

THE EFFECT OF SOIL POTASSIUM ON POSTHARVEST FUNGAL DISEASES OF BANANA

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Potassium (K) is generally known to increase resistance in plants against diseases and enhance quality. According to literature, application of K during the growth period of varied crops resulted in beneficial effects against disease development in 65% and deleterious effects in 28% of the cases studied. The objective of the current study was to determine the effect of K application to soil on natural disease resistance in fruits of banana cv. "Embul" to postharvest fungal pathogens.

Plants obtained from tissue culture were grown in a completely randomized block design in two sites at the University of Peradeniya. Treatments consisted of four levels of potassium (as mutriate of potash), T0 (0 g/pit), T1 (190 g/pit-recommended dose), T2 (380 g/pit) and T4 (760 g/pit) applied three times prior to flowering at 2, 5 and 9 months after planting together with Department of Agriculture recommended doses of N (110 g/pit as urea) and P (150 g/pit as rock phosphate). Fruits were harvested 13 weeks after flowering and allowed to ripen at room temperature (28 ± 1 °C). Intensity of freckle disease at harvest, anthracnose development from natural infections and following artificial inoculation and stalk-end rot during ripening were estimated. Presence of sclerenchyma tissue in the peel was observed. Soil, leaf and fruit peel were analyzed for N, P, K, Mg, Mn, Cu and Zn. Certain postharvest quality parameters, vegetative growth, flowering time and yield were also evaluated and compared with the control. The results were analyzed statistically by ANOVA (SAS computer package).

Site 1 had four times higher soil K level than the Site 2 prior to treatment. Fruits harvested from Site 2 with T2 K level developed significantly lesser ($P \leq 0.05$) anthracnose disease than the control in artificially inoculated fruits. However, higher K levels (T4) enhanced anthracnose in contrast. The stalk end rot was less ($P \leq 0.05$) in fruits harvested from K treated plants. A progressive reduction of freckle disease was observed with increasing K levels and the reduction in T4 was significant ($P = 0.05$, Kruscal-Wallis test) compared to the control. Peel sclerenchyma was higher in fruits harvested from T2 plants. Fruit peel tissue from T2 plants contained higher levels of K. However, fruit peels from T4 had lower K than T0. Plants treated with all K levels flowered earlier than T0 and recorded increases in growth and yield at T2 K level. Further the thickness of the fruit pulp was significantly higher in fruits at all K levels while the peel/pulp ratio decreased with increasing K levels. Other quality parameters measured (firmness of fruit or pulp, thickness of peel, pH of peel or pulp, total soluble solid content, shelf life) were not affected. Considering Site 1, the application of K had no effect on disease development, sclerenchyma production, growth or yield. However, pulp thickness and total soluble solids content increased significantly in fruits treated with 380 g/pit K (T2). Analysis of peel K content showed higher levels in the control compared to treated plants.