Glomalin-related soil protein after two decades of different tropical soil management

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Glomalin is a glycoprotein released to the soil by arbuscular mycorrhizal fungi. This protein plays a fundamental role in the formation and stability of soil aggregates and is related to reducing soil losses by erosion. This study was carried out in an experimental area of EMBRAPA Milho e Sorgo (Sete Lagoas, MG, Brazil), where three types of soil management for long period (> 20 years) were selected [disc plough (DP), no-tillage (NT), Grid with subsoiler (GS)] besides a natural cerrado (NC) area, used as reference. Soil samples were collected in the surface layer (0.00 to 0.10 m) and were submitted to extraction of two fractions: easily extractable glomalin (EEG) and total glomalin (TG), which are quantified according to colorimetric method using serum albumin bovine as the standard protein. Data of contents of EEG and TG were submitted to ANOVA and mean values of the treatments were first compared using Dunnet test ($p < 0.10$) to verify differences between soil management practices and natural cerrado. After that, Tukey test ($p < 0.10$) was performed aiming comparison between soil management treatments. Results obtained for easily extractable glomalin (NC: 12.8 mg g^{-1}, DP: 14.0 mg g^{-1}, NT: 12.6 mg g^{-1}, GS: 12.2 mg g^{-1}) indicated no means differences between soil management practices and reference (NC). Among soil management treatments, difference were identified just between DP and GS, and values obtained for NT were similar to these both treatments. For total glomalin (NC: 50.2 mg g^{-1}, DP: 32.61 mg g^{-1}, NT: 27.8 mg g^{-1}, GS: 34.55 mg g^{-1}), just PD treatment differed and presented lower mean value than the reference (NC). No differences among soil management practices was verified. Based on these results, two decades of soil management practices do not result in changes in easily extractable glomalin, but present a tendency to reduce total glomalin. Since glomalin-related soil protein is related to physical soil quality, practices should invest in increasing soil organic matter contents aiming to increase the biological activity and glomalin production.

Key-words: Soil quality, Arbuscular mycorrhizal fungi, Soil management.

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