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Organic Soil Amendments: A Potential Bacterial Wilt Control in Potato

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Abstract

Potato bacterial wilt (BW) disease caused by *Ralstonia solanacearum* is one of the most destructive bacterial diseases of potato production. Control of BW is very difficult as there are no effective chemical control measures available. The presented study aimed at investigating the effect of soil amendment (SA) and inoculum density on the subsequent development of (BW) in field conditions over two seasons. Eight SA used included compost 10 mm sized particles (C10) at three application rates of 5 t ha^{-1}, 2.5 t ha^{-1} and 1.25 t ha^{-1}, Neem kernel cake (N) at three application rates of 1 t ha^{-1}, 0.25 t ha^{-1} and 0.125 t ha^{-1}, a combination of C10 at 1.25 t ha^{-1} + N 0.125 t ha^{-1}, Plantmate (an organic fertiliser consisting of 25 beneficial microorganisms and macronutrients, probiotics, enzymes, amino acids, and growth promoting substances) and a control without SA, two inoculum densities used were 3.26 $\times$ 10^3 CFU ml^{-1} and 2.9 $\times$ 10^5 CFU ml^{-1}. The experimental layout was a split plot design with four replications, inoculum density as main plot and SA as sub plots. The field was inoculated three days before treatment application in each season with 200 ml per unit area of bacterial suspension. Potatoes were planted in all the two consecutive seasons and treatments were applied to the same plots before planting. BW population were quantified 48 hours before SA application and at the end of every season, weekly observations of disease incidences were recorded. The findings showed significant reduction of BW by 75 % and 65 % in Plant mate at 10^3 CFU ml^{-1} and 10^5; CFU ml^{-1} respectively and 60 % and 40 % in (N) at 10^3 CFU ml^{-1} and 10^5 CFU ml^{-1} respectively against Control. Yields losses in these treatment were low with average yields of 34 t ha^{-1} at 10^3 CFU ml^{-1} for both Plant mate and (N) as compared to 1 t ha^{-1} in the control and 29 t ha^{-1} and 27 t ha^{-1} at 10^5; CFU ml^{-1} for Plant mate and (N) respectively as compared to only 1 t ha^{-1} in the control. This study shows that Plant mate and (N) had a great potential in reducing losses caused by BW. Further studies on the mode of action particularly of the SA are currently underway.

Keywords: Compost, Neem kernel cake, potato, *Ralstonia solanacearum*

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