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A Novel Phage Based Marker Vaccine and DIVA Assay for Hemorrhagic Septicemia in Bovines

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Abstract

Hemorrhagic septicemia (HS) is an acute, fatal disease of bovines caused by *Pasteurella multocida* serotypes B:2 and E:2. Presently used oil emulsion and/or alum precipitated vaccines suffer from adverse effects, short term immunity, need for repeated vaccinations and reports of vaccination failures. We report here development of a *Pasteurella* bacteriophage based marker vaccine (containing an iron restricted protein and an adjuvant) and an immunoblot based DIVA assay for HS in bovines. *P. multocida* (B:2) grown under iron restricted conditions using 2', 2" dipyrindyl followed by lysis using a lytic *Pasteurella* bacteriophage to prepare the marker vaccine. Animals in Phage lysate vaccine (PLV) group showed higher antibody titers in comparison to conventional alum precipitated vaccine (CAPV) group at all stages of vaccination. The peak titers induced by the PLV group was 2.34 ± 0.21 at 90 days post vaccination (dpv) as revealed by ELISA. In the CAPV group the peak antibody titers were observed at 60 dpv (2.13 ± 0.07) by MAT. The detection of "novel iron restriction protein (137KDa) was done by western blot and ELISA. The serum of marker vaccinated cattle revealed presence of antibody to the 137KDa IROMPh in comparison to conventional alum precipitated HS vaccine group in which it was absent. The new marker vaccine with improved antigenicity and DIVA assays reported here would help in effective vaccination and thus the prevention, control and eradication of this disease, which is of great importance to farmers engaged in the rearing of bovines around the globe.

Key words: Bacteriophage, DIVA assay, Hemorrhagic septicemia, Marker vaccine



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