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PRRS is one of the most important diseases in Danish swine. Approximately 40 % of Danish herds are positive for PRRSV type 1 or/and type 2. Air borne transmission via aerosols has previously been described for PRRS type 2 viruses in the US, but there have been no reports of aerosol transmission of PRRSV under field conditions in Europe. Information on aerosol transmission is important for the control of the disease and methods to detect PRRSV in the air could be an effective tool in control and eradication programs. The aim of the study was to validate methods to be used for sampling, storage and analysis of air samples for PRRSV.

The stability of PRRSV stored under a range of practical feasible conditions were first tested and revealed that the samples were stable for at least 10 days at 4°C. A validation of viral precipitation of liquid air samples under different conditions established the optimal concentration of the Polyethylene Glycol 8000 (PEG8000) used for precipitation and the optimal incubation- and centrifugation time. Finally, the ability of the cyclone to collect aerosolized PRRSV were confirmed in the laboratory using artificial aerosols containing different amounts of PRRSV confirming a decrease in Ct-values for PRRSV after precipitation when tested by real time RT-PCR.

The liquid cyclonic collector was placed inside a PRRSV-positive wean-to-finisher herd following mass vaccination of all pigs. Air was collected in the cyclone for 30 minutes in the middle of each of three rooms and blood samples were collected from selected animals.
PRRSV was detected by real time RT-PCR in the majority of samples and no significantly difference was found between the detection of PRRSV in air and blood samples in a given room, indicating that the cyclone was an effective tool for detection of PRRSV within a section.

In addition, the cyclonic collector was placed approximately 30 meters downwind from 4 PRRSV-positive swine herds. Air was sampled in the cyclone for 30 minutes. The samples were subsequently tested for PRRSV by real-time RT-PCR.
In total, 4 out of 20 samples were PRRSV-positive and all were PRRSV type 1. From herds 1, 2 and 3, 2/4, 1/4 and 1/6 of the samples were positive, respectively. All air samples collected from herd 4 were PRRSV negative. The four positive air samples had a Ct-value of 35.01-38.8 indicating, that the levels of virus were relatively low in all samples.

In conclusion, to our knowledge, this is the first report on detection of PRRSV genotype 1 in air samples collected outside PRRSV-positive swine herds in Europe. Furthermore, test of air samples collected inside herds were as sensitive as blood samples for detection of PRRSV providing an alternative methods for the monitoring of PRRSV status of herds/sections.