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REDUCE EMISSION BY APPLYING PIT EXHAUST IN NATURALLY VENTILATED LIVESTOCK PRODUCTION BUILDINGS - FEASIBILITY STUDIES BASED ON A WIND TUNNEL INVESTIGATIONS

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ABSTRACT To reduce ammonia and greenhouse gas emission from a naturally ventilated livestock production building, several approaches have been reported and are under investigations. One of the possible approaches to reduce the emission from such a building might be that of using a pit exhaust in the system to remove the most pollutant air and to treat this part of air by an air purification unit. In order to study the feasibility of such an approach, a 1.2 scale model of manure pit section of a cattle building was built. The model was built with slatted floor and a pit head space of 0.4 meter high. The top of the slatted floor was place as the same level as the surface of the wind table in the wind tunnel. Investigations were performed under varied airflow velocities (speeds and directions) above the floor level, slatted floor opening ratios, and exhaust ventilation rates. The results showed that a proper design of a pit exhaust with about 10% of ventilation capacity may ensure air near to the slatted floor moving downward and pollutant air will exhaust via pit ventilation channel and treated by an air purification unit. The removing efficiency is increased by reducing the opening ratio of slatted floor. Based on the experiences from a pig production room with pit ventilation it is estimated that a reduction of 70-80% ammonia by such a system is feasible.

Keywords: pit ventilation, nature ventilation, ammonia and green house gas emission, cattle buildings.