

9th IWA Odour & VOC/Air Emission Conference 26-27 October 2021 Bilbao, Spain

ABSTRACT

ODOUR CONCENTRATION OF VARIOUS EMITTING AREA SOURCES FROM CATTLE FARMS

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Cattle farms comprise various spatially extended odour-emitting areas representing ground-level, diffuse odour sources. These include loose housing systems with outdoor exercise areas, the supplied diet, and storage areas for silage, slurry, and solid manure. The aim of this study was to identify relevant odour sources on farms and to compare the odour concentrations of individual sources while taking into account descriptive parameters. Odour investigations at the individual source are relevant for developing odour reduction measures at the source.

Therefore, a detailed data collection was performed with on-farm sampling and subsequent olfactometry in the laboratory. Samples from each source type were collected on at least three farms and with at least four samples per type. At these area sources, ventilated sampling hoods were set up on the areas, and air samples were collected over a 30-min period in Nalophan® sampling bags with a bag-in-bag system. Odour concentration was assessed on the same day with four assessors using the TO8 olfactometer with the 'yes/no' method. Additionally, descriptive farm-specific parameters were recorded such as temperature (air and bedding), degree of soiling, and dry matter content of bedding.

Compared with hay (mean: 530 OU m⁻³) and sugar beet pulp (730 OU m⁻³), higher odour concentrations resulted from the cut surface of grass (3990 OU m⁻³) and maize silage (1690 OU m⁻³) in the stores and from the mixed ration with maize and grass silage (2950 OU m⁻³) during feed provision. Samples from the floors in the cattle housings (feeding aisle, cubicle access area, outdoor exercise area) showed higher odour concentrations (1300 OU m⁻³), whereas littered areas such as cubicles, deep litter, or bedded sloped floor produced lower odour concentrations (<500 OU m⁻³). The variation of odour concentration within the individual types was particularly large for grass silage, maize-and-grass-silage mixed ration, and the solid-floor surfaces. The storages of cattle slurry (6570 OU m⁻³) and solid manure (1850 OU m⁻³) also produced high odour concentrations. In case of solid cattle manure, increased substrate temperatures were associated with higher odour concentrations. On four farms, the odour-reducing effect of the natural crust on the slurry stores was evident in comparison with slurry stores after crust removal.

These results improve the understanding of odour-emitting areas according to size, type, and farm management. Additionally, the findings of the large variation within individual odour sources offer starting points for mitigation.

Indicate preference of kind of presentation

- Oral Communication
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Indicate topic of your work for the conference:

- Policy and associated regulations for odour and air quality.
- Odour/VOC measurement, monitoring&sensor technologies.
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- Odour/VOC from waste water, sewer systems and livestock.
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