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Original Article

Genomic DNA Vaccine mix for common Food born Bacterial Diseases

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Abstract

Bacteria are the causative agents of two thirds of food born disease out breaks. The important bacterial infectious agents are *Salmonella typhi, Staphylococcus aureus, Escherichia coli* ect., In the present attempt, Genomic DNA of above said organism were isolated and mixed well then used as vaccine. The DNA was individually digested by BamH-I and Pst-I Enzymes and then mixed all BamH-I digested fragments and mixed well all Pst-I digested fragments and then used as vaccine. Here controls treatment was also maintained. Albino rat was used as test animal. After one week of injection, same dose (ie) booster dose was given to all animals then one week later blood samples were collected and analyzed. The maximum immune response was observed in Pst-I digested DNA Mixer. So it is concluding that Pst-I digested mixer DNA acts as best vaccine for these common food born infections.

Keywords: *Escherichia coil, Staphylococcus aureus, Salmonella typhi,* DNA Vaccine, Food borne diseases.

Introduction

Food born diseased (FBD) are defined by the world health organization as "disease of infections or toxic nature caused by consumption of food or water. The symptoms vary widely, depending on the etiological agents. The must common symptoms are diarrhea and vomiting. In many countries, national health care organization record FBD out breaks, defined as the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food. True incidence of FBDs is difficult to evaluate as many cases remain undeclared (http//www.cfsan.fda.gov) The most of these disease are infection caused by variety of organisms, other disease are poisoning caused by harmful toxins or chemicals that have contaminated the food. The microbes or toxins enter the body through gastrointestinal tract, and often causes the first symptoms there, so nausea, vomiting, abdominal cramps and diarrhea is common symptoms in many food born diseases. The most common recognized food born infections are those causes by the bacteria such as *Salmonella, Staphylococcus aureus, E.coli* and *campylobacter* and by a group of viruses called calicivirus (www.edc.gov).

The *Salmonella i*s wide spread in the intestine of birds, reptiles and mammals. It can spread to humans via a variety of different foods or animal origin. The illness it causes *Salmonellas* typically includes fever, diarrhea and abdominal cramps. In person with poor underlying health or weakened immune systems, it can invade the blood stream and cause life threatening infections (www.edc.gov). Another important pathogen is *E.coli* it's infection can spread through contaminated food, drinking water, contaminated swimming water ect. It is a gram-negative, rod shaped bacteria. It mainly cause diarrhea. This is commonly called traveler's diarrhea and it also gives urinary infections(Sharma,1995). Another predominant bacterium in food born infection is *Staphylococcus aureus*. It is a leading cause of gastroenteritis resulting from the consumption of contaminate food *Staphylococc*al food poisoning is due to the absorption of *staphylococcal* enterotoxins performed in the food (Yues Le Loir *et al.,* 2003). In this attempt, try to make a DNA vaccine for these common food born diseases.

Materials and Methods

Common Food born pathogens such as *E.coli,* S.aureus and *S.typhi* were isolated from patients in local hospital and have done regular biochemical and microbiological tests for confirmation. In this study albino rats were used as experimental animals. First Genomic

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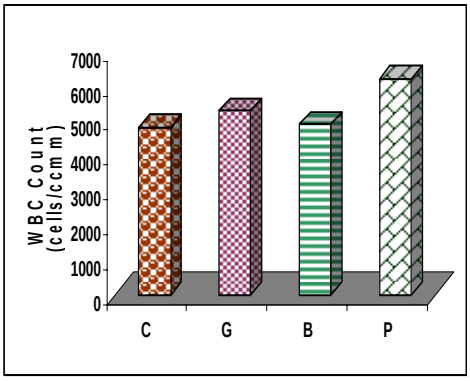
DNA was separately isolated from three pathogen by using kit (Medox kit). In this work, three treatments were tested. In the first treatment all the DNA were mixed and used as vaccine. In the second treatment, the DNA was digested by BamH-I and mix well, then used as vaccine. In the third treatment, DNA of all the organisms was digested by Pst-I enzyme then mixed well and used as vaccine. Control treatment was maintained after one week, same booster dose (Intramuscular injection) was given to all the animals, and then one week later blood sample was collected and analyzed.

Results and Discussion

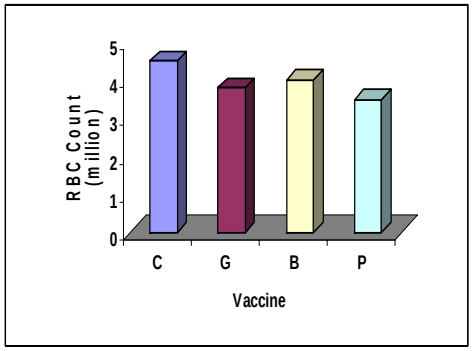
Food born disease is of major in concern worldwide. Bacteria are the main causative agents of food born disease out breaks. One of the important foods born pathogen is *E.coil*. It mainly caused diarrhea and also urinary infections. It mainly spread through contaminated water and food. It also give painful abdominal cramps without much fever. IN a3% to 5% of cases a complication called hemolytic ureic syndrome (HUS) can occur several weeks after the initial symptoms. The severe complications include temporary anemia, profuse bleeding and kidney failure. Another important Infectious agent *Salmonella typhi* it also spread through contaminated water food and through flies it mainly gives fever, diarrhea and abdominal cramps (www.edc.gov)



*C-Control Treatment, G-Genomic DNA,
B-BamH-I Digested DNA, P-Pst –I digested DNA.

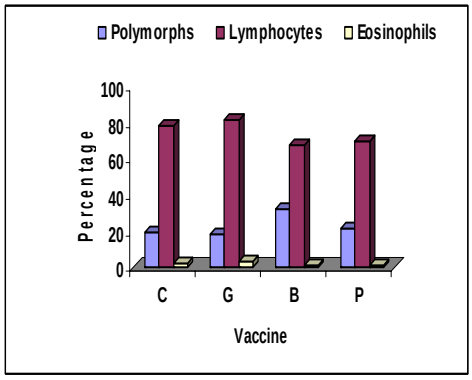
Fig.1:Various DNA vaccine influence on WBC count of Albino rats

The important and predominant bacteria in food born disease are *Staphylococcus aureus.* It is a leading cause for gastroenteritis; the toxin is heat resistant and gives food poisoning (Yues Le Loir,2003) In this attempt, we prepared DNA vaccine for all these diseases. In this attempt three treatment and one control was maintained. The whole DNA, DNA digested by BamH-I and Pst-I was given to first, second and third treatment respectively. The maximum WBC count (6300 cells/cumm) was observed in Pst-I treatment and minimum Hemoglobin (10.6gm %) and RBC (3.5million) count was observed in this treatment (Fig.1,23&4).



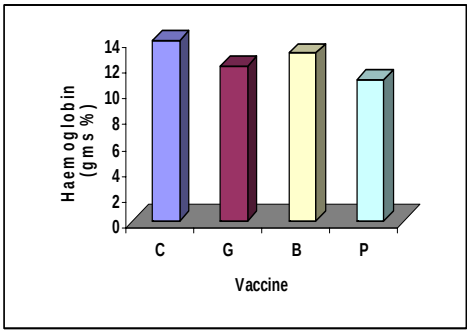
*C-Control Treatment, G-Genomic DNA,
B-BamH-I Digested DNA, P-Pst –I digested DNA.

Fig.2: Various DNA vaccine influence on RBC count of Albino rats



*C-Control Treatment, G-Genomic DNA,
B-BamH-I Digested DNA, P-Pst –I digested DNA.

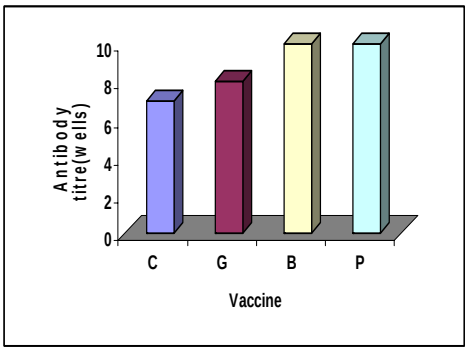
Fig.3:Various DNA vaccine influence on WBC differential count of Albino rats



***C-Control Treatment; G-Genomic DNA, B-BamH-I Digested DNA, P-Pst –I digested DNA.**

Fig. 4: Various DNA vaccine influence on haemoglobin levels of Albino rats

The minimum WBC count was observed in control treatment. The highest antibody level was observed in enzyme digested DNA treatment (Fig.5).



***C-Control Treatment; G-Genomic DNA, B-BamH-I Digested DNA, P-Pst –I digested DNA.**

Fig.5: Various DNA vaccine influence on antibody levels of Albino rats

So it is concluded that Pst-I digested mixer Genomic DNA act as very good vaccine for these common food born diseases.

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