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The advantages of sulfur hexafluoride and GreenFeed techniques for measuring methane emissions in cattle in tropical grazing systems

Dear Editor:

This letter, drafted by a research group, emphasizes the importance of accurate methane emission measurements for the Mexican cattle sector. It discusses specific details of the SF₆ (sulfur hexafluoride) and GreenFeed techniques, which are widely used for determining methane emissions from ruminants. The content of this letter was inspired by an international workshop entitled "Greenhouse gases in grazing cattle in the tropics: SF₆ and static chambers", held at the Centro de Enseñanza, Investigación y Extensión en Ganadería Tropical (CEIEGT) of the Universidad Nacional Autónoma de México from June 26th to 28th, 2024. This workshop facilitated the exchange of technical and scientific experiences on the use of the SF₆ technique, as well as the establishment of technical and infrastructure support networks for attendees.

Measuring methane emissions from ruminants involves various methods that enable researchers to quantify and understand the sources and amounts of methane produced. Although several methods have been employed for this purpose, the most commonly used are respiration chambers, open-circuit respirometry, stable isotope techniques, remote sensing techniques, and the SF₆ technique.

The SF₆ technique is a valuable tool for accurately measuring methane emissions from ruminant livestock and has significantly contributed to research efforts aimed at mitigating greenhouse gas emissions from agricultural sources. However, the GreenFeed technique is also a promising alternative. This technique is designed to assess methane emissions and heat production from ruminants and other animal species.

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The GreenFeed technique consists of a feeding station equipped with sensors that continuously monitor gases emitted by cattle during feeding⁽¹⁾ that measures gases in the breath of the animal, particularly focusing on methane (CH₄). It does not require animals to be confined or disturbed during measurement, making it less stressful and more animal-friendly than other methods.⁽²⁾ This technique allows for continuous real-time measurement of methane emissions, capturing variations throughout the day and in response to different feeds or environmental conditions. GreenFeed also provides accurate measurements of methane emissions from individual animals, facilitating research on factors influencing methane production. As a result, it is extensively used to study methane emissions from cattle, sheep, and goats under various dietary regimes, management practices, and breeding strategies.

Future studies focusing on methane emissions may benefit from the use of the GreenFeed technique, as it is a non-invasive tool capable of recording data continuously. Overall, in the grazing systems of the Mexican tropics, both the SF6 and GreenFeed techniques can produce high-quality methane emissions data. Both approaches⁽³⁾ are suitable for precision livestock farming, aiding in the adaptation and reduction of greenhouse gas emissions from cattle production systems.

Conflicts of interest

The authors have no conflicts of interest to declare.

Author contributions

Conceptualization: E Vargas-Bello-Pérez, I. García-Galicia, J. Ku-Vera.

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