

# Feasibility of household-scale dual culture bio-assay for *in vitro* screening of banana resistance against fusarium wilt

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**Abstract** *Fusarium odoratissimum* is the most pathogenic fungus that causes Fusarium wilt disease in bananas. There is currently no established conventional method to prevent Fusarium wilt. Additionally, *F. odoratissimum*'s spores can persist in the soil for years. Breeding banana plants for resistant cultivars through mutation or somaclonal variation using plant tissue culture could serve as an alternative for controlling Fusarium wilt. Screening of resistant variety of banana could be done via the dual-culture bioassay method. Despite the expensive and sophisticated instruments at the laboratory scale required to perform this method, we propose a dual-culture bioassay at a household scale, which can be adapted in remote areas to promote the development of Fusarium wilt control in many developing countries.

A pressure cooker and low-cost containers were used as adaptations of an autoclave and laminar airflow, respectively. The usage of a pressure cooker for MS0 preparation showed no significant difference compared to an autoclave (p-value: 0.287, Kruskal-Wallis test). Containers equipped with a UVC lamp increased the sterility of commercial PDA medium, the production of sterile non-commercial PDA medium, sterile Foc subculture in commercial PDA, and sterile banana subculture up to 100%, 86.67%, 93.33%, and 64.29%, respectively. Overall, under a controlled environment, the dual-culture bioassay of banana plants at a household scale yielded similar results compared to a laboratory scale.

**Keywords:** dual culture bioassay; fusarium wilt disease; household scale; *in vitro* culture; *Musa acuminata*