

CHEMICAL ODORANTS MEASURED DOWNWIND FROM PIG PRODUCTION FACILITIES

*M.J. Hansen^{*1}; P.L. Kasper²; P. Brandt³; M. Holm³.*

Affiliations: ¹Aarhus University, Department of Biological and Chemical Engineering, Gustav Wieds Vej 10, 8000, Aarhus. ²Danish Technological Institute, Agro Food Park 15, 8200, Aarhus N. ³SEGES Innovation P/S, Agro Food Park 15, 8200 Aarhus N.

Corresponding author *

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Abstract: Odor from livestock production in Denmark is regulated based on odor measurements that were performed nearly 20 years ago [1]. During the last decades there has been a development of methods for measuring volatile compounds in air and the methods available today are both specific and sensitive towards chemical odorants found in livestock facilities. There has been extensive research in relation to characterization of the odorants that are found in the outlet air from especially pig production [2-4]. However, there is only a limited understanding of how chemical odorants are affected by factors such as chemical reactions, deposition, photooxidation, dilution etc., as they leave the outlet from the livestock facilities. Some studies have shown that it is only a limited number of the odorants found in the outlet air, that can be detected downwind [5, 6]. Knowledge about which odorants that reach the surroundings in concentrations above or close to the odor threshold values is of great interest, as they are assumed to be positively correlated with the nuisance experienced by neighbors. In the present study, odorants from a pig production facility are measured simultaneously in the outlet air and downwind using proton-transfer-reaction mass spectrometry (PTR-MS). The measurements will take place during the summer of 2024 and the first preliminary results will be presented. The odorants measured downwind from the facility will be compared to dispersion models using the outlet concentrations of odorants. Furthermore, the setback distance based on the odor threshold values of detected odorants downwind will be compared to the present regulation based on odor emission.

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References: [1] Proceedings of Workshop on Agricultural Air Quality: State of the Science (1039-1043); [2] Environmental Science & Technology (47, 5894-5900); [3] Atmospheric Environment (135, 50-58); [4] Agriculture, Ecosystems & Environment (218, 209-219); [5] Journal of Environmental Management (233, 12-23); [6] Journal of Agricultural and Food Chemistry (53, 8663-8672).