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PHAGE LYSED BACTERIA AS VACCINES AGAINST PASTEURELLA AND *BRUCELLA* INFECTIONS IN CATTLE

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Hemorrhagic Septicemia (HS) is a fatal disease of bovines caused by *Pasteurella multocida*. Marker vaccine could help in control of HS. Bovine brucellosis is an important zoonotic disease causing huge economic losses worldwide. Currently no effective therapy is available for Brucellosis and animals remain carrier lifelong. We have developed novel marker vaccine for HS and therapeutic vaccine for brucellosis employing bacteriophages. *P. multocida* (B: 2) has grown under iron restricted conditions followed by lysis with a lytic *Pasteurella phage* was used as the marker vaccine. Cattle in phage lysate vaccine (PLV) group showed higher antibody titers compared to alum precipitated vaccine (APV) group as revealed by ELISA. Mice and rabbits vaccinated with PLV revealed significantly higher antibody titres than mice and rabbits receiving APV by ELISA (P<0.001). The peak log10 values (3.46) in case of PLV mice by ELISA were attained at 90 days post inoculation (DPI) whereas in APV mice, the peak value at 90 DPI was 2.82. Mean log10 titres by ELISA in PLV and APV rabbits were 2.43 and 2.35, respectively at 30 DPI whereas at 120 DPI, the titres were 3.29 and 2.75, respectively. The marker vaccine induced higher and longer immune response in cattle, mice and rabbits compared to the APV. We have developed a therapeutic vaccine for bovine brucellosis employing phage lysates of RB51 (RL) and S19 (SL) strains of *Brucella abortus*. The SL induced strong antibody response and RL stimulated cell mediated immunity. In vitro restimulation of leukocytes from RL immunized cattle induced interferon gamma production. A single subcutaneous dose of 2 ml of cocktail lysate (both RL and SL), eliminated live virulent *Brucella* from Brucellosis affected cattle. The plasma level of *Brucella* specific 223 bp amplicon became undetectable by RTPCR and blood was negative for live *Brucella* in 3 months post-immunization as evident by culture.

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