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ORGANIC MATTER QUALITY AND CARBON MINERALIZATION IN A HUMID TROPICAL ULTISOL UNDER RUBBER

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Soil organic matter quality and carbon mineralization in soils under immature rubber with *Pueraria phaseoloides*, banana, and pineapple and mature rubber were studied in a farmer's field in Kottayam district of Kerala state, India. It was found that water soluble carbon (WSC) and hot water extractable carbon (HWEC) were significantly higher in immature rubber with *Pueraria* and banana than the other two systems. Among the four systems studied, immature rubber with *Pueraria* had significantly higher particulate organic matter carbon (POMC) followed by mature rubber, immature rubber with pineapple and immature rubber with banana. Total carbon also showed significant variation among the systems and it decreased in the order immature rubber with *Pueraria* > immature rubber with banana > mature rubber > immature rubber with pineapple. An incubation experiment was also conducted to study the soil carbon mineralization in these systems. There was significant difference in carbon decomposition rate among the systems studied. The rate of carbon mineralization was in the order, immature rubber with *Pueraria* > immature rubber with banana = immature rubber with pineapple > mature rubber. Carbon mineralization is positively influenced by WSC, HWEC and POMC and these parameters can be used as soil quality indicators in rubber based systems. The study indicated that vegetation and management practices in rubber plantation influenced soil organic matter quality and carbon mineralisation. Among the immature systems studied rubber-*Pueraria* system showed more nutrient supplying potential and mature rubber plantation showed carbon sequestration potential.

Key words: Carbon mineralization, Labile carbon, Rubber based systems, Soil quality

INTRODUCTION

Organic matter is an important component of soil which greatly influences soil quality. It has a key role in determining the soil fertility and plays an important role in the global carbon balance also. The quantity and quality of soil organic matter (SOM) may vary in arable systems depending on the crops and management practices (Wander, 2004). Soil organic matter can be broadly categorized to labile and recalcitrant pools depending on their turnover rates (Six *et al*., 2002). Labile fraction mainly consists of easily oxidizable components such as carbohydrates, sugars, cellulose *etc*. which are palatable to microbes whereas, lignin and tannin type materials falls under the recalcitrant group which are resistant to decay (Heal *et al*., 1997; Ghani

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