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Comparative study of haemagglutination inhibition test and competitive- elisa for diagnosis of peste des petits ruminants in goats

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Abstract
The present study was carried out to evaluate the comparative study of Haemagglutination Inhibition test (HI) and competitive- ELISA (c-ELISA) in the PPR affected goats of Assam. A total of 456 serum samples were tested for detection of PPRV antibody by HI test and c-ELISA test. The test result indicated that, HI test was more sensitive and c-ELISA was more specific. The Chi-square analysis showed HI test was more significant than c-ELISA for detecting PPR viral antibody in the field conditions where sophisticated facilities and equipments are not available for diagnosis of PPR. Moreover, the HI test is also cheaper and less time consuming than c-ELISA.

Keywords: C-ELISA, Goat, HI, PPR

1. Introduction
Peste des petits ruminants is an acute, highly contagious disease of sheep and goats having high morbidity and mortality rates. The disease is caused by Peste des petits ruminant's virus (PPRV) under the genus morbilli virus in the family of Paramyxoviridae [1]. The disease was first reported in West Africa in the year 1940 [2]. In India, the disease was first reported for the first time in an Arasur village of Tamil Nadu [3]. Now the disease has become endemic to all over India (Uttar Pradesh [4], Punjab [5], Gujarat [6], Madhya Pradesh [7] and in Assam [8]) and is spreading with greater magnitude in every year causing severe economic losses throughout the country. Since the disease is similar to that of Rinderpest so it is difficult to diagnose. Moreover, the serological tests currently used are time consuming and costlier for routing screening of a large number of field samples. The present study was conducted to evaluate the simple tests like Haemagglutination Inhibition test (HI) and competitive - Enzyme link Immune Sorbent Assay (c-ELISA) for routine screening of serological samples in the field condition as alternative methods.

2. Materials and methods
2.1 Study area, sample collection and procedure of the tests:
In the present study, altogether 456 serum samples of goats collected from different places of Assam during the outbreak of the disease as well as from apparently healthy goats in the vicinity of the outbreaks and from non affected areas. All the serum samples were subjected to HI test and c-ELISA test. c-ELISA kit developed in France (ID Screen PPR competition, Montpeller) was used. As per protocol of the test the c-ELISA plate was read at 450 nm in ELISA reader. The interpretation of the test result was calculated based on competition percentage. The sample with competition percentage ≤ 30% were considered positive for the presence of PPRV antibodies, greater than 35% (≥35%) and less than 45% (≤ 45%) were considered doubtful and greater than 45% (≥ 45%) were considered as negative.
On the other hand, the Haemagglutination test was performed as per the procedure described by [6]. with 0.5% chicken RBC in a microtiter plate with lyophilized freeze dried live vaccine procured from Indian Immunologicals (Raksha PPR) and 4HAU (Haemagglutination Unit) was calculated as per the procedure described by [9].

2.2 Statistical analysis
The relative sensitivity and specificity of the two tests was calculated as per the following formula

a. Specificity: True negative/(True negative+ False positive) X 100
b. Sensitivity: True positives/ (True positives + False negative) X 100

Data were subjected to Chi- Square analysis for comparative evaluation of HI and c-ELISA test following the standard statistical procedure using the software SPSS available at Biostatics Unit, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam.

3. Results and discussion

In the present investigation, out of 456 serum samples screened for the detection of PPR viral antibody, 269 serum samples showed positive in HI test and 209 serum samples showed positive in c- ELISA test respectively. 60 serum samples showing positive by the HI test were negative in c-ELISA test. 11 serum samples showing negative by the HI test were found positive by c-ELISA test. The relative sensitivity of HI and c-ELISA was 81.22% and 77.69% respectively. The relative specificity of Hi and c-ELISA test was 94.44% and 95.73% respectively.

Comparison of HI test with c-ELISA revealed that, HI test was more sensitive than c-ELISA. On the other hand, the specificity of the two tests reveals that c-ELISA was more specific than HI test. In comparative study using Chi-square test also showed that HI test was more sensitive than c-ELISA. Similar findings were also recorded by [11] who observed 78.0% sensitivity in goats and75.0% in sheep by HI test, where as 85.7% in goat and 88.9% in sheep by c-ELISA. Due to paucity of reference the specificity of both the tests could not be explained.

4. Conclusion

The result of the present study confirmed that HI test is more significant for detecting PPR viral antibody in field conditions where sophisticated facilities and equipments are not available for diagnosis of PPR. Moreover, the HI test is also cheaper and less time consuming in compared with c-ELISA.

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