

Title: Evaluation of different substrates in the inoculant based in arbuscular mycorrhizal fungi formulation aiming to increase soybean productivity (*Glycine max* L.)

Authors: Nielsen, J.A.C.¹, Barazetti, A.R.¹, Santos, I.M.O.¹, Benite, M.B.¹, Freitas, V.F.¹, Cely, M.V.T.¹, de Oliveira, A.G.¹, Andrade, G.¹

Foundation: ¹Department of Microbiology, UEL – Universidade Estadual de Londrina
CEP 86051-980 Londrina – Paraná, Brazil – E-mail: andradeg@uel.br

Abstract:

Soybean (*Glycine max* L.) is considered the most important legume in the international market because of their high protein and lipid values. In the search of higher levels of productivity, the use of mineral fertilizers is common, and among them, the phosphorus (P) is one of the most used and limiting agricultural production. Arbuscular mycorrhizal fungi (AMF) establish symbiotic associations with most of the land plants. In this context, the objective of this study was to evaluate the efficiency of different substrates that served as vehicles for the inoculum produced *in vitro*, from *Rhizophagus clarus* at Microbial Ecology Laboratory, where is held in association with transformed carrot roots. The experiment was carried at the experimental field at the Universidade Estadual de Londrina – UEL, between December/2014 and April/2015. Where they were tested, eight treatments spread over five randomized blocks, namely: Absolute control (T1), NPK (T2), AMF + Peat + KCl (T3), AMF+ Phosphate Rock + KCl (T4), AMF + vermiculite + KCl (T5), AMF + Peat + NPK (T6), AMF + Phosphate Rock + NPK (T7) and AMF + vermiculite + NPK (T8). The fertilization was carried with NPK 00:20:20 and KCl to compare the efficacy of the AMF in the presence and absence of P. The effect of different vehicles was evaluated for aerial parts dry weight and soybeans production. In relation to the dry weight, T6 (39.7g) showed the best average among the treatments, followed by T8 (39.0g), T5 (38.5g), T3 (37.4g), T7 (35.7g), T4 (35.1g). On the other hand, T2 (34.8g) and T1 (31.4g) were those with the worst results. Considering productivity, T5 (4545.5 Kg/ha) showed the highest rates, followed by T3 (4214.5 Kg/ha), T7 (4188.9 Kg/ha), T4 (4142.6 Kg/ha), T2 (4128.4 Kg/ha), while the treatments that had the lowest rates were the T6 (4056.0 Kg/ha), T8 (3874.6 Kg/ha) and T1 (3765.3 Kg/ha). The results suggest stimulus in productivity, once it makes use of AMF based inoculant, pointing vermiculite as best vehicle, and suggests that the fungus responds better when there is not phosphorus fertilization.

Keywords: inoculant, mycorrhizal, vermiculite, soybean.

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