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Supplement of

Photoacoustic measurement with infrared band-pass filters significantly overestimates NH_3 emissions from cattle houses due to volatile organic compound (VOC) interferences

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Table S1. Filter specifications for the Innova 1312.

Optical filter number	Target gas	Filter center		Band width (%)	Filter bandpass (cm ⁻¹)
		(μm)	(cm ⁻¹)		
UA0982	CO ₂	14.1	710	7.5	657-763
UA0985	N ₂ O	4.5	2215	2.0	2171-2259
UA0936	NH ₃	9.8	1020	6.5	954-1086
UA0972	SF ₆	8.8	1139	6.0	1071-1207
UA0969	CH ₄	8.0	1254	5.5	1185-1323

Table S2. The percentage for each range of ratio of PAS/PTR-MS concentrations for the data from

Figure 5A and 5C in the field study.

ratio of PAS/PTR-MS	<1	1-2	2-3	3-4	4-5	5-6	6-8	8-10	10-11
% for Fig.5A	0.6	45.0	44.7	6.1	2.9	0.7	(-)	(-)	(-)
% for Fig.5C	2.0	29.9	36.5	14.5	7.7	3.6	3.8	1.5	0.5

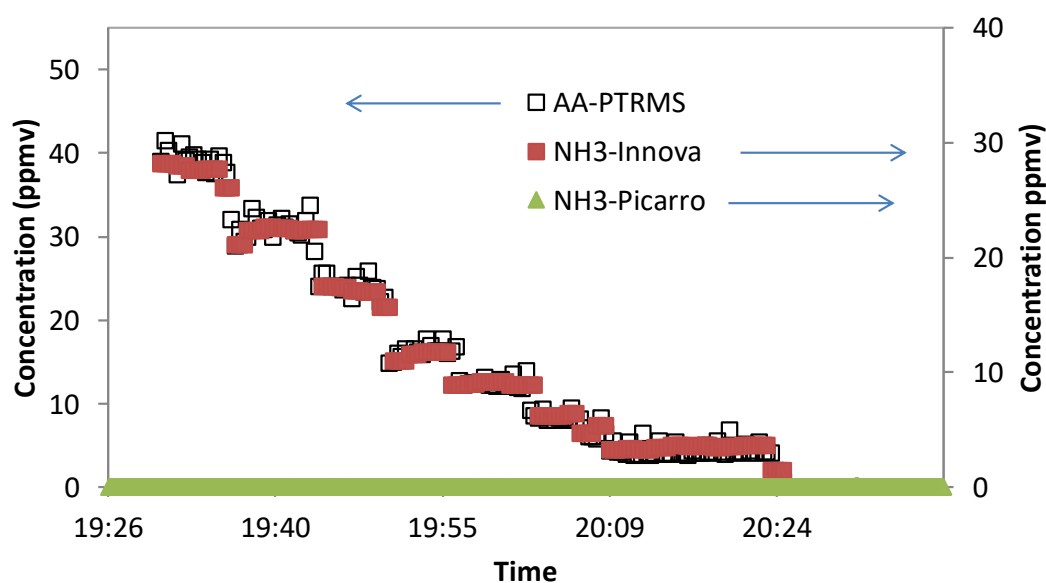


Figure S1 An example of the interferences calibration for acetic acid measured simultaneously by the PTR-MS, PAS and CRDS. AA-PTR-MS: acetic acid concentration measured by the PTR-MS; NH3-Innova: the false ammonia concentration caused by the acetic acid when measured by the Innova 1412; NH3-Picarro: the ammonia concentration measured by CRDS.

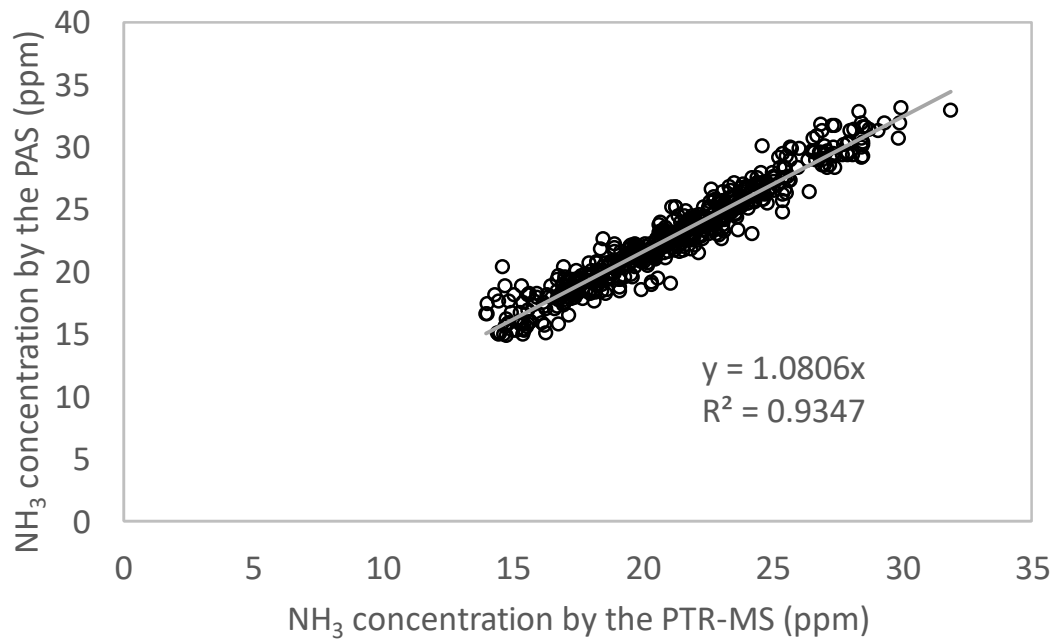


Figure S2 Comparison of measured ammonia concentration by the Innova (PAS) and by the PTR-MS in a hybrid ventilated full-scale dairy barn during summer period. The data were obtained from the ventilation air dragged from the headspace above the manure channel.

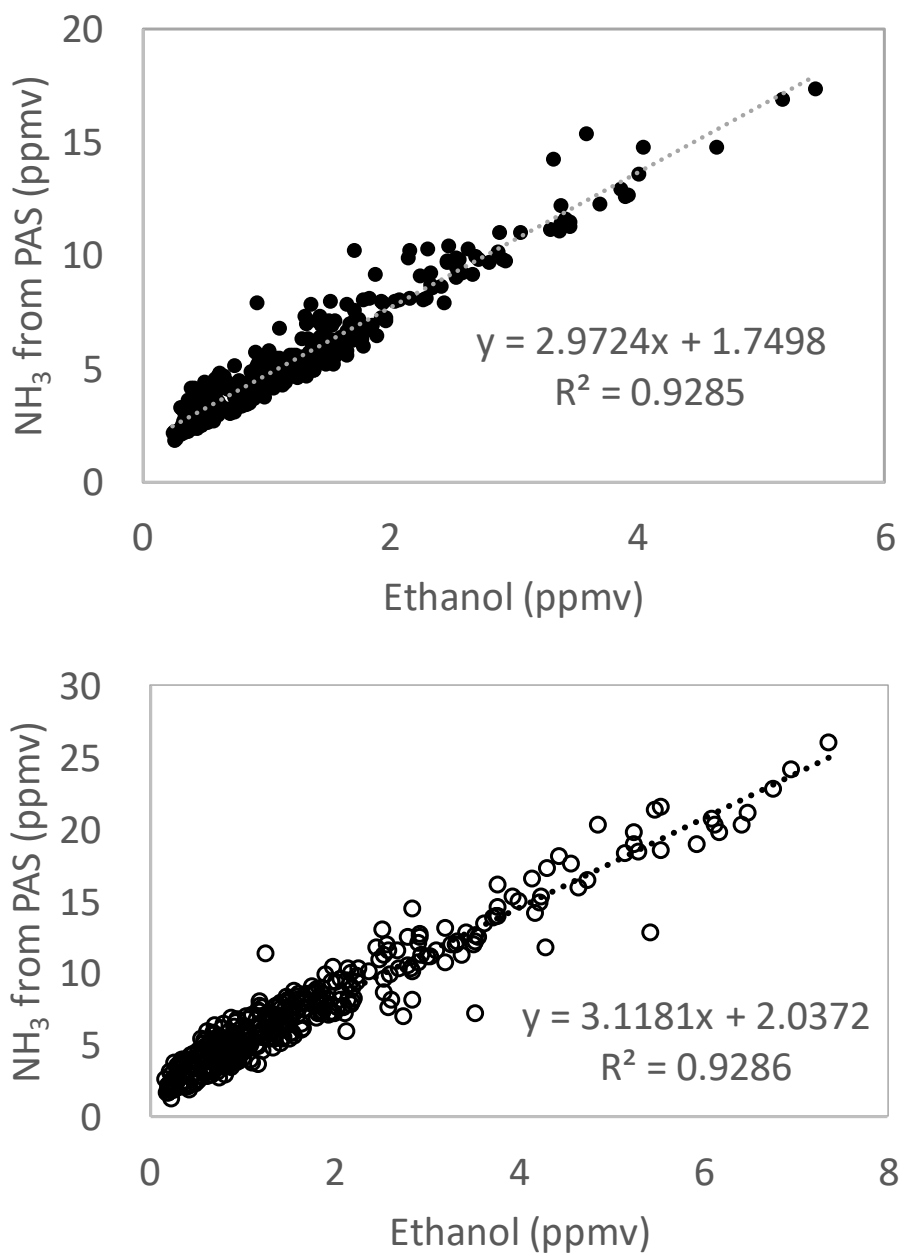


Figure S3 Ammonia concentration measured by the PAS and the ethanol concentration measured by the PTR-MS during the same period, in the measurement campaign inside the cattle barn (Location One and Location Two for the up and down panel, respectively) during winter time. The slope of 2.97 and 3.12 is generally close to the correction factor of 2.81 found in our calibration experiment for ammonia false signal by ethanol, shown in Table 1.

