(Notification) 531/2023 **Dated: 03-03-2023**

Name: **Latief Ahmad Wani**

Under the supervision of: **Prof. Jawaid Ahmad Khan**

Thesis title: **Development of diagnostic system for detection of viruses infecting rose plant**

Department of Biosciences,

Faculty of Natural Sciences,

Jamia Millia Islamia,

New Delhi-110025

Findings

Key words: ApMV, PNRSV, duplex RT-PCR, RT-LAMP assay, STH-PAS kit.

In this study, rose leaf samples collected from different regions of India, were subjected to RT-PCR based screening for virus infection. The 2.5 % rose leaf samples collected from Srinagar (Jammu and Kashmir) and the 8.5% collected from Jhajra-Dehradun (Uttarakhand), were found to be infected with the *Apple mosaic virus* (ApMV). Further, 5.0 % of rose leaf samples collected from Jammu and Kashmir were found infected with *Prunus necrotic ringspot virus* (PNRSV). None of the leaf sample collected from other sampling sites test positive for PNRSV infection. The results confirmed that the ApMV CP gene of rose isolates from Srinagar (Jammu and Kashmir) and Jhajra-Dehradun (Uttrakhand), shared 96.3 % - 98.0 % sequence identity with the ApMV CP genes of rose isolates from Poland and Turkey. The PNRSV CP gene of rose isolates from Srinagar, shared 98.6 - 99.7 % sequence identity with rose isolates from India, China, and Poland. The CP gene sequences of the detected ApMV and PNRSV rose isolates were determined and submitted to the NCBI GenBank database.

A duplex RT-PCR assay was developed for the first time for simultaneous detection of ApMV and PNRSV infecting rose plants. Furthermore, one-step colorimetric RT-LAMP assays were developed for the first time to detect ApMV and PNRSV with 100 % specificity and are 10^3 fold more sensitive than their conventional RT-PCR assays. There was no cross-amplification with viruses belonging even to the same genus (*Ilarvirus*). For the first time, we developed a Single-strand Tag/Hybridization - Printed Array Strip (STH-PAS)-based kit for detection of ApMV and PNRSV, which could simultaneously detect them with 100 % specificity and was 10 fold more sensitive than their RT-PCR assays as it could detect both the viruses up to 100 pg concentration of the infected sample.

This research was successfully concluded following the development of a duplex RT-PCR, RT-LAMP assays, and a STH-PAS-based kit for simultaneous detection of ApMV and PNRSV viruses with their broad spectrum on field application.