International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 09 Issue: 01 | Jan - 2025 SJIF Rating: 8.448 ISSN: 2582-3930

"Plant Disease Management and cure: A Systematic Review of Pathogens, control strategies and future directions"

Kapil Sharma[1], Narendra Sharma[2], Divyanshu Singh Nathawat[3], Tofik Mev[4].

BBA ENTERPRENURSHIP

Bsc (AGRI+ MBA)

BCA (COMPUTER SCIENCE)

CSE(AI&DS)

INTRODUCTION

We are taking a plant of Guava (Psidium guajava) for our project. Guava is a tropical fruit-bearing plant native to Central and South America, though it is now grown in many tropical and subtropical regions worldwide. Here's a comprehensive guide to guava plants:

Botanical Classification, Family: Myrtaceae, Genus: Psidium, Species: Psidium guajava[3]

It has a place with phylum: Mangoliophyta, class: Mangoliopsida and Myrtaceae family[6].

Plant Description: Size: Guava is a small to medium-sized evergreen tree or shrub, typically growing to a height of 3-10 meters (10-33 feet), Leaves: The leaves are opposite, simple, elliptic to oval-shaped, and about 5–15 cm long. They have a smooth upper surface and a hairy underside, Flowers: Guava flowers are white with multiple stamens, fragrant, and about 2–3 cm in diameter. They grow singly or in small clusters in the leaf axils, Fruits: The guava fruit can be round, oval, or pear-shaped. The skin can be green, yellow, or pinkish when ripe, and the flesh may be white, pink, red, or yellow with numerous tiny seeds. Fruits have a distinct musky, sweet fragrance.

Varieties of Guava: There are many varieties of guava, differing in size, colour, and taste: Common guava (Psidium guajava): This is the most cultivated species.

Strawberry guava (Psidium cattleianum): Produces smaller fruits with a strawberry-like flavor. Apple guava: Produces larger, round fruits similar to apples in size and shape. Growing Conditions: Temperature: 20-30 degree C, Soil PH : 5.5- 6.5, Soil type : sandy loam soil with organic matter, Sun light : full sun light ideal guava growth, Watering : regular watering and consistent moisture. Propagation Methods: Seeds: Guava can be propagated from seeds, but this method takes longer and may not produce true-to-type fruits. Cuttings: A more reliable method for propagation is by rooting semi-hardwood cuttings. Air Layering: Another common method is air layering, which encourages root growth on branches still attached to the mother plant. Grafting: Guava can also be grafted to ensure the offspring is true to the parent plant. Harvesting: Depending on the variety, climate and ready to harvest 3-6 month after flowering[1]. Economic Importance: Top producers countries India, China, Brazil, Mexico and Thailand and Indian export value off guava $300 million in (2020-21). Hamiduzzaman et al. (1997) revealed from Bangladesh that shrivel rate was most extreme when seedlings were vaccinated by F. Oxysporum & F. Sp. Psidii alongside the nematodes H. Dihystera and H. indicus[2]. Uses

of Guava: Culinary: Guavas are consumed raw, juiced, or used in cooking and baking. Rejuvenating oil is available in leaves which contain α-pinene, limonene, β-pinene, isopropyl liquor, menthol, terpenyl acetic acid derivation, caryophyllene, longicyclene and β-bisabolene. Oleanolic corrosive is likewise found in guava leaves[11]. They are popular in jams, jellies, desserts, and beverages. Nutritional Value: Guava is rich in vitamin C, dietary fiber, and antioxidants. It has musky exceptional smell when matured which is solid yet charming[8] .It's also a good source of vitamin A, potassium, and folic acid. Medicinal Uses: Guava leaves and fruits have been used traditionally for their anti-inflammatory, antimicrobial, and antioxidant properties. Guava leaf tea is popular in many cultures as a remedy for diarrhea and digestive issues. Psidium guajava L. is devoured as food as well as people medication in subtropical regions all around the world because of its pharmacological exercises[9].

It has been suggested for cough because of its anti-cough activity[12].

Leaves have highly satisfied of limonene around 42.1% and caryophyllene about 21.3%[10].

Ascorbic corrosive and citrus extract are the significant elements of guava that assume significant part in enemy of mutagenic movement[7].

Now and again the ecological changes and chemicals become the explanation of free extreme creation. These free revolutionaries are liable for all the oxidation responses[16].

Guava is a highly valued plant for its nutritious fruits, ease of cultivation, and adaptability to various conditions. Whether grown in a backyard garden or on a large commercial scale, it is relatively low-maintenance but requires regular care for optimal production

Convention broiler drying was come about to hold the greater part of the absolute phenolic contents (TPC), ascorbic corrosive identical cancer prevention agent limit (AEAC) and ferric diminishing power (FRP) measure of guava. Nonetheless, the drying brought about a critical diminishing of AEAC, TPC and FRP[13].

We are taking this plant it is so commonly consumed and growed in world wide areas.

Quercetin, quercetin-3-0-glucopyranoside and morin can be secluded from leaves. These mixtures show the counter oxidant action. Quercetin has free extreme adjusting action. Its decreasing power is lot higher than any remaining mixtures. It is considered as most dynamic and solid cancer prevention agent in the leaves of guava[14,15].

Defensive splashes against anthracnose, styler end decay and different kind of decays adjacent to epidemiological investigation and shower gauging can enormously upgrade the exhibition of plantation showers. Subsequently, pre-harvest treatment with more secure synthetics including IPM is a proper methodology in circumstances where significant reap injury misfortunes are expected[4].

Wilt is the most widely recognized sickness in guava plant. Assessed that 5 to 15% of the tress passed on because of wilt consistently in 12 regions of U.P., coming about into a deficiency of worth Rs. 1,000,000 roughly.

During the beyond 2 thirty years, various methodologies have been made for in vitro proliferation of guava. An outline on the vitro recovery of guava through organogenesis, somatic embryogenesis, and engineered seeds is introduced [5].

If the plant is affected by wilt then the plant will show this type of symptoms :-

The leaves and flower will dry up and fruit size will get smaller and browning of leaves will occur, and the tree will dry.

Timeline of this study: 6 months.

LITERATURE REVIEW/BACKGROUND STUDY

1. S.S. Negi, A.K. Misra and S.Rajan central institute for subtropical horticulture, Rehmankhera, P.O. Kakori, Lucknow 2001.
2. A.K. Misra, Central Institute for Subtropical Horticulture, Rehmankhera, P.O. Kakori, Lucknow 2011.
3. Maritha H Schoeman and Nico Labuschagne; 2014
4. Current Scenario of Guava Disease in India and their Integrated Management By O. Prakash, B.K. Pandey.
5. Biotechnological Advances in Guava(Psidium Guajava L.): recent developments and prospects for further research.
6. Dakappa SS, Adhikari R, Timilsina SS, Sajjekhan S. A review on the medicinal plant Psidium Guajava Linn. (Myrtaceae). J Drug Deliv Ther. 2013;3(2):162–8
7. Grover IS, Bala S. Studies on antimutagenic effect of guava (Psidium guajava) in Salmonella typhimurium. Mut Res. 1993; 300:1–3.
8. Morton JF. Fruits of Warm Climates; 2004. p. 425–8.
9. Deguchi Y, Miyazaki K. Anti-hyperglycemic and anti-hyperlipidemic effects of guava leaf extract. Nutr Metab (Lond). 2010;7:9.
10. Ogunwande IA, Olawore NO, Adeleke KA, Ekundayo O, Koenig WA. Chemical composition of the leaf volatile oil of Psidium guajava *L.* growing in Nigeria. Flavour Fragr. J. 2003;18:136–8.
11. Begum S, Hassan SI, Ali SN, Siddiqui BS. Chemical constituents from the leaves of Psidium guajava. Nat Prod Res. 2004;18(2):135–40.
12. Jaiarj P, Khoohaswan P, Wongkrajang Y, Peungvicha P, Suriyawong P, Sumal Saraya ML, et al. Anticough and antimicrobial activities of Psidium guajava Linn. Leaf extract. J Ethnopharmacol. 1999;67(2):203–12.
13. Siow LF, Hui YW. Comparison on the antioxidant properties of fresh and convection oven-dried guava (Psidium guajava L.). Int Food Res J. 2013;20(2):639–44.
14. Nantitanon W, Okonogi S. Comparison of antioxidant activity of compounds isolated from guava leaves and a stability study of the most active compound. Drug Discov Ther. 2012;6(1):38–43.
15. Soman S, Rauf AA, Indira M, Rajamanickam C. Antioxidant and Antiglycative potential of ethyl acetate fraction of Psidium guajava leaf extract in Streptozotocin-induced diabetic rats. Plant Foods Hum Nutr. 2010; 65:386–91.
16. Masuda T, Inaba Y, Maekawa T, Takeda Y, Yamaguchi H, Nakamoto K, Kuninaga H, Nishizato S, Nonaka A. Simple detection method of powerful antiradical compounds in the raw extract of plants and its application for the identification of antiradical plant constituents. J Agric Food Chem. 2003;51:1831–8.

METHODOLOGY

We have taken 100 plants of guava affected by wilt disease. We have divided them into 2 groups. Group A and Group B containing 50 plants each. We are applying 2 types of chemical one is Bavistin on group A and another one is Brassicol on group B. They both are used for guava wilt disease caused by Furasium Oxysporum. Both the chemical have different type of effectiveness as Brassicol effectiveness may vary depending on the severity of the disease and the plants overall health where Bavistin is considered a more reliable option for controlling this disease.

Mode of action of both the chemical is different as Brassicol works by releasing copper ions that inhibit fungal growth and sporulation where Bavistin works by inhibiting fungal cell division and disrupting fungal cell walls, which ultimately leads to the death of the fungal pathogen.

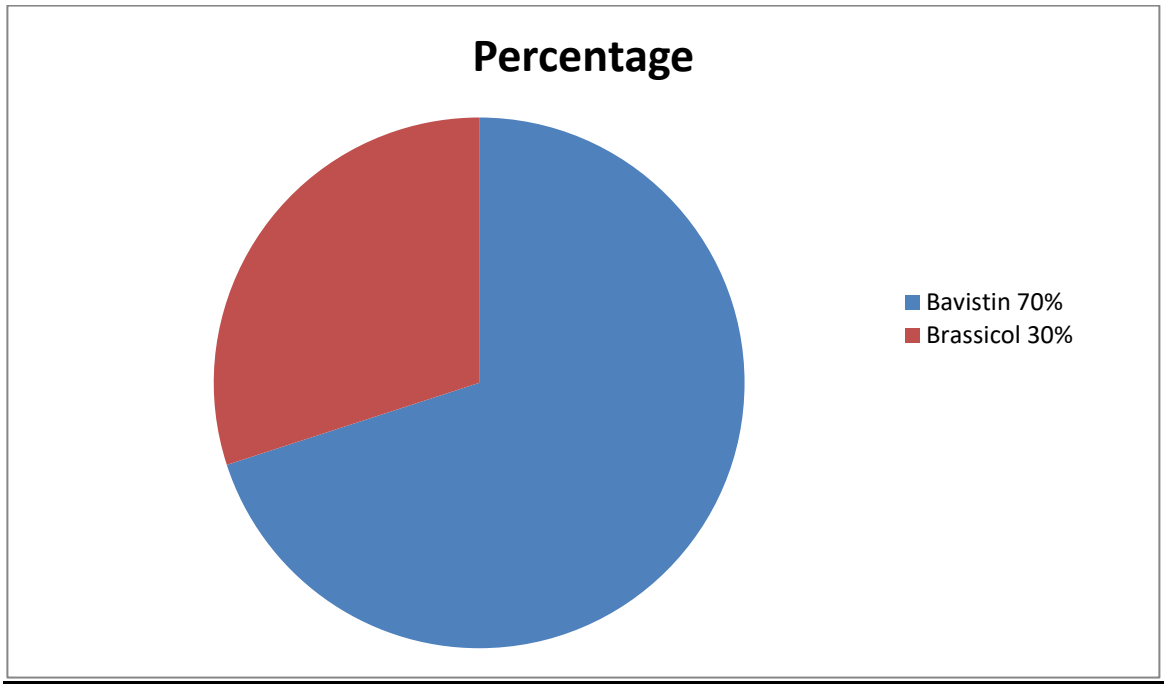
Application Timing of both the chemical is different as Brassicol is applied as an preventive measures, before the onset of disease where Bavistin can be applied as both preventive measures and as curative treatment, depending on the severity of plant disease.

Dosage and Frequency of both the chemical is about similar as Brassicol is used 2-3 grams per litre water and should be applied in every 10-15 days where Bavistin is used 1-2 grams per litre water and should be applied in every 10-15 days.

Precaution of both the chemical is different as Brassicol can cause phytotoxicity if used at high concentration or on sensitive plants where Bavistin can cause skin and eye irritation and should be handled with caution.

RESULT

We have tested Bavistin and Brassicol on 2 Group, Group A and Group B. In Group A we have tested Bavistin which has shown has better result. 70% plants of group a are cured by applying Bavistin where as in Group B in which we have tested Brassicol has shown less result. Only 30% of plant are cured by applying Brassicol.



CONCLUSION

Bavistin is more effective than Brassicol in controlling fungal disease in guava plants. Bavistin also provides better protection for plant roots. Therefore, Bavistin is better choice for controlling fungal disease in guava plant. Brassicol is good for prevention of this disease.