

Studies on immune response against a new bicistronic DNA vaccine for anthrax using the protective antigen gene (pag) and catalytically inactivated lethal factor gene (mlef)

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Anthrax is primarily a disease of herbivorous animals including cattle, buffalo, sheep, and goat. Anthrax causes per acute death in the animals, hence treatment is neither possible nor pragmatic approach to control the disease. So vaccination is considered as a key strategy for prevention and control of anthrax in ruminants. In the present study, bicistronic DNA vaccine construct for anthrax using protective antigen (pag) and catalytically inactivated mutated lethal factor (mlef) along with monocistronic construct encoding pag and mlef were developed. The lethal factor was catalytically inactivated by mutating the GAA codon to TGC codon (E687C) by primer based site directed mutagenesis. Simultaneously both pag and mlef were cloned and expressed in prokaryotic expression system and recombinant protein was used for booster immunization. Prepared DNA vaccine constructs were tested for their functional expression by transfection of MDBK cell line followed by indirect immunofluorescence analysis. The immune response study was done in mice with these DNA vaccines boosted with DNA vaccine or recombinant protein or anthrax spore vaccine on 14th and 28th DPV and monitoring of immune response was done by ELISA. Antibodies were detectable from 7th day onwards and peaked on 42nd day. Cell mediated immune response was assessed by quantitating level of IFN γ , IL-2 and IL-4. The level of these three cytokines were high in the (pMlef-Pag+ rPag+ rMlef) and (pPag+rPag) groups. The immunized mice were challenged with 1000 LD₅₀ of Bacillus anthracis IVRI strain on 42nd day. Among the various vaccine groups, pMlef-Pag+rPag+rMlef and pPag+rPag groups were found to provide maximum protection (66.66%) while, pMlef-Pag + pMlef-Pag, pPag+pPag and AVA induced only 50%, 33.33%, and 50% protection respectively. Considering the protective efficacy, immune responses and stimulation of cytokines pMlef- pPag+rPag+rMlef vaccine seems to be better than other vaccines. Among the DNA vaccine group pMlef-Pag had shown better immune response and protective efficacy than pPag indicating synergistic effect of pMlef on immune response and protective efficacy.

Biography

Bincy Joseph has completed graduation in veterinary sciences (BVSc & AH) from Kerala Agricultural University with KAU merit scholarship. She has completed post graduation in Veterinary Bacteriology from Indian Veterinary Research Institute with ICAR Junior Research Fellowship and completed doctorate in veterinary bacteriology from Indian veterinary research institute with Senior Research Fellowship. She has published 8 research articles in various reputed journals and participated in more than 10 national and international conferences and presented research papers.

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Influence of enzymes on the physicochemical characteristics of papaya pulp

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Papaya (*Carica papaya* L.) is low acidic fruit which is deliciously sweet with musky undertones and a soft, butter-like consistency consumed worldwide. The post-harvest losses of papaya are mainly attributed to its perishable nature and inadequate post-harvest storage facilities and handling. In the present scenario of underutilized fruits, there is an ever increasing demand for the diversified processed products from papaya. Use of enzymes as processing aids has been practiced in the fruit and vegetable processing industry to obtain low viscosity pulp and high yields of juices. This study aims to optimize the enzyme concentration, incubation time and incubation temperature required for the enzymatic liquefaction of papaya pulp using response surface methodology (RSM) to achieve higher juice yield and further to observe the physicochemical changes during the process. The results showed that 0.3% amyloglucosidase: pectinase: cellulase (AMGPC) enzyme concentration for a period of 180 minutes at room temperature was sufficient to achieve a maximum juice yield of 87%. Similarly at 45°C, 0.7% of amyloglucosidase: pectinase (AMGP) enzyme concentration for a period of 180 minutes yielded the maximum juice yield of 74.5%. Parameters such as pH, acidity, TSS, reducing sugars, total sugars, ascorbic acid and color values were found to have changed marginally. Significant changes were observed in viscosity, clarity and total carotenoids during enzymatic liquefaction as compared to the untreated papaya pulp. Finally, it can be summarized that there is a vast scope and demand for the production of enzyme liquefied papaya juices in the international arena.

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