

Assessment of the suitability of GRAS (Generally Recognized As Safe) compounds to control anthracnose disease of guava (*Psidium guajava*)

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Abstract

Guava (*Psidium guajava* Linn.) is an important fruit of subtropical countries. It is a hardy crop, is cultivated successfully even in a neglected soils. There are number of pathogens, mainly fungal which affect guava crop besides few bacterial, algal, some physiological disorders or deficiencies. About 177 pathogens are reported on various parts of guava plant of which 167 are fungal, 3 bacterial, 3 algal, 3 nematodes and one epiphyte. About 91 pathogens are reported on fruits, they cause various symptoms in fruit rots.

Anthracnose is one of the main disease in all guava growing countries, causing considerable post harvest losses. It is characterized by depressed soaked necrotic lesions with an irregular shape and brown color on the fruit surface.

Colletotrichum gloeosporioides is the causal agent of the anthracnose disease and it grows in intracellular hemibiotrophic manner. Therefore proper spraying pattern should be followed to control anthracnose in guava in addition to other management tools. There are chemical fungicides recommendations to control post harvest diseases of fruits. There is increasing public concern over the level of pesticide residues in food and this is caused to reveal some innovative considerations to search for alternatives to synthetic fungicides. Recently there has been considerable interest in safe compounds that are the compounds of naturally occurring biological active compounds of plants and inorganic compounds. These safe compounds assumed to be more acceptable and less hazardous than synthetic fungicides. Hence this study was focused on GRAS (Generally Recognized as Safe) compounds to control anthracnose disease of guava fruits.

Symptom showing fruits of Horana White and Horana Red were collected and pieces were surfaced sterilized and aseptically inoculated into solidified agar media composed with different concentrations of selected

GRAS compounds viz. sodium bicarbonate (10000, 20000, 30000, 40000 and 50000ppm) , ammonium bicarbonate (5000,10000, 20000, 30000 and 40000ppm) , sodium meta bisulphate(500, 1000, 1500, 2000 and 2500ppm) ,calcium chloride(10000, 20000, 30000, 40000 and 50000ppm) , sodium benzoate (10000, 20000,30000 and 40000ppm) , acetaldehyde (50, 100, 102, 105 and 110ppm), cinnamaldehyde (1, 4, 5, 6, 8, 10, 15 and 20ppm), benzaldehyde (1, 5, 10, 20, 30 and 40ppm) and daconil). Pathogenicity was proved by using healthy fruits. According to the price, compounds were selected for field evaluation. Both invitro proved and one concentration higher than that value was experimented in field conditions. Selected GRAS compounds were field evaluated with ten replicates in Randomized Complete Block Design at a research field of Fruit Research and Development Institute, Horana from 2013 to 2014. Then sprayed fruits were plucked at proper harvesting stage and they were surface sterilized by washing off with teepol and followed by running tap water and dipped in relavant GRAS compound aqueous solution prior to artificial inoculation and sample size was 10 fruits from each treatment. Artificially inoculated fruits were humidified in a closed chamber at room temperature. Lesion diameter was recorded in inoculated fruits at two days interval and data was analyzed by using SAS statistical software..

In-vitro studies revealed that sodium bicarbonate(40000ppm), ammonium bicarbonate(10000ppm), sodium meta bisulphate(1500ppm) , sodium benzoate(30000ppm), acetaldehyde(110ppm), cinnamaldehyde(5ppm) and daconil(3ppm) were effective treatments and calcium chloride has no effective control.. Field studies revealed that frequently spraying of both concentrations of sodium metabisulphite has some possibilities to use as a safe compound to control the anthracnose disease. Horana white fruits showed more susceptibility to anthracnose than Horana Red guava fruits and it may be due to the polyphenolic compound content of fructoplane of fruits and they give protection from biotic factors especially fungi like *Colletotrichum gloeosporioids*.

Keywords: Guava, anthracnose, GRAS compounds