

SYSTEMIC RESISTANCE INDUCED SEEDLINGS FOR BETTER VEGETATIVE GROWTH, YIELD PRODUCTION AND DISEASE RESISTANCE FOR PAPAYA AND BANANA

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ABSTRACT

Papaya and banana have been listed as priority fruit crops for domestic and export market. However, the efforts to increase the production of both fruits have been severely affected by incidences of invasive alien bacterial diseases. Various approaches including chemical and biological controls have been tested, however, none were successful. One of the techniques that was not fully explored was the enhancement of plant resistance against diseases, which is known as Induced Systemic Resistance (ISR). The aim of this study was to produce ISR seedlings that were healthy, vigorous and resistant against papaya dieback and banana blood diseases by inoculation with Plant Growth Promoting Rhizobacteria (PGPR). ISR technology to control both the papaya bacterial dieback and banana blood disease was developed by bio-prospection and manipulation of ISR inducing PGPR from soil. For papaya, the ISR seedlings showed vigorous vegetative growth and total recovery against dieback infection compared to the control seedlings (non-ISR) which, totally succumbed to the disease. When the papaya seedlings (ISR and non-ISR) were produced and tested on a hotspot for dieback disease, after one crop cycle (2 years), all treatments except one totally survived the disease. None of the controls survived. In a follow-up study, where one of the ISR treatment was selected and up-scaled in a farmer's plot (hotspot) 95% of the plants survived against the dieback disease. This success enabled the technology to be commercialized and made available in the market for farmer's utilization. This success, also encouraged us to develop ISR plants against blood disease of banana. When the ISR banana seedlings were challenged with the pathogen, three treatments recorded 100% control, two with 75% control, whereas all control plants did not survive. All these five treatments were tested in a hotspot for blood disease where lower incidence was observed in treated plants compared to the control. Generally, all the ISR treatments recorded more vigorous growth and generated extra yields compared to the control.

Keywords: papaya bacteria dieback, blood disease of banana, Induced Systemic Resistance (ISR), Plant Growth Promoting Rhizobacteria (PGPR)