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Short Communication

A Primed Nano biosensor for Plant Pathogens Detection

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Abstract

Plant Pathogens are the significant impact in terms of quantity, quality of food and food born infections such as Escherichia coli, Norovirus, the Hepatitis A virus, Salmonella Typhi etc. To prevent food born infections, an early bacterial or viral detection and elimination is substantial. The current techniques which can diagnose plant pathogens are polymerase chain reaction (PCR), enzyme-linked immunosorbent assay (ELISA), and several types of Nucleic acid-based technologies have been developed which takes around 1 to 3 hours to complete the test with limits to use as cost effective, slow process, low sensitivity, and selectivity diagnostic method. This proposal reiterates an optimal high throughput molecular diagnostic technology using Patent approved Nano biosensor based on highly selective DNA/RNA for the early identification of viral plant-pathogen in minimal processing time of 15 minutes and are more accurate in identifying pathogens with high sensitivity and selectivity.

Key words: Plant pathogen; PCR; Nano Biosensor; DNA/RNA; High Selectivity and Sensitivity

Introduction

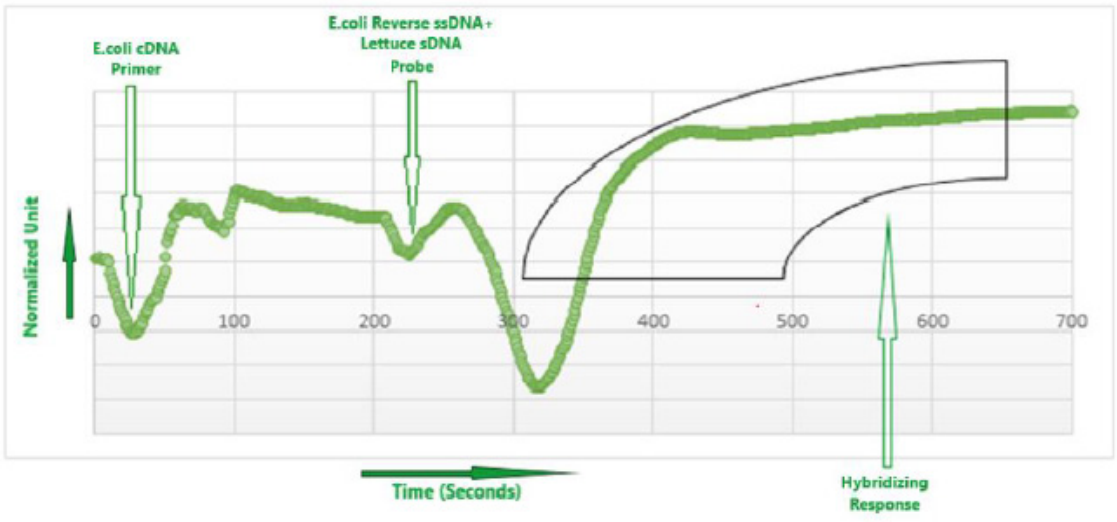

Figure 1: Hybridization (Positive test).

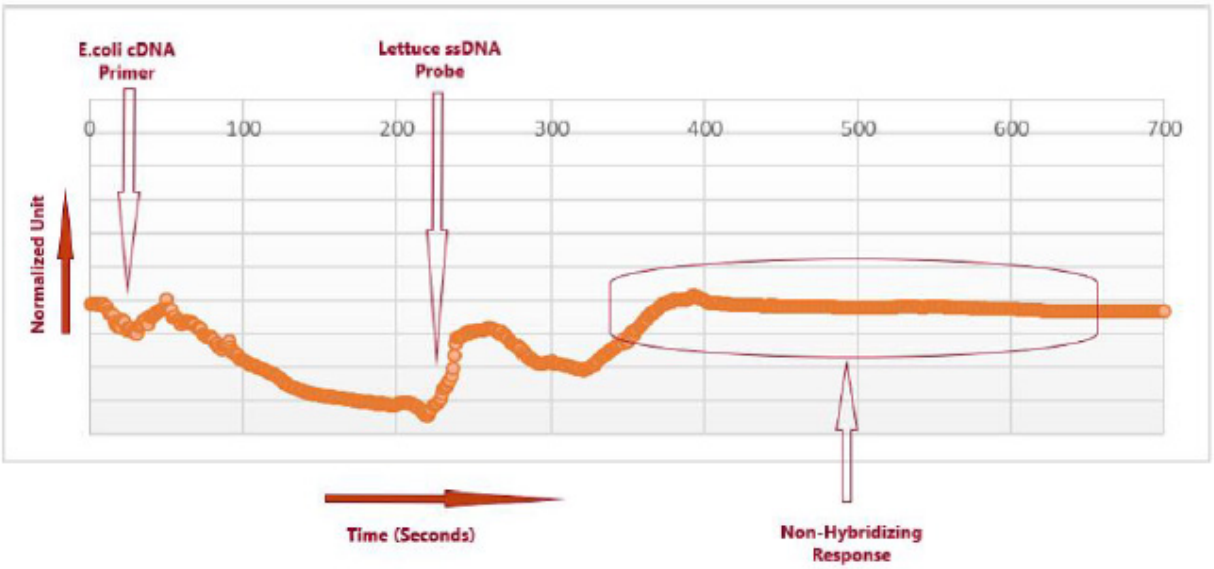

Figure 2: Non-Hybridization (Negative test).

In this paper, the presence and absence of E. coli in Lettuce is tested with the estimation of high selectivity and sensitivity result using the DNA/RNA selective based device. At first, for the positive test the sensor is coated with the primer of E. coli ssDNA (E. coli cDNA) and tested with the targeted sample of probe which has the mixture of lettuce ssDNA and E. coli Reverse ssDNA which is complementary to the primer, the acquired test result (figure 1) shows the gradual increase in plot which confirms the presence of E. coli in lettuce based on the DNA/RNA hybridization principle. In the negative test, the target probe has only the lettuce ssDNA with the absence of any E. coli ssDNA which is complementary to the primer of E. coli ssDNA (E. coli cDNA) and by testing, the obtained result (figure 2) reveals the absence of E. coli in Lettuce as no change in the plot based on DNA/RNA Non-Hybridization principle.

Method

a) Start running the test with E. coli ss cDNA as a primer coated sensor around 10 to 50 seconds at 60°c.

b) Hybridization: Add the targeted sample (mixture of E. coli Reverse ssDNA and Lettuce ssDNA) around 210-250 seconds at 60°c and run the test until 700 seconds.

c) Non-Hybridization: Add the targeted sample (Lettuce ssDNA) around 210-250 seconds at 60°c and run the test until 700 seconds.

d) Acquire and analyze data by using Excel.

Conclusion

In this paper, the provided results consist of averaged 60 experimental test results which validates the performance of the device with high sensitivity and selectivity to detect the pathogens in plant. Based on this obtained result, our device can guarantee in detecting the contaminated vegetables within a minute.