CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
S0514

Project Title
Development of New Primers and TaqMan(R) Probes for the Detection of Grapevine Viruses

Abstract

Objectives/Goals
To develop primers for Red Blotch Associated Virus, and to run extractions under the same conditions and same methods

Methods/Materials
i.Designing and ordering the primers
1.With this newfound region, design primers and probes using the program Primer Express 3.0.1.
2.Order the primers and probes.
ii.Collect grape shoot samples and extract DNA and RNA
1.Visit the vineyard and collect samples. a.Plant 1: Red blotch associated virus and Grapevine leafroll associated virus 1 and 3. b.Plant 2: Grapevine leafroll associated virus 1 and 3. c.Plant 3: Grapevine leafroll associated virus 1 and 3.
iii.Extract the DNA and RNA
1.DNeasy Extraction kit. 2.RNeasy Extraction kit
iv.Running qPCR
1.Apply the DNA samples to a master mix containing primers and probe. 2.Using this master mix set up for the 96-well fast PCR on the QuantStudio Dx Real-Time PCR Instrument.
v.Running Digital PCR
vi.Analyze
vii.Conclusion

Results
Each CT value for the red blotch virus (RB) and the leaf roll virus 1 (LR1) ranged between 21- 25% meaning the virus had infected said percentage to that percent. Ct is the cycle at which the fluorescence within a sample crosses a certain threshold point. Samples that cross the threshold first have a higher concentration of virus. The threshold is determined by where the amplification plot lines are most parallel to each other.
All the standard deviations were ranging between 0.4 and 0.6 allowing the conclusion that the tests worked and provided accurate data. The standard deviation is a measure that is used to quantify the amount of variation or dispersion of a set of data values.

Conclusions/Discussion
The project focuses around finding a faster way to examine plants and diagnose them for a given virus. With thorough research and experimentation I can conclude that a great amount of farmers will willingly

Summary Statement
My project is about finding a fast and cost-manageable method to detect DNA and RNA based viruses under the same conditions.

Help Received
Dr. Mysore Sudarshan helped provied facilities and opporutnity to learn under his expertise at the UC Davis Plant Pathology Lab. Trent Lawler mentored and guided me in learning how to run tests.