Abstract:

Onion (*Allium cepa* L.) is one of the most widely used vegetables in food preparation around the world, especially in tropical countries, and can also act as a medicinal compound for many diseases. Nonetheless, a number of plant diseases, including sour skin (*Burkholderia cepacia*), is post-harvest diseases in onions that cause significant economic losses for onion growers, and pose a major threat to the onion industry. Due to the economic importance the *Burkholderia cepacia* disease an accurate and timely diagnosis of sour rot helps to reduce post-harvest losses as well as prevention of the secondary spread of bacteria in store. This study is a measurement approach to detect *Burkholderia cepacia* using multiplex PCR and gold nanoparticles probe colorimetric assay. In multiplex PCR techniques, designed primers for *recA*, *APZ15-03995* and *APZ15-27735* genes were used and the results showed amplification of 689bp, 1120bp and 428bp, respectively. The specificity and sensitivity of this reaction were investigated with negative control bacteria and preparation of genomic DNA dilution. The results of this study showed 100% specificity and a sensitivity of 74.4×10^{-3} of genomic DNA. Next, detection of this bacteria using a gold nanoparticle probe designed for the *recA* gene was investigated, and changes in color and wavelengths were observed in the presence of target bacteria. 100% specificity and a sensitivity of 74.4×10^{-6} of genomic DNA were achieved in this method. The results showed that both methods are specific and sensitive enough to diagnose *Burkholderia cepacia*. However, the use of gold nanoparticles is a better option for detecting *Burkholderia cepacia* due to its high specificity and sensitivity and shorter time than multiple PCR.

Key words*:* *Burkholderia cepacia*, Sour skin, Multiplex PCR, Gold nanoparticle probe, *recA ,APZ15-03995, APZ15-27735*

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