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Survey Of Air Scrubber Performance At Pig Farms In Practice: Odour And Ammonia Removal Still A Challenge

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In countries such as the Netherlands, Germany, Denmark, and Belgium, air scrubber technology is used at large scale to reduce emissions of ammonia, odour, and particulate matter. The main types are single-stage acid scrubbers, biotrickling filters, and multi-stage scrubbers (or combi-scrubbers) that combine a water spray section with either an acid or, in most cases, a biotrickling step. A survey was carried out in the Netherlands with the objective to evaluate odour and ammonia removal performance level of scrubbers in practice. In total 48 farm locations were visited, without prior notice. Odour removal (30 min. sampling, olfactometric) and ammonia removal (gas detection tubes) and pH and electrical conductivity (EC) levels of the washing water were determined. The results show that odour an ammonia removal for acid scrubbers (n=16) and biotrickling filters (n=3) were close to assigned removal values in regulations. For combi-scrubbers (n=29), however, an average reduction was found of 40% for odour and 59% for ammonia, whereas assigned regulatory levels amounted 70-85% for odour removal and 85% for ammonia removal. The low odour removal of combi-scrubbers might partly be caused by systematic differences between the odour laboratories in this survey and laboratories that were involved in tests on which the assigned removal capacities were based. Earlier research demonstrated strong differences in removal capacity between laboratories evaluating the same air scrubbers, despite all of them using EN13725. Another factor could be better operation conditions of air scrubbers during test programs (which regulatory levels are based on) than during normal farm practice. For ammonia, low removal efficiencies are expected to be caused by operational parameters, although pH and EC levels were mostly within normal range. It is concluded that the performance level of combi-scrubbers in practice are not meeting expectations, and that test procedures with regards to odour removal need improvement.

Keywords:
air scrubber, multi-stage scrubbers, pig, odour, ammonia