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EVALUATION OF LEAF LITTER DECOMPOSITION IN TEA [*CAMELLIA SINENSIS* (L.) O. KUNTZE] UNDER ORGANIC AND CONVENTIONAL SYSTEMS

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Conventional tea cultivation depends on intensive use of synthetic agrochemicals, which negatively affect soil quality and environments. In contrast, organic systems offer scope to improve these parameters. Thus, it was hypothesized that soil properties of organic tea systems would stimulate litter decomposition. On this basis, the overall objective of this study was to evaluate litter decomposition rate of tea under organic and conventional systems. The study conducted in the long term organic and conventional comparison 'TRI-ORCON' trial of the Tea Research Institute of Sri Lanka (TRI), Talawakelle, planted with tea, cultivar DT1. The experiment consisted of four treatments: three organic manures namely tea waste, neem oil cake compost and conventional inorganic fertilizer recommended by the TRI, arranged in a randomized complete block design. Leaf litter decay rates were measured using the standard litterbag technique, and decomposition rates were estimated by regressing the natural log of the percentage mass remaining against incubation time period. Litter samples were collected in each treatment and incubated in litterbags for 14, 28, 42, 56 and 70 days. Soil properties and the major nutrient dynamics of decomposing tea leaf litter were analyzed. The results provided empirical evidence that organic and conventional systems have a significant effect ($p<0.0001$) on mass loss of decomposing tea leaf litter. The highest decay rate was observed in compost treated plots (0.0058 day $^{-1}$) followed by decay rates in tea waste (0.0052 day $^{-1}$), neem oil cake (0.0039 day $^{-1}$) and conventional (0.0028 day $^{-1}$) plots. The results of soil analysis indicated that the incorporation of organic manures increases soil moisture (26%-28.8% against 25% in conventional), organic C (3.17%-4% against 3.4% in conventional), total N (0.24%-0.32% against 0.25% in conventional) and soil microorganisms, as indicated by soil respiration (1.96-2.11 mg CO_2/day/10g soil against 1.19 mg CO_2/day/10g soil in conventional). The rate of litter decomposition was positively related to soil moisture ($R^2=0.9843$, $p=0.0079$) and microbial populations associated with leaf litter ($R^2=0.9404$, $p=0.0303$). Changes in N, K and C content of decomposing leaf litter were significant in different treatments whereas the changes in P content were not significant. On the basis of these studies it can be stated that organic farming increased leaf litter decomposition in the soil.

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