

Title Postharvest detection of mango anthracnose based on simple and rapid paper based nucleic acid analysis chip

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Abstract

Colletotrichum gloeosporioides causes most significant losses on mango when fruits are affected after harvest. It is difficult to predict whether disease is likely to occur and how severe it will become. Early detection and diagnosis can provide more accurate forecast of disease and improve the precaution of disease management practices. Simple and rapid disposable paper based nucleic acid diagnostic test allowing workers in fields more detailed of disease incidence without the need for expensive equipment and facilities was developed for the first time. The single unit chip was fabricated on Whatman filter paper using plastic lamination. It has 2.5x3 cm² dimension and divided into 2 parts, one for nucleic acid amplification and the other for signals detection. The assay was based on an inter transcribed spacer element amplification via loop mediated isothermal DNA amplification platform using primer set specific to 6 areas of the DNA. Further DNA signals detection was performed by visual observation of colorimetric changes of blue silver nanoparticles (AgNPs), in signals detection part. Assay had a limit of detection at 50 copies of target gene with high specificity against other types of *Colletotrichum species* and mango pathogens. It spent only one hour to complete all processes. This provided a basis for a simple and rapid assay of mango using paper based chip.