

Greenhouse gases measurement in sheep using Portable Accumulation Chambers (PACs)

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Abstract focused on practical and relevant aspects of measuring greenhouse gases emissions from sheep, based on short-term measurements using portable static accumulation chambers with an internal volume of 870 L (Goopy et al., 2011; Hegarty., 2013). This method allows measuring (and ranking) large groups of animals in a fast and inexpensive way. After weaning, animals are placed two to three times (one week between rounds) in sealed chambers for 40-50 minutes, after three weeks of constant feeding in terms of quantity and type of feed. On the measurement day with the animal placed into the chamber, CH₄, CO₂, and O₂ are recorded using a portable multi-gas detector (in parallel with a background estimation) every ten or twenty minutes. Air temperature and pressure are also registered for the calculation of methane emission at standardized conditions. Multi-gas detector calibration, bump tests and chambers leak tests are performed routinely. Sealing of the chamber is mandatory to guarantee isolation, which is highly recommended. Transparent chambers are used to reduce stress, accounting for animal welfare. Records of bodyweight are necessary to estimate actual gas volume in the chamber and to estimate methane intensity. Also, dry matter intake on the measurement day and previous days are required to assess methane yield.



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Goopy, J. P., Woodgate, R., Donaldson, A., Robinson, D. L., & Hegarty, R. S. (2011). Validation of a short-term methane measurement using portable static chambers to estimate daily methane production in sheep. *Animal Feed Science and Technology*, 166, 219-226.

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