UNIVERSIDAD DE LA FRONTERA

Facultad de Ingeniería y Ciencias

Doctorado en Ciencias de Recursos Naturales

Impact of poultry manure application, alone or combined with phosphate rock on biogeochemical cycling of C and P in grassland soils.

DOCTORAL THESIS IN FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE DOCTOR OF SCIENCES IN NATURAL RESOURCES

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“Impact of poultry manure application, alone or combined with phosphate rock, on ryegrass biogeochemical cycling of C and P in grassland soils”

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Thesis summary

"This thesis addresses the need to improve the sustainability of agricultural production in the context of climate change. It highlights the importance of reducing the use of limited resources and employing negative emission technologies. Phosphorus (P), essential in fertilization, is obtained mainly from phosphate rock (PR) mining, the cost of which has increased over time. Given the limitation of PR in some countries, strategies are sought to reduce its use without affecting agricultural productivity.research focuses on pastures and their fertilization with P. Poultry manure (PM) emerges as a promising option to improve the release and utilization of P compared to PR. The long-term impact of PM on carbon (C) accumulation and soil P forms is evaluated, and how the combination of PM and RP affects P availability and plant production in the short term is investigated. Furthermore, it explores how PM, rich in organic C, could influence soil organic matter accumulation and discusses the relevance of these findings for improving agricultural practice.In summary, this thesis seeks to optimize rangeland fertilization by considering alternatives to RP use and better understanding its impact on soil sustainability and agricultural production in the context of climate change."