短期施用生物炭對坡耕地二氧化碳釋放量之影響

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摘　要　本研究以一坡地砂質壤土為供試土壤，在 20 ton ha-1 及 60 ton ha-1 的牛糞堆肥添加基準下，分別再添加 2% 及 4%之稻殼炭，進行 25℃的室溫孵育試驗，孵育期間分別於 3、7、21 及 28 天測定土壤 CO2 累積釋放量之變化。目的主要為探討生物炭以及與堆肥合併施入土壤後對碳礦化作用的影響。實驗結果顯示，所有處理在孵育 3–7 天後，CO2 累積釋放量便維持趨於穩定。於 28 天後，僅生物炭處理下，2%添加量的 CO2 釋放量約為 204 mg CO2-C kg-1，而 4%處理下之 CO2 釋放量為 228 mg CO2-C kg-1，皆顯著高於對照組。當生物炭與堆肥共同施用後，不同比例的生物炭施用並無明顯影響 CO2 累積釋放量。然而，比較相同生物炭施用率之處理，60 ton ha-1 堆肥處理的 CO2 累積釋放量顯著高於 20 ton ha-1 堆肥處理。將各處理換算成施用碳分解率(Applied C mineralized, ACM)後顯示，稻殼炭添加可明顯減緩土壤中堆肥之礦化速率，意喻可減少每年堆肥施用次數。

關鍵詞：生物炭、堆肥、碳礦化、CO2 釋放。

Effects of Short-term Application of Biochar on CO2 Emission in A Rural Soil at Slopelands

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ABSTRACT This study aims to evaluate CO2 emission in the sandy soil incorporated by rice husk biochar (RHB) and cow manure compost (CMC) at a slopeland. The application rates of RHB are 2% and 4% (w/w), and CMC are 1% and 3% (w/w). The CO2 emission was estimated at 3, 7, 21, and 28 d. The results indicated that addition of RHB and CMC could increase CO2 emission amounts in the soil at beginning of incubation due to priming effect. Among treatments of co-applying of RHB and CMC, the accumulated CO2 emission amounts could not significantly be affected by increasing application rates of RHB. However, the accumulated CO2 emission amounts were obviously increased with increasing of CMC application rates. Regarding ratio of applied C mineralized (ACM), the results showed that the presence of RHB in the CMC-amended soil could prevent CMC from decomposition by microbes, and therefore could reduce application frequency of compost in field.

Key Words : Biochar, compost, C mineralization, CO2 emission.

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