

## **Hydrogen Sulphide Emissions from Grower Pig Excreta Produced by a Belt Conveyor System**

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Hydrogen sulphide ( $H_2S$ ) gas remains an occupational health and safety issue in Canada because exposure to this toxic gas can represent a threat to both human and animal health. A new housing concept featuring a belt conveyor (BC) system to separate feces from the urine at the pen level has been successfully developed at IRDA. The pen concept utilizes an inclined BC as the pen dunging area. The feces are removed by a wiper at the top of the belt incline whereas the urine drains to the bottom of the incline. A brush dipped in a water bath is located beneath the belt to periodically clean the belt. The objective of the study was to measure the effectiveness of the BC at reducing continuous  $H_2S$  emissions from excreta compared to conventional liquid manure and to evaluate  $H_2S$  emissions during manure agitation. Two-wk excreta collections from the Control (manure) and BC (solids, urine, washwater) treatment were placed in ventilated (0.19 L/s), 1.0 m x 1.0 m x 1.0 m stainless steel boxes, each located in an environmentally controlled chamber over a 4-wk period (three replicates). Levels of  $H_2S$  and ammonia ( $NH_3$ ) and ambient and floor surface temperatures of each collection box were measured over a 4-wk period. Each excreta sample was analyzed for sulphur content at the start and end of the sampling period. In a parallel experiment, the collected excreta samples were agitated and the resulting  $H_2S$  levels in the sample container headspace were monitored.  $H_2S$  and  $NH_3$  emission rates ( $\mu\text{g}/\text{d}/\text{kg}$ ) were calculated for each type of excreta. The performance of the pigs in the Control and the BC treatment were reported. The total mass of the manure, solids, urine and washwater were recorded along with the amount of drinking water disappearance and washwater usage. This paper will present the impact of both housing systems on  $H_2S$  and  $NH_3$  emission rates and how it could influence livestock housing design.