Indicator plant (TPO) assays

Screening for a variety of viruses in plant material

Introduction

When producing planting material, it is essential to start with a clean stock. In addition to our service for pathogen detection by PCR, we also use indicator plants (i.e. toetsplantonderzoek) for pathogen (virus) detection.

A limitation of PCR is that, when a virus is detected, it cannot determine whether the virus is biological active. With indicator plants we can determine whether a virus is biologically active. It should however be noted that not all viruses can be detected with indicator plants, but is limited to viruses that can be mechanically transmitted. Our indicator plant service is ASLN authorised by Naktuinbouw and the results can be used for an Elite certificate. We normally perform tests with two indicator plants (*Chenopodium quinoa* and *Nicotiana occidentalis*), and can add a third plant (*Nicotiana benthamiana*) if required. These plants are known for their susceptibility towards a broad range of viruses.

Methodology

Our plants are grown in phytotrons under constant conditions that are suitable for the plants, but also for virus multiplication. After the seedlings have grown for several weeks and have developed their first leaves, they are ready to be inoculated with a sample. The sample consist of a leaf extract that can be derived from up to 25 leaves.

After inoculation plants are grown for three more weeks before final scoring. This will give the possible viruses the time to infect the plants. After this period, any symptoms of viral infection should be visible on the indicator plant(s) and each sample will be scored as: ‘free of virus’ or ‘virus detected’. If requested we can follow up with a PCR test to determine the pathogen.

For more information about bioassay projects or you can contact our analytical research team through analysis@iribov.com

Indicator plants *C. quinoa* (back) and *N. occidentalis* (front) at three weeks after inoculation. No symptoms visible.

Indicator plant *N. occidentalis* at three weeks after inoculation. Plant on the right with clear disease symptoms.

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