Rumen-protected methionine and lysine improved performance and environmental impact when lowering dietary protein content on dairy farms

Speaker:
Davide Militello (MSc Student, University of Turin)

Moderators:
Robert Bennett (Ruminant Category Manager, EMEA, Adisseo,
Dr Lahlou Bahloul (Global Ruminant Support, Rumen-Protected Nutrients, Adisseo)

Poster and abstract presented at 2022 ADSA meeting, Kansas City, USA

Reference: Militello, D., Lemosquet S., Mathieu Y., Bahloul L., Andrieu D., Rolland M., Rouverand S., Trou G. 2022. Rumen-protected methionine and lysine supplementation improved performances and environmental impact of nitrogen when lowering dietary protein content in dairy farms. J. Dairy Sci. 105 (Suppl. 1): 333.

Introduction

- Methionine (Met) and lysine (Lys) have been identified as first limiting amino acids (EAA) for dairy cattle performance.[1]
- Ruminants use on average 25%[2] (up to 45%)[3] of their dietary nitrogen transformed into animal product while the remaining part is excreted into the environment through feces and urine.
- One of the current challenges is to reduce the negative impact of nitrogen losses on the environment by optimizing better nitrogen (N) use efficiency (NUE).

References:
1. National Research Council. (2001). *Nutrient requirements of dairy cattle: 2001*. National Academies Press.
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3. Oenema, O., Bannink, A., Sommer, S. G., Van Groenigen, J. W., & Velthof, G. L. (2008). Gaseous nitrogen emissions from livestock farming systems. In *Nitrogen in the Environment* (pp. 395-441). Academic Press.

Objective

Investigate how less N load and AA balancing could improve dairy farm sustainability.

Table 1. *Experimental protocol*

Period T	Period E	Period T'
Control diet T Partial mixed corn silage diet with different proportion (12 ± 2.8%) of grass silage	**Experimental diet E** -0.6 kg/cow/d soybean meal +0.6 kg energetic concentrate +0.2 kg amino acid mixture (35 g Lys as AjiPro®-L = 8.75 g LysDI +20 g Met as Smartamine® M = 12 g of MetDI)	**Control diet T'** Return to the control diet T
1 month	2 months	1 month
2 dairy milk controls n° 1 and 2	3 dairy milk controls n° 3, 4 and 5	2 dairy milk controls n° 6 and 7

This project was funded by the European Agricultural Fund for Rural Development (EAFRD) and Regional Councils

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Results

Figure 1. *AA impact in dairy farms*

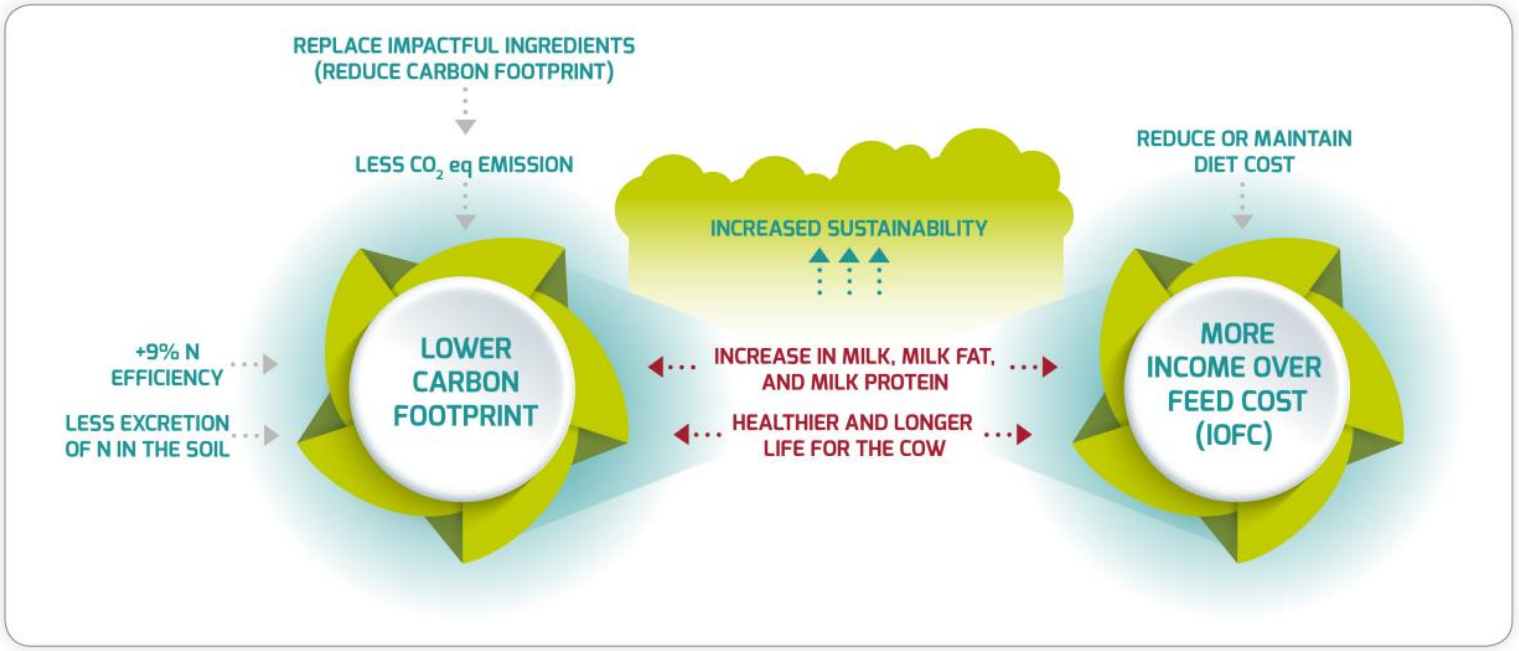
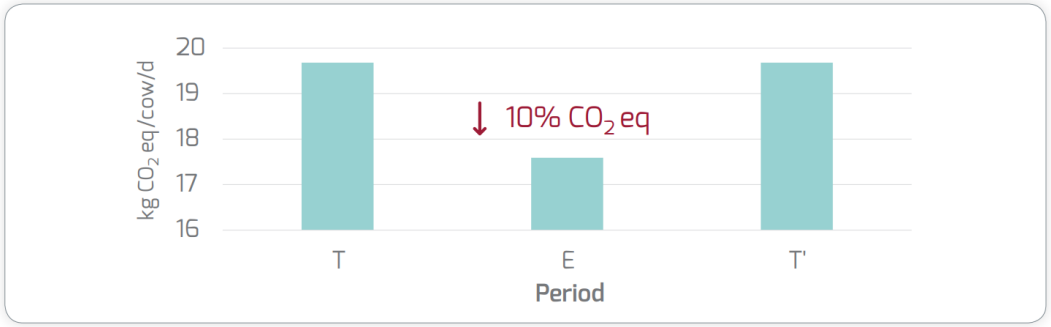


Figure 2. *Diet CO_2 eq emissions*



- Milk yield: +0.6 kg/cow/d.
- Milk protein: +0.5 g/kg.
- Milk urea nitrogen: -48 mg/l.
- Gross MP efficiency +4% and NUE +9%.
- IOFC: +5%.

Full list of author details:

Militello, D.[1,2*], Lemosquet S.[3], Mathieu Y.[4], Bahloul L.[2], Andrieu D.[5], Rolland M.[6], Rouverand S.[7], Trou G[8].

[1]Department of Agricultural, Forest, and Food Sciences, University of Turin, Largo Paolo Braccini 2, Grugliasco Torino 10095, Italy
[2]Centre of Expertise and Research in Nutrition, Adisseo France S.A.S., 03600 Commentry, France
[3]PEGASE, INRAE, Institut Agro, 35590 Saint-Gilles, France
[4]Seenovia - rue P.A. Bobierre - La Géraudière - 44939 Nantes CEDEX 9 - France
[5]CCPA - ZA du Bois de Teillay - Quartier du Haut-Bois - 35150 JANZÉ - France
[6]Vision Lait, 10 rue de Soissons 51140 Muizon France
[7]Valorial, 8 rue J Maillard de la Gounerie, 35000 Rennes, France
[8]Chambres d'agriculture de Bretagne, rue Maurice Le Lannou – C5 74223 – 35042 Rennes Cedex - France

Presented at the ADSA meeting 2022

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