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# LOOP- MEDIATED ISOTHERMAL AMPLIFICATION (LAMP) METHOD FOR PATHOGEN AND PESTS DETECTION, AND FOR ASSISTED BREEDING

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The loop-mediated isothermal amplification (LAMP) has been recently described as a fast, highly sensitive, cost-effective and easy-to-handle method for specific DNA amplification (Notomi et al. 2000; Nagamine et al. 2002; Caipang et al. 2004; Tomita et al. 2008). Isothermal techniques simply require a thermo-block (no thermocycler is needed) to maintain constant temperature ranging from 60 to 65 °C (Tomotada et al., 2003; Tomlinson et al., 2010). A very little amount of template (DNA or RNA) even extracted with a simple and fast method is needed. For most tests, amplification process takes less than 15 minutes. The amplified product is detected by various methods either directly in the test tubes (turbidity, fluorescence) or by conventional methods (electrophoresis). For all these reasons, LAMP is suitable for field-use.

Actually, LAMP allows a wide array of applications for pathogen and pests detections in plant, animal or human samples for detection of plant species in food, For support to breeding.

In the context of sustainable agriculture, it is imperative to accurately detect the pathogen (viruses, bacteria, fungi) and pests (insects, nematodes) in real time during the early stage of crop cultivation.

The LAMP method has been successfully used for detection of different microorganisms: bacteria (*Xylella fastidiosa)*; phytoplasmas ( Flavescence dorée*);* protozoa as *Trypanosoma*; fungi (such as *Fusarium oxysporum and graminearum*, *Sclerotinia sclerotiorum);* oomicetes*,* (*Plasmopara viticola*); either DNA or RNA virus (*Plum pox virus*, *Potato virus Y and X*, *Tomato torrado virus* (ToTV), *Tomato yellow leaf curl virus* (TYLCV), *Tomato spotted wilt virus* (TSWV), *Wheat streak mosaic virus* (WSMV)). The method also provided the opportunity to precisely identify strain/species within a pathogen.

Our group succeed to detect *Tranzschelia discolour* in anemone rhizomes and Ranunculus Mild Mosaic Virus (RMMV) and Cucumber Mosaic Virus (CMV) in infected anemone plants by LAMP.

Lamp was employed in plant breeding in several field: identification of SNP, sex determination (papaya and asparagus), detection of self compatible individuals (Japanese apricot), GMO detection, monitoring gene flow, high-throughput field based genotyping. We propose LAMP as a tool to help detection of solid mutants following CRISPR/Cas9 mediated site directed mutagenesis.