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Development of a gold-nano particle based novel dot immunobinding assay for rapid and sensitive detection of *Banana bunchy top virus*

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Highlights

- An improved gold nanoparticles based Dot immunobinding assay (DIBA) was developed for detection of *Banana bunchy top virus* (BBTV)
- The test could detect the virus at sap dilution up-to 10^{-2} .
- Gold nanoparticles based DIBA, was found to be more efficient user friendly, rapid and cost effective diagnostic method than ELISA
- The study indicates the importance of indexing the asymptomatic mother plants destined to become the source of explants for in-vitro propagation.

Abstract

An improved gold nanoparticle based Dot immunobinding assay (DIBA) was developed for the detection of *Banana bunchy top virus* (BBTV), that is more efficient, sensitive, rapid and simpler than conventional DIBA and ELISA. Instead of enzyme conjugates, gold nanoparticles were used as reporters owing to their unique optical properties. Antibody was raised against expressed recombinant coat protein of BBTV. The gold nanoparticles were conjugated to primary / detection antibody raised following immunization with recombinant coat protein, making it highly specific for the virus. Gold nanoparticle conjugated primary antibody (GCPab) based DIBA developed in this study has a detection efficiency comparable to ELISA. The results of using this assay format for detection of BBTV in banana plants from four geographical regions of India are also presented in this report. The test could detect the virus at sap dilution up-to 10^{-2} . Using this improved DIBA, any lab with basic amenities can perform indexing on large numbers of samples.

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