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Title of Thesis :Soil CO2 Emission Under Different Tillage Practices in Redloam/Laterite, Clay and Coastal Sandy Soils of Kerala

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ABSTRACT

Abstract

International pressure is increasing on India to adopt a more pro-active role in greenhouse gas emission. Hence it is important to develop a clear understanding of our emission inventory towards reducing CO2 emissions. Soils are an important pool of active carbon and tillage can lead to carbon emission from agricultural soils. This study aims in assessment of quantity of CO2 release from three major soils of Kerala (red loam, coastal sandy and paddy field soil) under different tillage practices (conventional, with cultivator and with rotovator) and to optimize the tillage practices with minimum CO2 emission. The CO2 emission from soil surfaces were measured using base trap method with NaOH as base. The influence soil temperature, soil moisture content, organic matter in soil, soil pH, bulk density, atmospheric temperature and relative humidity on CO2 emission was also assessed. The maximum CO2 emission was observed in the Paddy filed soil followed by red loam and the least value was observed from the coastal sandy. The conventional tillage resulted in the maximum CO2 emission followed by the tillage with cultivator and the least value was observed when tilled with rotovator in all the soil types studied. The major quantity of CO2 was released just after the breakage of soil in all kind of tillage methods and soil types. The release of CO2 from the soil was almost equal to the undisturbed condition after two hours of ploughing. The bulk density of soil was negatively correlated, organic carbon content was positively correlated, soil temperature was positively correlated and atmospheric temperature was positively correlated with CO2 emission from soils in all the tillage practices. No significant correlation was obtained between relative humidity and soil moisture with CO2 emission. It could be concluded that tillage with rotovator in any type of soil contribute the minimum CO2 to atmosphere. This contribute a significant reduction in emission of CO2 when it considered globally. This reduction significantly affect the concentration of CO2, the major greenhouse gas in the atmosphere, ultimately contribute in mitigation of global warming.