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Adib Rowhani
Plant Materials Center
Univ. of California
Davis, CA

Real time TaqMan® RT-PCR (TaqMan® RT-PCR) assays were developed to detect the viruses associated with Rugose wood complex of grapevines. The viruses detected were *Rupestris stem pitting-associated virus* (RSPaV) in the genus *Foveavirus*, *Grapevine virus A* (GVA), *Grapevine virus B* (GVB) and *Grapevine virus D* (GVD) in the genus *Vitivirus*. The coat protein was found to be the most conserved gene within the viral species, therefore, the primers and probes for TaqMan® RT-PCR assays were designed from the multiple alignment of the coat protein sequence of various isolates of each virus. Comparisons were also made between the conventional one step RT-PCR and TaqMan® RT-PCR for the detection of these viruses using four fold serial dilutions of both purified RNA and crude extract prepared from grapevine tissue. Results showed that TaqMan® RT-PCR was more sensitive and could detect viruses at 32 and 256 fold higher dilutions for purified RNA and crude extract, respectively, compared to RT-PCR.

In a different experiment, Low Density Arrays (LDA) were designed based on the real-time RT-PCR (TaqMan®) assays for the specific detection of 13 viruses that infect Grapevines. The viruses included in the study were *Grapevine leafroll associated viruses* (GLRaV) types 1, 2, 3, 4, 5, and 9, *Grapevine leafroll associated virus 2*-Redglobe strain (GLRaV-2RG), RSPaV, GVA, GVB, *Grapevine Fanleaf Virus* (GFLV), *Tomato Ringspot virus* (ToRSV), and *Grapevine Fleck virus* (GFkV). The LDAs were evaluated against a wide range of geographically distributed isolates. Geographical locations included Africa, Europe, Australia, Asia, Latin America and the United States. High throughput detection of these viruses using LDAs was compared to RT-PCR and real time TaqMan® RT-PCR. The efficiency of different RNA extraction methodologies and buffers were compared for use in low density array detection. In addition improving the RNA extraction technique and testing the quality of the RNA using the 18S ribosomal RNA TaqMan® assay as an RNA specific internal control proved to generate better diagnostic assays. This is the first report on use of LDA for the detection of plant viruses.