Efficacy of Biofertilizers and Farmyard Manure in Management of Late Blight (*Phytophthora infestans*) and Yield of Potato

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Abstract Seed potato with latent infection of *Phytophthora infestans* is implicated in the initiation and transmission of late blight early in cropping seasons. The disease is managed by extensive use of fungicides that has led to emergence of fungicide resistant strains resulting in chemical ineffectiveness and increased cost of late blight management. Biological agents offer a sustainable alternative in managing potato late blight. Field experiments were conducted to determine the efficacy of Biofertilizers (*Trichoderma asperellum* and *Bacillus subtilis*) and farm yard manure (FYM) on management of late blight in potatoes. Biofertilizers were applied through seed treatment and foliar applications. Some seed tubers were pre-treated with *Trichoderma asperellum* and *Bacillus subtilis* (1.0×10^7 CFU/mL) while others planted without any treatment and later on sprayed with the same concentration. FYM was applied two weeks prior to planting and incorporated into soil at the rate of 30 tons ha^{-1}. The susceptible variety of late blight (*Shangi*) was used. Result showed that FYM + *Trichoderma asperellum* and FYM + *Bacillus subtilis* were not significantly different ($P \leq 0.05$) in reduction of disease severity by 72.95% and 72.23%, and disease incidences by 74.12%, and 72. 23% while increased yields by 63.18% and 62.38%, respectively. In addition, the treatment combinations had lowest tuber infection of 12.24% and 14.60%, respectively, compared to the untreated control. The highest disease severity, incidence, tuber infection and lowest yield was observed on untreated and farmyard manure (FYM) only. Similarly, the results revealed that spraying and soaking methods were significantly different in yield and late blight severity. The yield was increased by 42% in treatments associated with the soaking method compared to the spraying method. The spraying method reduced disease severity by 11.42% leading to a 12.36% higher yield than the soaking method. The results suggest that seed treatment by spraying of *Trichoderma asperellum* and *Bacillus subtilis* and application of farmyard manure can manage to reduce late blight on potatoes while improving yield.

Keywords: *Bacillus subtilis, FYM, Late blight, Methods, Ridomil®, Trichoderma asperellum Soaking, Spray, Shangi*