

## ORAL

### Technical Session 2

#### **Validation related to the Use and Usability of Data**

### **A new ICAR test facility to validate sniffer devices that measure methane output of dairy cows**

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Governments worldwide have committed to decrease greenhouse gas (GHG) emissions by 2050. Animal breeding is identified as an important mitigation tool to reduce the environmental footprint of livestock because it is cost-effective, permanent and cumulative over generations. The impact of animal breeding, however, depends highly on the scale of GHG recording. Sniffers are widely recognized instruments for large-scale measurements of methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>) concentrations in the cow's breath. Even though sniffers are widely used nowadays, there is a lack of (1) comparability between sniffers of different manufacturers, and (2) protocols, the methods to calibrate and utilize the equipment at farm level to increase the repeatability. Therefore, in September 2025, a test facility at the Dairy Campus (Leeuwarden, the Netherlands) was established to evaluate the performance of four different sniffer devices. This is a part of the Global Methane Genetics initiative, which supports international harmonization and standardization of CH<sub>4</sub> recording.

A measuring tube was installed in the feed bin of the milking robot, and all four sniffers were connected to this measuring tube, ensuring all four sniffers measure the same air sample at the same time. Sixty cows visit this milking robot several times during the day. Once per month, a reference method is performed where the same air that is analyzed by each sniffer is also sampled in a 10 liter Nalophan sampling bag inserted in a closed vessel. These bags with air are then analyzed in the laboratory with a gas chromatograph (GC). The average CH<sub>4</sub> and CO<sub>2</sub> concentrations recorded by each sniffer are compared to the CH<sub>4</sub> and CO<sub>2</sub> concentrations from the GC, sampled in the same timeframe. A GreenFeed (c-lock inc.) is installed near the milking robot, and the cows can visit it freely, providing CH<sub>4</sub> production measures of the same cows on the same day. In total, the sniffers will be tested for one year, with monthly references. Spearman rank correlations are calculated to compare the ranking of cows for CH<sub>4</sub> with all four devices. The correlations are high (0.92-0.98) among the sniffers themselves and are ~0.33 with the GreenFeed for all sniffers. The International Committee of Animal Recording (ICAR, Utrecht, the Netherlands) has made this an official service for sniffer manufacturers as of January 2026.