Efficacy evaluation of supplementation with an anti-biotoxin solution in dairy cows

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CONTEXT

Main mycotoxins effects on ruminants have been reported considering high dosage and/or single mycotoxin contamination. However, little is known about the effects of naturally low levels of multiple mycotoxins on the performance, metabolism, and immunity of dairy cattle.

OBJECTIVE

Evaluate the efficacy of an anti-biotoxin product in feed naturally contaminated with mycotoxins on commercial dairy farms.

MATERIALS AND METHODS

- 120 lactating Holstein dairy cows (West of France, 2019-2020).
- Diet supplemented (60 days, 50g/cow/day) with an anti-biotoxin (MPY: Multiprotect Y, Mixscience, France).
- Analysis of mycotoxins and metabolites in Total Mixed Ration (TMR) and urine (HPLC-MS/MS , Labocea, France).
- Immunological and blood serum biochemistry (3 groups, Total: 16 cows: 5 primiparous / 6 cows 2nd-3td lactation / 5 cows ≥ 4 lactation)
- Zootechnical performance (milk production, 45 animals: average 150 days in milk (DIM)).

Table 1 : Mycotoxins contamination (mg/kg) in TMR

DON	FUMs	ZEA	H-T2
0.36	0.14	0.02	0.02

Low but multiple *Fusarium* mycotoxins contamination in the TMR during the whole studied period

RESULTS

Table 2 : Evolution of different biomarkers with MPY supplemented diet

		Biomarkers	Evolution after supplementation
Mycotoxins	Urine	DOM-1	↓*
		DON	=
		Tenuazonic acid	=
Oxydative stress	Blood	PRO/ANTIoxydant	Variable[1]
Inflammation markers	Blood	Haptoglobin	Variable[1]
		Serum amyloid A (SAA)	Variable[1]
		Albumin	=
		IgG	↓*
Liver functions	Blood	ALAT (alanine aminotransferase)	↓*
		ASAT (aspartate aminotransferase)	=
		GGT (γ-glutamyl transferase)	=
		AP (alkaline phosphatase)	=
		Urea	↓*
		Bilirubin (conjugated form)	↓*
Liver/Kidney functions	Blood	Creatinine	↓*

** p-value<0.05* *[1] variability according to the kinetic times*

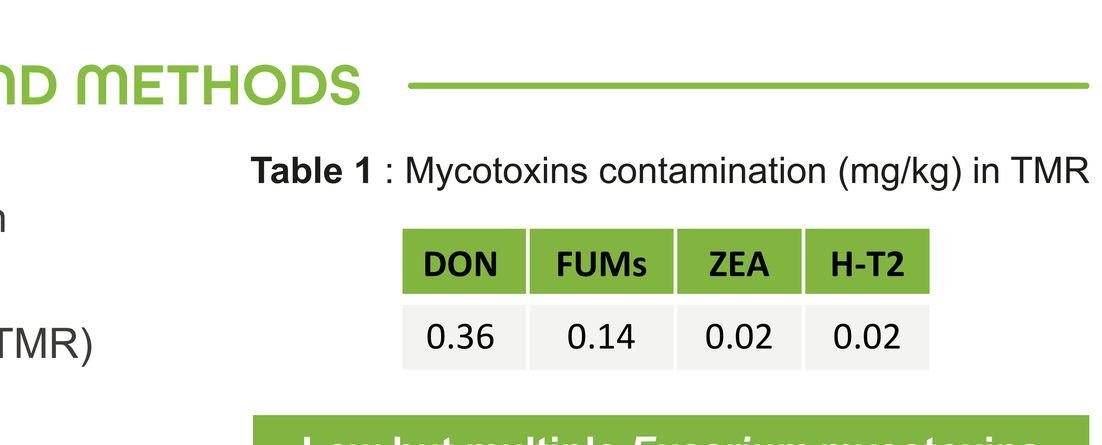

Fig. 1. Serum IgG level of dairy cattle before (T0) and after MPY supplementation

Red lines indicate references value from Knapp and Guyot,2016

Improvement of Liver/kidney functions

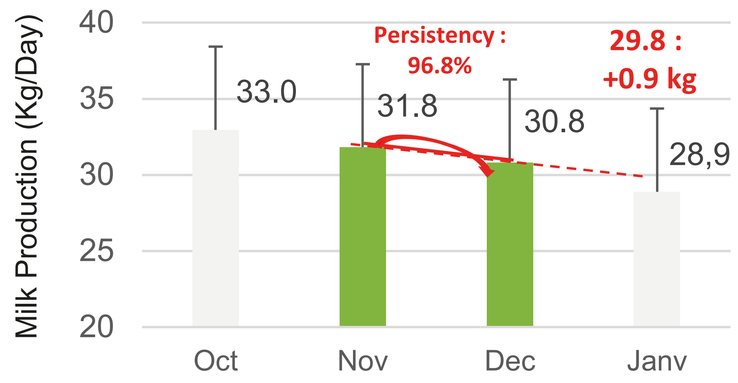

Fig. 2. Milk Production (Kg/Day) before (Oct)/during (Nov-Dec)/ After (Jan) supplementation

Considering milk production persistency at 96.8% ⟶ calculated gain of 0.9 Kg milk/cow/day with supplemented diet

Table 3 : Inflammation diagnostic of dairy cattle before (T0) and after MPY supplementation*

	T0	T15	T30	T45	T60
Total proteins (g/L)	**81.8**	**93.1**	**76.7**	**77.3**	**76.7**
Albumin/Globulin	**0.80**	**0.66**	0.90	0.88	0.92
Inflammation diagnostic*	**Chronic**	**Chronic**	Healthy	Healthy	Healthy

**According to Knapp and Guyot, 2016*

Improvement of immunity and animal health status

CONCLUSIONS

- Feed contaminated with regular levels of *Fusarium* mycotoxins can adversely **affect the performance and immunity** of dairy cows.
- Supplementation with **anti-biotoxin product (MPY)** improves **immunity**, **sanitary status** of animals and **zootechnical performances**.

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