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Abstract Submission Form

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Preferred presentation Poster

Preferred session Session 8: Global challenges in measuring methane in ruminants

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Title of your paper Estimation of enteric methane emission of three dairy breeds in Italy by a Tier 2 approach

Insert ABSTRACT text

Methane (CH4) is a greenhouse gas that persists in the atmosphere for roughly 9 to 15 years. It is more than 20 times more effective than carbon dioxide (CO2) in trapping heat over a 100-year period. Dairy and beef cattle are significant contributors to the overall methane emissions (mainly enteric methane) from livestock farming. As a result, there is a growing interest in researching ways to decrease enteric methane emissions from ruminants, and the EU is generally committed to promoting the implementation of mitigation strategies at farm level.
Feeding and nutritional strategies play a key role in reducing enteric methane emission by manipulating ruminal fermentation and directly inhibiting methanogens, or by redirecting hydrogen ions away from methanogens.
Current scientific research has identified further novel CH4 mitigation options including the addition of probiotics, organic acids, plant extracts (e.g., essential oils) or inhibitors (3-NOP) to the diet. Furthermore, advancements in genetic and genomic selection of cows offer promising avenues.

Regardless of the chosen mitigation strategy, a robust assessment of enteric methane emissions at the farm level serves as the foundational step in evaluating its effectiveness. Utilization of Tier 2 data, where available, holds potential for enhancing these assessments.
Towards this goal, we compile a dataset merging DHI data and milk measurements at individual and farm levels with primary data on diet collected from 138 dairy farms rearing Holstein Friesian, Swiss Brown and the double purpose Italian Red Pied. The dataset included a total of 8,173 lactating cows, 7,164 heifers and 1172 dry cows. Longitudinal DHI data include animal identification, milk yield, fat and protein milk content, reproductive performances as well as herd composition and culling rate. Primary data on diet include the composition and quantity of feed administered to each animal category. The average herd size and the daily milk yield per cow were 140 and 32.2kgd1 for Holstein, 118 and 27.5 kgd1for Brown Swiss and 66 and 24.7 kgd-1 for Italian Red Pied. The feeding composition recorded included majorly corn silage, meadow hay, corn flour, concentrate and alfalfa hay.
To quantify Entheric methane emission we use the predictive equation proposed by IPCC 2019 refined by the exact Ym factor according with the diet digestibility and NDF content calculated from the primary data collected in farm.
The average farm Methane Emission Intensity expressed as gr CH4/kg FPCM were 22.14 std 8.72 for Brown Swiss, 21.29 std 6.23 for Italian Holstein and 32.68 std 11.14 for Red Pied. Conversely, the average methane emission expressed in kg CH4 Livestock unit-1/year were 118.84 std 8.60 for Brown Swiss, 132.20 std 14.97 for Red Pie and 143.62 std 20.77 for Italian Holstein. The findings provide a strong foundation for estimating nationwide enteric methane emissions from the dairy sector and assessing the efficacy of potential mitigation strategies implemented at the farm level.

Enter keywords Enteric methane emission, dairy cattle, mitigation