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## Forage shortage affects performances, CH<sub>4</sub> emissions and cheese quality in grass- or corn-fed cows

Matthieu Bouchon, Isabelle Verdier-Metz, Maguy Eugène, C Bord, Bruno Martin, Juliette Bloor, Marie-Caroline Michalski, Benoit Graulet, Céline Delbès

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Matthieu Bouchon, Isabelle Verdier-Metz, Maguy Eugène, C Bord, Bruno Martin, et al.. Forage shortage affects performances, CH<sub>4</sub> emissions and cheese quality in grass- or corn-fed cows. 74th Joint International Congress on Animal Science: Climate change, biodiversity and global sustainability of animal production, L'événement est organisé par INRAE et l'Association française de zootechnie (AFZ), au nom de la Fédération européenne de zootechnie (EAAP), de l'Association mondiale de zootechnie (WAAP) et par France Génétique Élevage au nom d'Interbull., Aug 2023, Lyon, France. hal-04229892

**HAL Id: hal-04229892**

**<https://hal.inrae.fr/hal-04229892>**

Submitted on 5 Oct 2023

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Abstract no.: 42767

Abstract title: Forage shortage affects performances, CH<sub>4</sub> emissions and cheese quality in grass- or corn-fed cows

Author: Bouchon, M., Verdier-Metz, I., Eugene, M., Bord, C., Martin, B., Bloor, J., Michalski, M.C., Graulet, B., Delbès, C.

Preferred presentation: Theatre

Preferred session: 48: Grassland management and grassland-based feeding systems for efficient and sustainable milk and meat production

Abstract text:

Grass-based dairy systems are considered to contribute to the agroecological transition and resilience of farming compared with more intensive corn silage-based systems, but the impacts of drought-induced forage shortages on services provided by these different systems are unclear. This study aims at evaluating the impact of a reduction of grass availability of -25% of the total intake during two months, as might be expected in case of a summer drought, for groups of cows fed either a pasture-based diet (AE) or a corn silage-based diet (IN). In each group, only half of the cows were subjected to the reduction in grass allowance (75 to 50% in AE, replaced by a hay-based diet; 25 to 0% in IN, replaced by corn-silage based TMR). Milk yield (MY) was higher for IN cows but the reduction in grass allowance did not affect MY nor milk fat content. MY decreased more over time for AE cows, in line with seasonal decreases in grass nutritional value. Milk protein content was the highest for IN cows with no more access to pasture. Dry matter intake was higher for IN cows and increased by the reduction in grass allowance. Raw CH<sub>4</sub> emissions were estimated using INRAE 2018 equations and were higher for IN cows, particularly for those with no grass in the diet. However, CH<sub>4</sub> emissions calculated on a MY basis were similar for all cows but expressed on a DMI basis, they were lower for IN groups and decreased in response to forage shortage for both AE and IN cows. Cheeses made with raw milk from AE groups were more yellow and softer while cheeses from IN groups had a lesser intense global odour. Within each group, cheeses were less yellow and firmer for cows subjected to a forage shortage. This study suggests that reducing access to pasture in a grazing system has less effect than removing pasture in a corn-silage based system on the services provided by the farming system.