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Emission-controlled intensive livestock housing systems for ecological transition: innovative measuring, mitigating and mapping strategies (EMILI)

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Abstract

Within the National Recovery and Resilience Plan (PNRR) framework and the European Green Deal, the agricultural sector is expected to reduce its environmental impact thus achieving an actual ecological transition. Agriculture is responsible for 10.3% of the EU's GHG emissions and about 94% of NH_3 emissions. Livestock housing contributes substantially to N losses by reaching even 20% of total N losses. An adequate manure management system in housing can potentially mitigate methane (CH_4) and ammonia (NH_3). However, the effects on nitrous oxide (N_2O) and the relation between NH_3 and particulate matter (PM) from livestock housing systems still need further investigation.

Scientific debate is devoted to define a standard protocol to quantify emissions produced by livestock farming, but the complexity of the phenomenon due to large number of variables, poses a big challenge. The project EMILI aims to improve knowledge about innovative strategies to reduce the impacts of emissions from livestock housing systems, specifically piggeries and dairy cattle barns, and their effects on the environment at the landscape level in the Mediterranean area. The objectives of the project are to identify the proper measurement methods that allow the emissions monitoring related to NH_3, GHG and PM; to estimate the emission factors at the housing level with innovative mitigation strategies. The estimation will be done according to the more recent and cost-effective techniques for emission detections, including self-engineered units equipped with the latest miniature sensors for ground and drone-based measurements; to validate the use of innovative devices for concentrations monitoring; to suggest and validate possible mitigations strategies; to provide a predictive model which can be used as a tool by farmers and institutions to get environmental sustainability of the livestock breeding sector; to assess impact of housing systems at the landscape level.