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EFFECT OF DIFFERENT MANURE APPLICATIONS AND WETTING-DRYING CYCLES ON CO₂ EMISSIONS FROM SOIL

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Abstract

Organic carbon is transformed into CO₂ by various interventions applied to the soil and diffuse to the atmosphere. The manures which used unconscious under available soil moisture and temperature condition makes the soil microorganism activity increased. This causes CO₂ emission increase as well by oxidation of organic matter. In this study, it was aimed to evaluate different amounts of sheep (20, 40 and 60 t ha⁻¹) and poultry (15, 30 and 45 t ha⁻¹) manure under different wetting-drying cycles (irrigation intervals of 3, 6 and 9-days) in terms of CO₂ emission and to understand the relationship of soil temperature and soil moisture with CO₂ emission. The study was conducted according to arranged in a complete randomized block design with three replications as a pot study in greenhouse conditions. The frequent irrigation and using high amount of manure increased CO₂ emissions. Although the same amount of organic matter was provided to the soil in different amounts of sheep and poultry manures, CO₂ emission was higher in sheep manure. Soil temperature increased by irrigation at infrequent intervals and high amount of manure. Moisture retention in the soil increased by using high amount of manure. The linear relationship of soil temperature (R²=0.922) and soil moisture (R²=0.895) with CO₂ emission was found to be quite significant (P<0.01). As a result of the study, using low amount of poultry manure (15 or 30 t ha⁻¹) instead of sheep manure and irrigation at infrequent intervals (9-days) can be suggested as precautions to decrease CO₂ emissions.

Key words: CO₂, irrigation interval, manure, soil organic matter, wetting-drying cycles

Received: December, 2020; Revised final: February, 2021; Accepted: March, 2021; Published in final edited form: September, 2021

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