

BIOCHAR APPLICATION IN MANURE MANAGEMENT: ENVIRONMENTAL IMPACTS, GAS EMISSIONS, AND NUTRIENT RETENTION

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ABSTRACT

Manure management in intensive livestock production represents a major environmental challenge due to gas emissions, nutrient losses, and potential air and water pollution. Biochar is a carbon-rich material produced through biomass pyrolysis under limited oxygen conditions. It is used as an amendment in manure management systems due to its porous structure and ability to adsorb ammonia and other compounds present in manure. This paper reviews the available scientific literature on biochar application in manure management, with the aim of summarizing its effects on environmental impact, gas emissions, and nutrient retention. The literature most commonly indicates that biochar application may reduce ammonia and greenhouse gas emissions and improve nutrient retention in manure. However, these effects are not consistent and depend on biochar physicochemical properties, manure type, and application conditions. The reviewed findings highlight biochar as a potentially useful amendment that can contribute to reducing environmental burdens and improving the sustainability of manure management systems.

Keywords: biochar, manure, gas emissions, environmental impact, nutrient retention, sustainability.