

**Title** Colorimetric biosensor based on gold nano particles for a simple and rapid detection of *Escherichia coli* in freshcut melon

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**Citation** Abstracts of 7<sup>th</sup> International Postharvest Symposium 2012 (IPS2012). 25-29 June, 2012. Putra World Trade Centre (PWTC), Kuala Lumpur, Malaysia. 238 pages.

**Keywords** melon; *E. coli*

### **Abstract**

Safety quality control of fresh cut produce of being free of micro-organisms contamination is essential in quality control management and quality assurance. Conventional methods used for quality and safety monitoring, including plate counting, immunological methods. The conventional methods fully utilize on laboratory facilities and relatively slow due to time demanding with about 2-7 days to. These demonstrate the need for a better quality and safety monitoring method to control risks associated with these products. We had developed a simple and rapid *Escherichia coli* detection method less reliable on laboratory facilities for freshcut melon based on loop-mediated isothermal DNA amplification with colorimetric signals detection using 20 nm gold nanoparticles. Detection processes were based on an enrichment procedure made direct from fresh cut melon to enable DNA amplification without any sample pre-treatment such as DNA extraction and a specific DNA amplification of *mal B* gene at 65°C isothermal temperature. DNA signals were visualized on colorimetric responses of gold nanoparticles. Color of gold nanoparticles was still in ruby red in samples containing *E. coli* while drastic changing of the color from ruby red to purple was observed in negative samples. The method had a limit of detection at 10 copies of *E. coli* DNA per 50g of sample. No cross-reactivity was observed from samples contaminated with other bacteria. Detection could be completed within 4 hours of operation including the enrichment and nucleic acid detection processes without the need of thermo cycler. This method constitutes a basis for a rapid yet simple detection of pathogenic bacteria suitable for field application.