

Characterization of Minerals, Elicitors in Spent Mushroom Substrate Extract and Effects on Growth, Yield and the Management of Cassava Mosaic Diseases

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Abstract : Introduction: This paper evaluated the mineral compositions, disease resistance elicitors in *Pleurotus ostratus* (POWESMS), and *Pleurotus tuber-regium* water extract spent mushroom substrate (PTWESMS) on the growth, yield, and management of cassava mosaic disease. Materials and Methods: The cassava plantlet (tms 98/0505) were generated through meristem tip culture at the Tissue Culture Laboratory, National Root Crop Research Institute, Umudike before they were transferred to the screen house, University of Port Harcourt Research Farm. The minerals and elicitors contained in the two spent mushroom substrates were evaluated using standard procedures. The treatments for this investigation comprised cassava plants treated with POWESMS, PTWESMS, and untreated cassava as control, which were inoculated with viral inoculum seven days after treatment application. The experiment was laid out in a completely randomized block design with 3 replicates. The data generated were subjected to analysis of variance (ANOVA). Means were separated using Fishers Least Significant Difference at $p=0.05$. Results: The results obtained revealed that POWESMS contained 19.3, 0.52, and 0.1g/200g substrate of carbohydrate polymers, glycoproteins, and lipid molecules elicitors respectively while it also contained 3.17, 212.1, 17.9, 21.8, 58.8 and 111.0 mg/100g substrate for N, P, K, Na, Mg and Ca respectively. Further, PTWESMS contain 1.6, 0.04, and 0.2g/200g of the substrate as carbohydrate polymers, glycoprotein, and lipid respectively; the minerals contained in this substrate were 3.4, 204.8, 8.9, 24.2, 32.2 and 105.5 mg respectively for N, P, K, Na, and Ca. There were also significant differences in the mean values of the number of storage roots, root length, fresh root weight, fresh weight plant biomass, root girth, and whole plant dry biomass, but no significant difference was recorded for harvest index. The result also revealed significant differences in mean values of disease severity index evaluated at 4, 8, 12, 16, 20, 24, and 28 weeks after inoculation (WAI). Conclusion: The aqueous extract of these spent mushrooms substrate have shown outstanding prospect in managing cassava mosaic disease and also improvement in growth and yield of cassava due to the high level of the minerals and elicitors they contain when compared with the control. However, more work is recommended, especially in understanding the mechanism of this induced resistance.

Keywords : characterization, elicitors, mosaic, mushroom

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