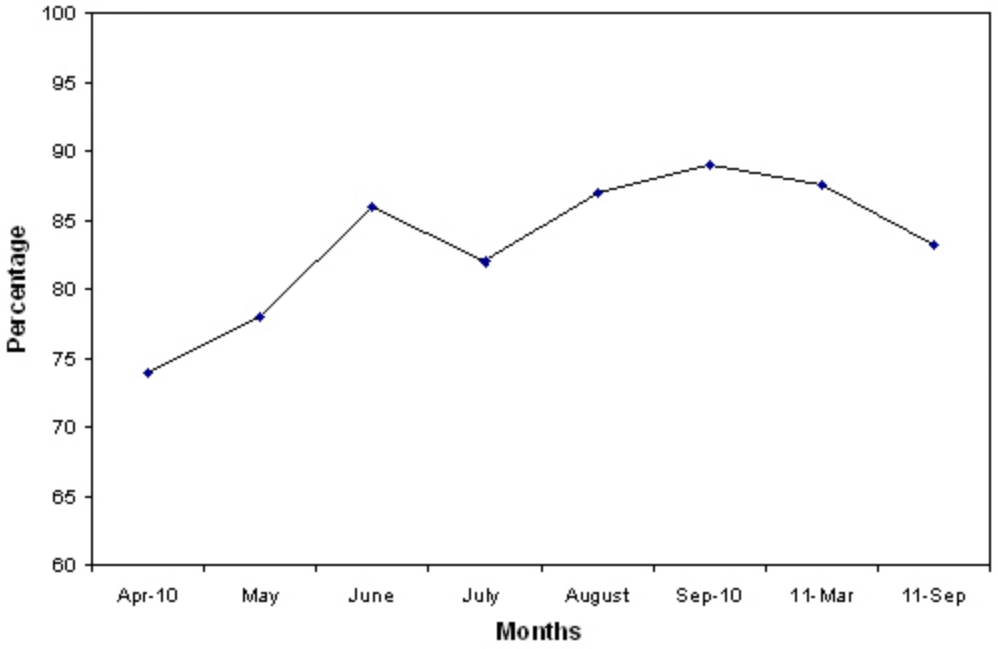
The post-outbreak sero-conversion rate in the population was found to be 48.7%, indicating relatively weak herd immunity. The main reason for the low sero-conversion could be the low pathogenic nature of virus and/ or better herd management. The sero-conversion and antibodies titers improved significantly after vaccination.

So the above study is the basic step towards the understanding the post-outbreak profile of PPRV antibodies in relation to vaccination in recovered goats population.

Table 1: Comparison of Post-vaccination Percent Inhibition values of Goats with PPR vaccine

Sample #	*Pre vaccination*	*Apr-10*	*May-10*	*Jun-10*	*Jul-10*	*Aug-10*	*Sep-10*	*Mar-11*	*Sep-11*
1	58	85	84	93	87	91	93	92	90
2	61	85	95	94	71	73	82	83	81
3	22	79	82	83	87	90	88	87	82
4	27	75	68	85	77	88	86	88	84
5	67	84	93	94	88	92	90	90	86
6	60	83	82	87	87	88	86	88	85
7	35	67	73	88	83	86	89	85	83
8	28	65	76	87	89	79	87	86	80
9	61	73	67	78	87	88	92	90	87
10	57	78	74	89	60	85	88	86	81
11	62	73	78	91	91	86	88	88	84
12	58	84	82	93	90	91	89	90	88
13	66	85	78	89	84	86	88	85	83
14	64	83	75	81	83	89	87	87	80
15	30	65	73	75	73	79	90	87	78
16	21	61	74	93	90	88	91	89	83
17	35	71	78	89	90	92	88	90	85
18	43	75	84	89	77	84	87	85	81
19	59	77	77	84	85	88	91	89	83
20	60	75	79	81	77	91	89	88	80
PI Average	**48.7**	**76.2**	**78.6**	**87.1**	**82.8**	**86.7**	**88.5**	**87.6**	**83.2**

Figure 1: Post-vaccination Comparison of Average Percent Inhibition (PI) Values



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