



# Integrated Application of Compost and Plant-Based Foliar Teas Improves Tuber Yield, Tuber Quality, and Foliar Disease Resistance in Potato (*Solanum tuberosum* L.)

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## Abstract

Potato production under rainfed conditions requires sustainable management strategies, including integrated agroecological approaches that combine nutrient inputs with plant-based biopreparations to maintain tuber yield and quality while reducing foliar disease pressure. This three-year field study (2022–2024) evaluated the effects of garlic (*Allium sativum*) and horsetail (*Equisetum arvense*) teas, alone or combined with compost derived from medicinal plant residues, on growth, yield, tuber quality, and disease incidence of the traditional variety Desiree under rainfed conditions in South Banat, Serbia. Treatments included garlic tea (GT, 2 L/ha), horsetail tea (HT, 2 L/ha), a combination of both teas (GHT, 2 + 2 L/ha), compost alone (Comp, 100 t/ha), compost combined with both teas (CompGHT), and an untreated control. The combined CompGHT treatment consistently enhanced tuber number per plant (8.1 vs. 5.0), average tuber weight (62.5 vs. 38.7 g), total tuber weight ( $\approx 506$  vs. 193 g/plant), and marketable yield (35.2 vs. 21.8 t/ha), representing a 52–62% increase over the control. CompGHT also reduced early blight (*Alternaria solani*) and late blight (*Phytophthora infestans*) incidence by 18–35%, while improving dry matter content (27.5 vs. 23.1%) and vitamin C concentration (22.4 vs. 11.5 mg/100 g fresh weight). Compost alone moderately increased yield (+38%) and reduced early blight severity (+22%), whereas single tea applications induced smaller, but measurable, effects on yield and disease. These results demonstrate that integrated compost and plant-based treatments improved yield, tuber quality, and disease management under field conditions, reflecting combined nutrient-driven and biostimulatory effects. Significance for potato production is reflected in the combined use of medicinal plant-based compost and foliar teas as a feasible, environmentally friendly approach to enhance yield, improve nutritional quality, and reduce foliar disease incidence, supporting more resilient and sustainable organic and low-input potato cropping systems.

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