

Post-partum Inflammation reduces milk production in dairy cows.

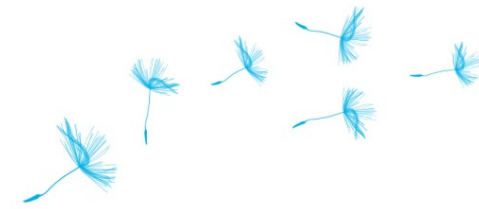
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frobert@ccpa.fr

Introduction



Bradford B., Kansas University, USA

Bertoni G. Trevisi E, Istituto di Zootecnica Piacenza, Italy

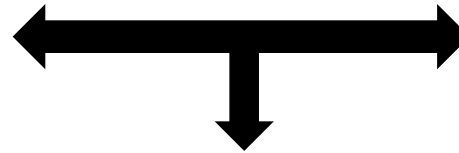
Aitken S.L., Michigan state University, USA

Gessner D., Justus-Liebig-Universität Giessen, Germany, ...



TRANSITION PERIOD

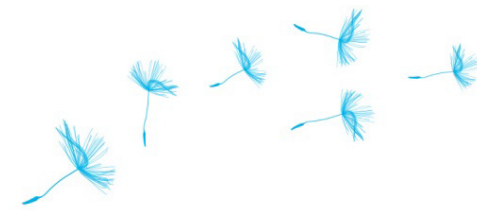
Oxidative stress



Inflammation

Metabolic and health disorders
Decreased milk production

Introduction



- **Objectives**

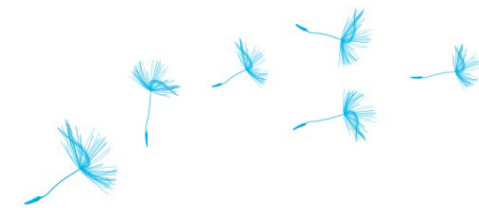
- Use of routinely available biomarkers of oxidative stress and inflammation
 - to describe transition period
 - to evaluate their relationships with milk production

Materials and Methods



- Farm 1 (INRA Mézujeaume herd)
 - Blood samples -30, -15, +7, +28, +56 days versus calving
 - Haptoglobin (Tridelta PHASE Haptoglobin Assay)
 - Oxidative stress : dROM test, BAP test (Diacron)
 - n=23, (22 cows with full data for correlation analysis)
- Farm 2 and 3 (commercial dairy farms)
 - Farm 2, 32 dairy cows – Farm 3, 40 dairy cows (automatic milking)
 - Blood samples +7 and +21 days after calving
 - Haptoglobin, dROM
- Statistical analysis
 - Log transformation (haptoglobin)
 - Mixed model (day effect) and Pearson correlation (SPSS version 19)

Materials and Methods



- Oxidative Stress Index (OSI)
 - David Costantini (2009), Pietro Celi (2010)

Pro-oxidant capacity

Anti-oxidant capacity

dROM test



Hydroperoxydes



Cells lesions

BAP test (Biological Antioxidant Potential)



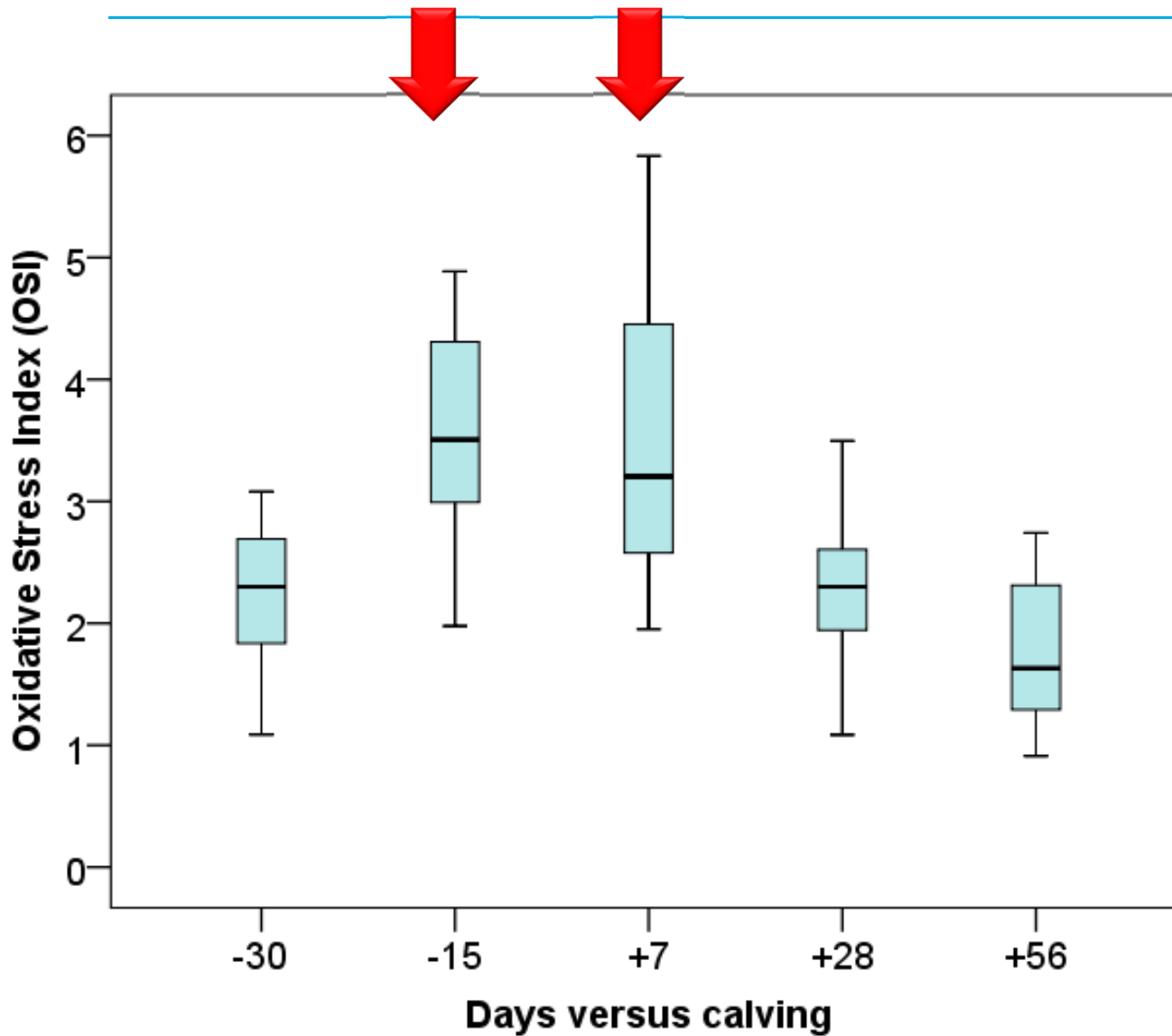
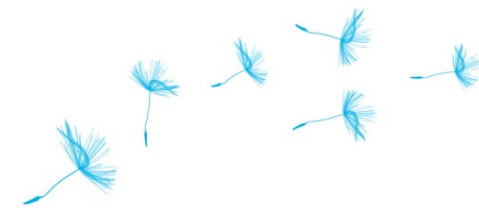
Antioxidant capacity



Protection

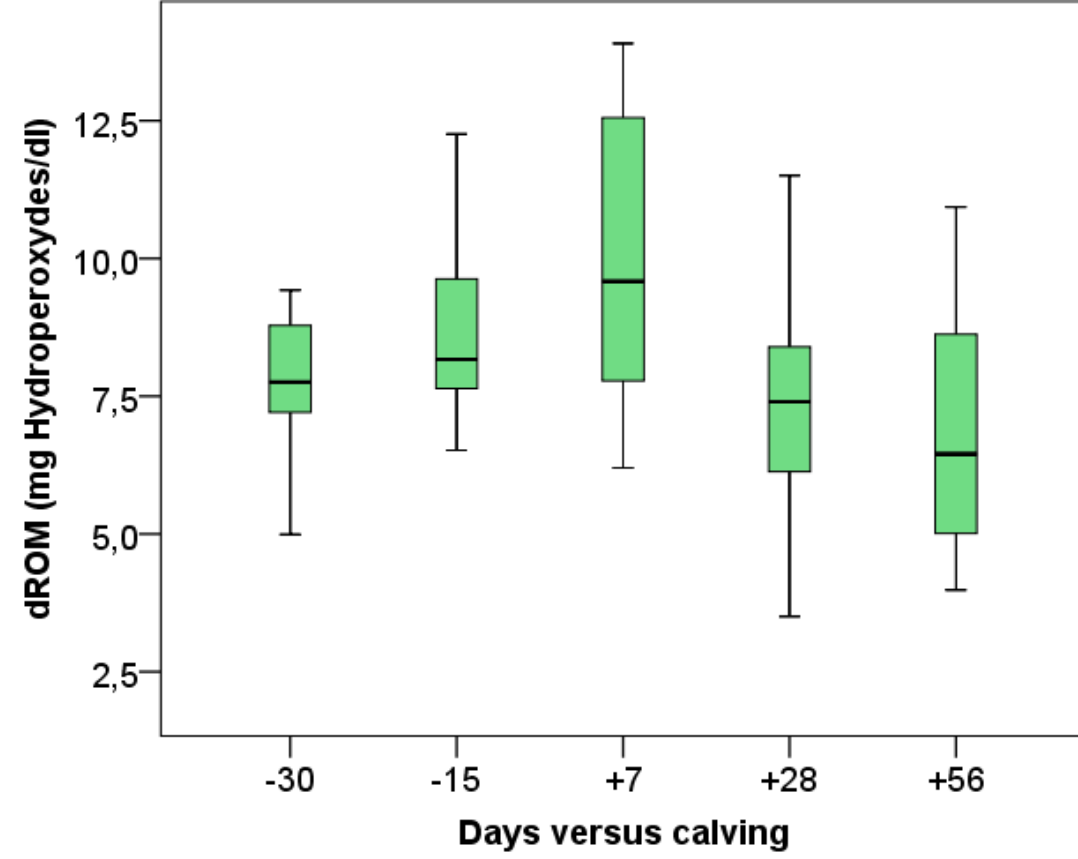
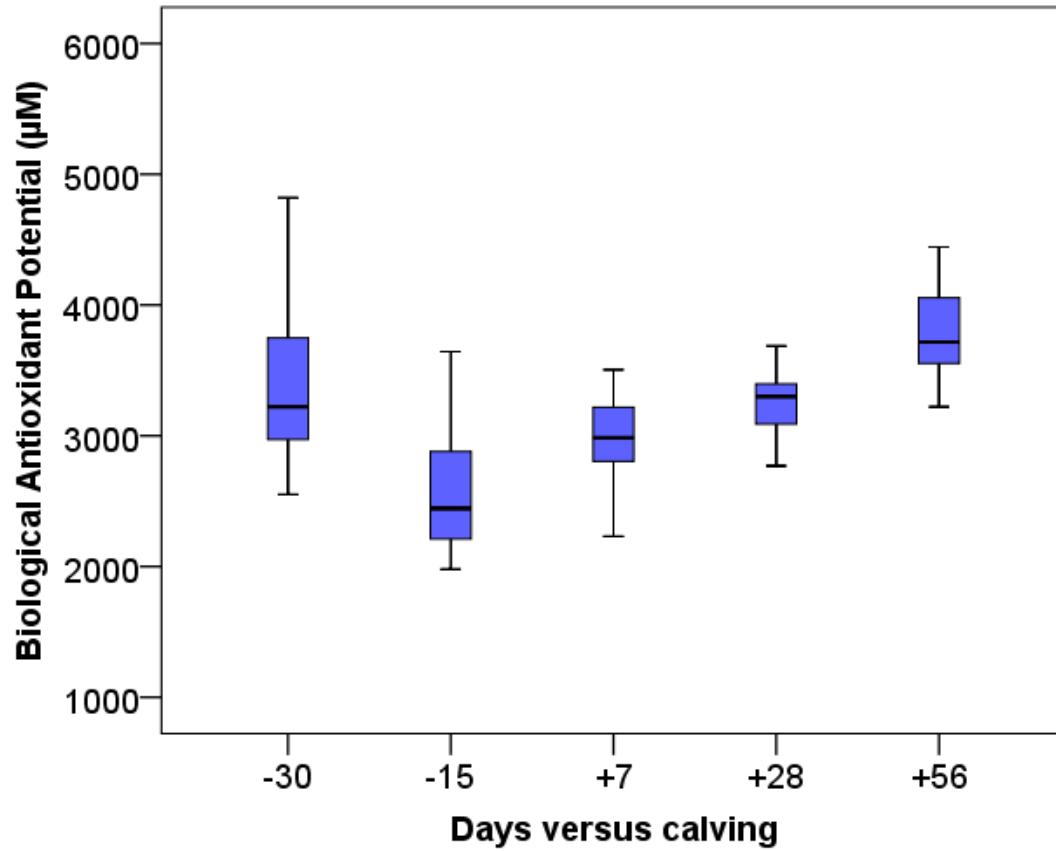
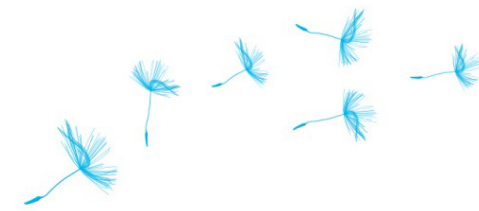
RESULTS

Oxidative Stress Index (OSI) – Farm 1



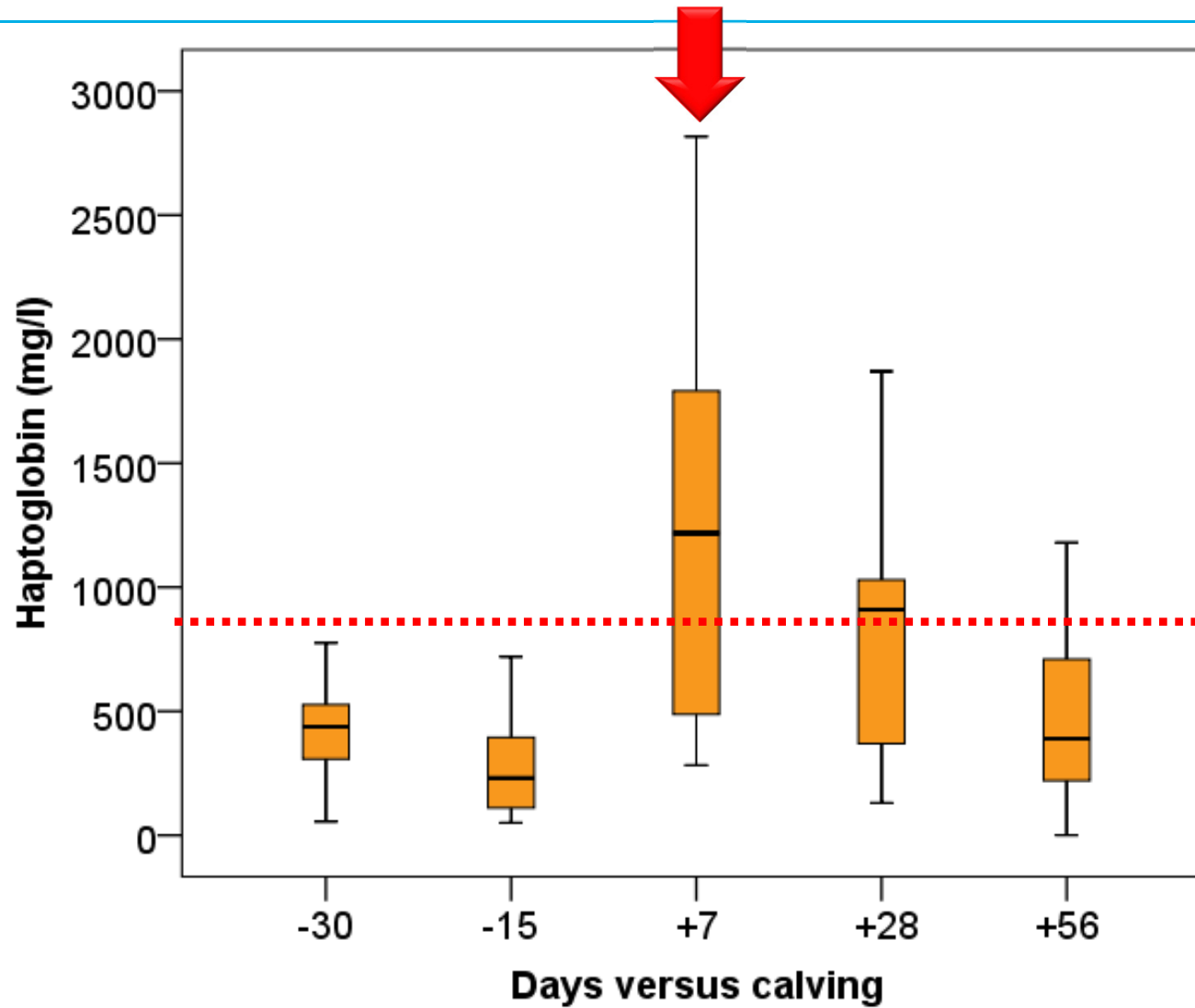
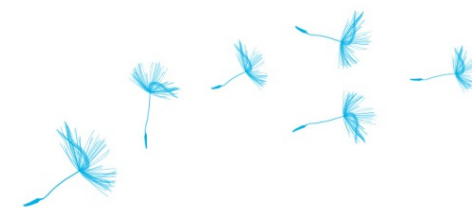
$$\text{OSI} = \frac{\text{dROM}}{\text{BAP}}$$

Oxidative stress – Farm 1



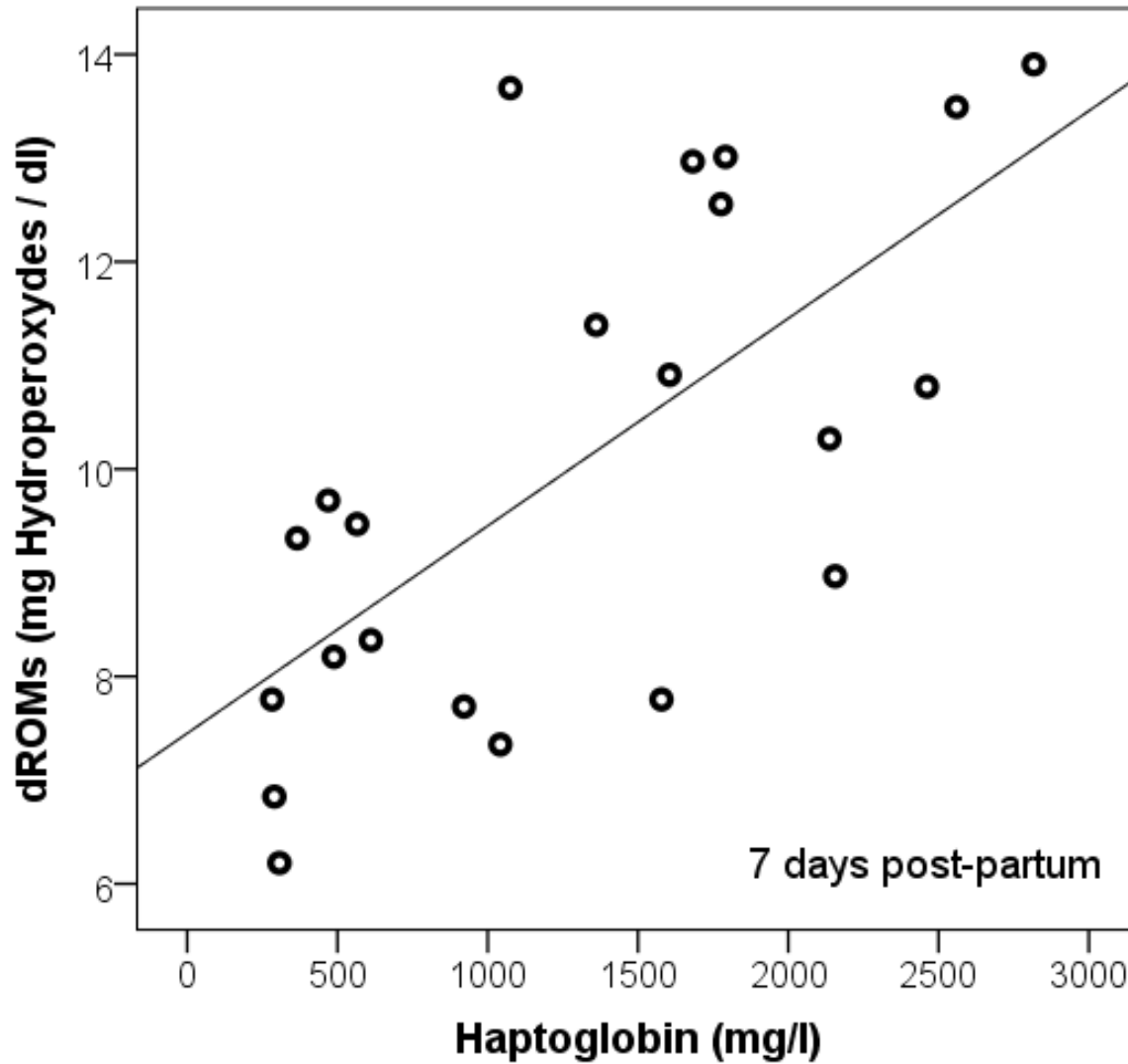
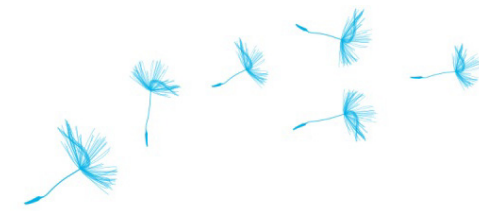
- ➔ 2 weeks before calving low antioxidant capacity
- ➔ 1 week after calving increased cells lesions (Hydroperoxydes)

Haptoglobin – Farm 1



ACUTE PHASE

Haptoglobin and dROM – Farm 1

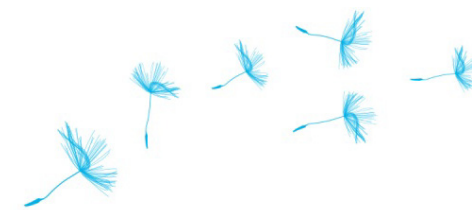


7 days after calving haptoglobin and dROM are correlated

$$R^2 = 0,45$$

$$P=0,001$$

Results farm 1 – Pearsons correlations

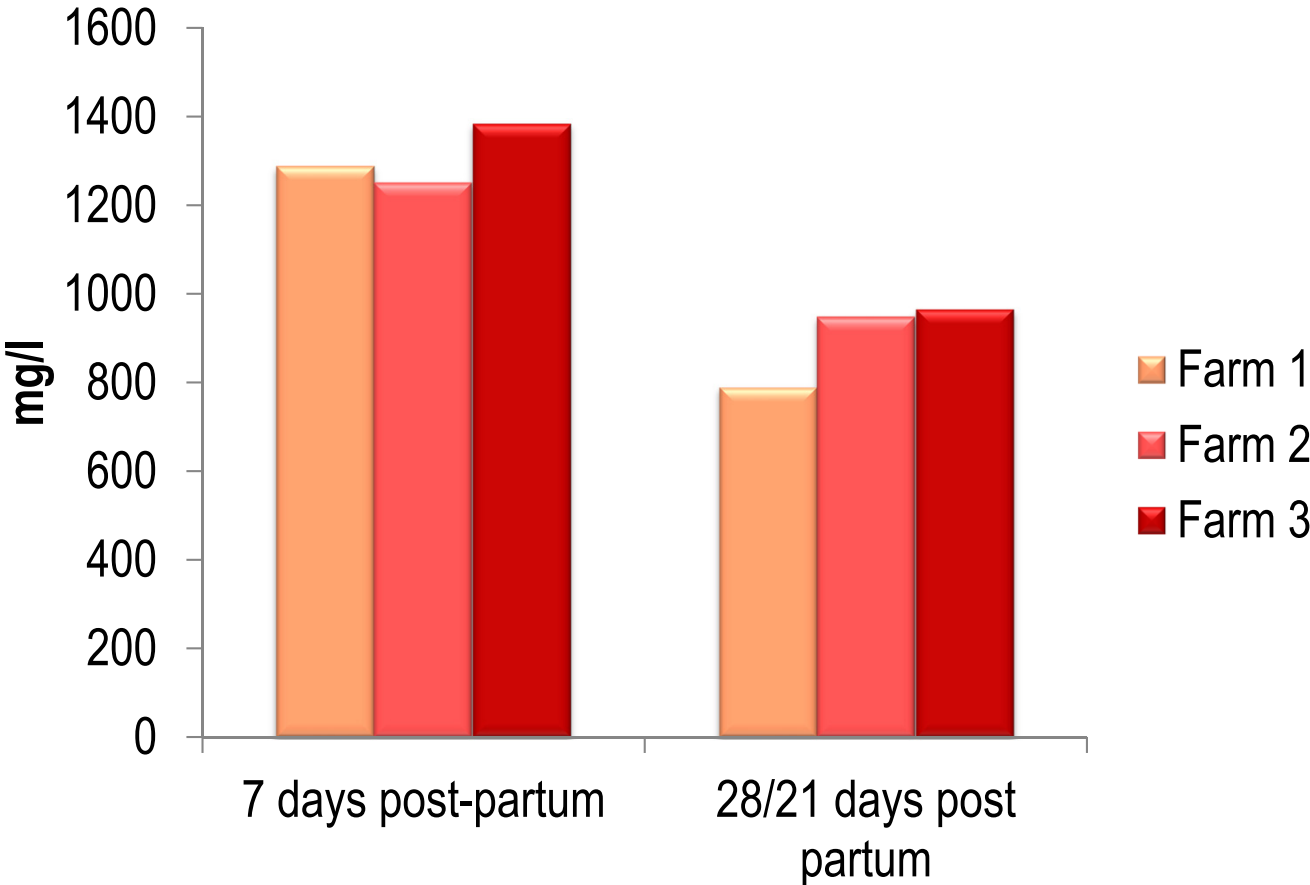
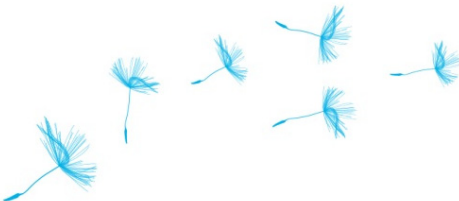


		MILK PRODUCTION												
		1	2	3	4	5	6	7	8	1 - 4	5- 8			
Weeks post-partum →														
dROM (7 days PP)	Pearson correlation	-0,37	-0,39	-0,39	-0,45	-0,39	-0,41	-0,37	-0,37	-0,42	-0,40			
	<i>p</i>	0,09	0,07	0,07	0,04	0,08	0,06	0,09	0,09	0,05	0,06			
Haptoglobin (7 days PP)	Pearson correlation	-0,35	-0,41	-0,32	-0,37	-0,29	-0,26	-0,30	-0,30	-0,38	-0,30			
	<i>p</i>	0,11	0,06	0,14	0,09	0,19	0,25	0,18	0,18	0,08	0,18			

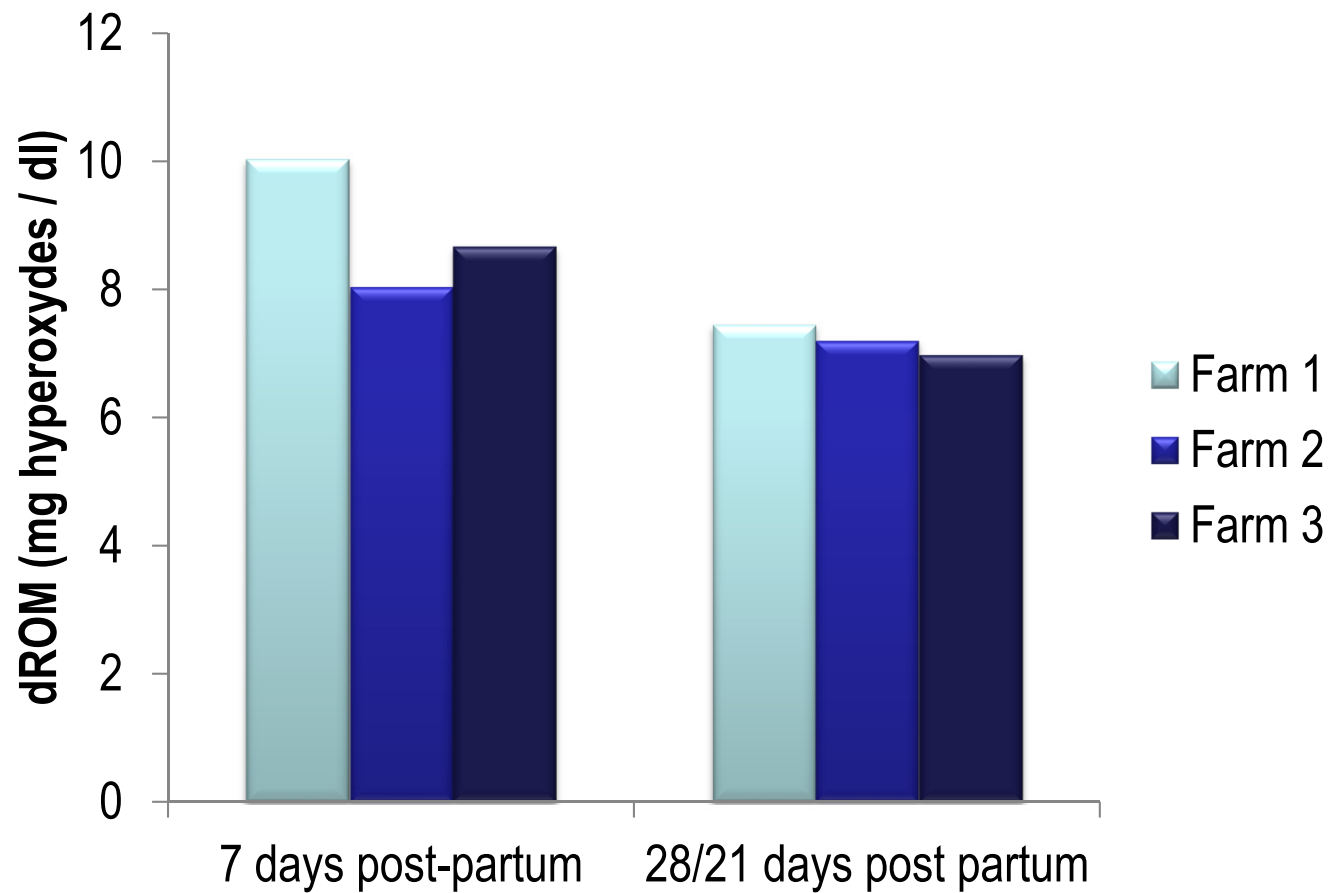
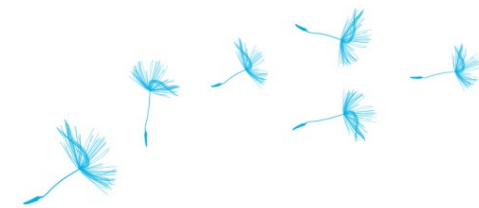
→ Trend to negative correlation between plasmatic hydroperoxydes, haptoglobin 7 days post partum and milk production (n=22)

→ No correlation with other sampling's periods

Haptoglobin



Oxidative stress (dROM test)



Pearson correlations 7 days post partum



FARM 2

	dROM	Milk production Weeks 1 - 4
Haptoglobine	0,46*	-0,35*
dROM		-0,17

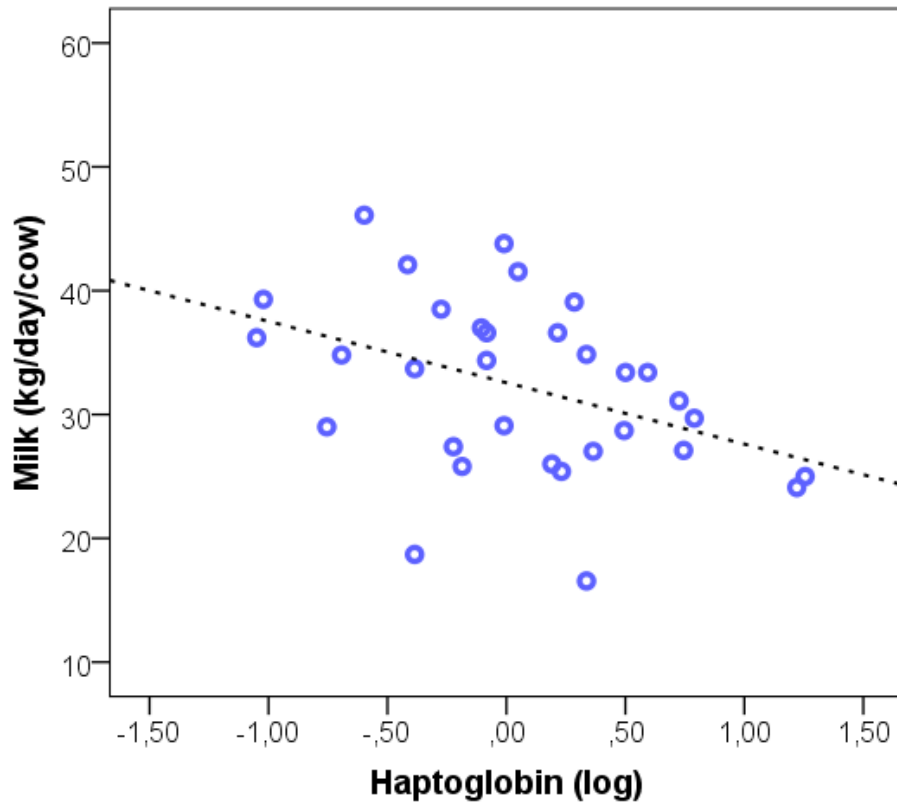
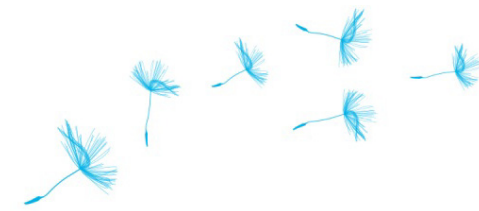
FARM 3

	dROM	Milk production Weeks 1 - 4
Haptoglobine	0,44*	-0,41*
dROM		-0,34

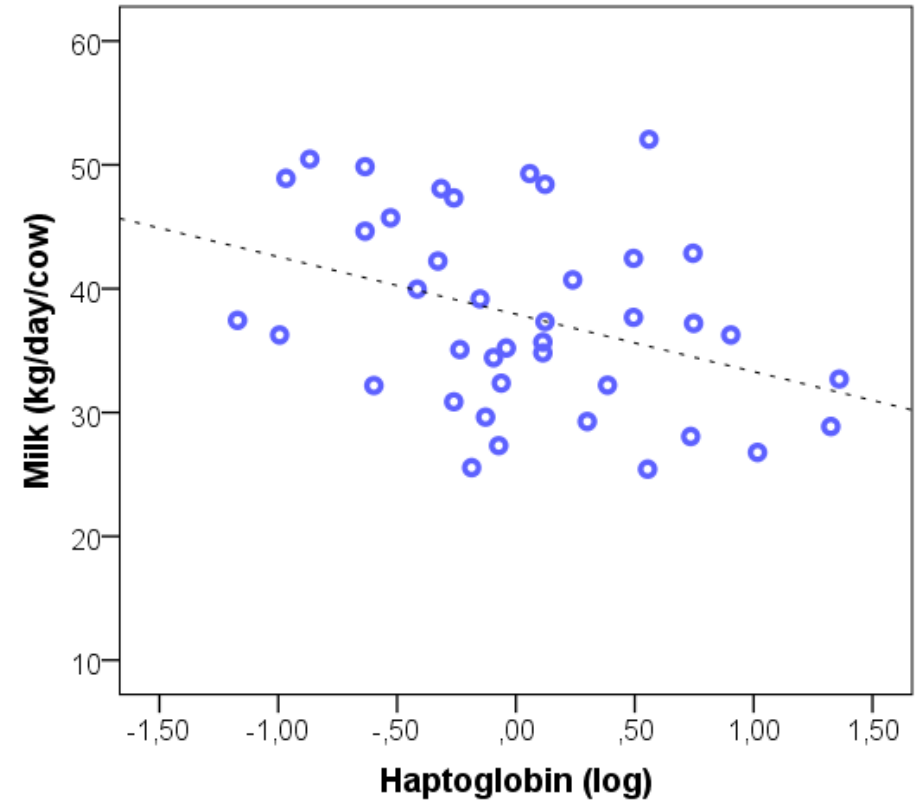
- No relationships at 21 days
- Milk production during 4 weeks after calving

• * $p < 0,05$

Haptoglobin and milk production (4 weeks)



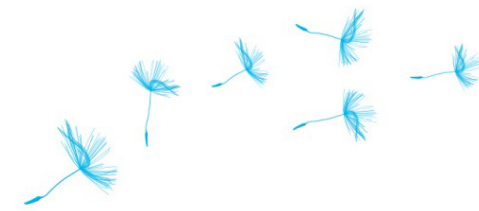
Farm 2



Farm 3

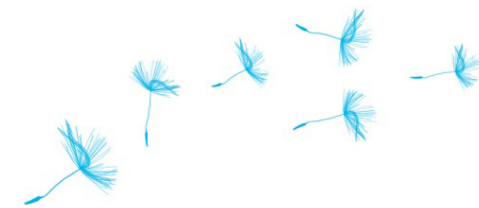


Conclusions



- Calving induces an acute phase response and oxidative stress.
 - BAP and dROM tests are accurate to detect it.
 - Acute phase response occurs after calving
 - Oxidative stress begins before calving (decrease of antioxidant capacity)
- After calving dROM and haptoglobin are correlated.
- Milk production during, at least the first 4 weeks of lactation, is negatively correlated with haptoglobin measured 7 days after calving.
- Haptoglobin variations after calving explain +/- 15% of milk production variations.

Implications



- Inflammation / reduced milk : a cause ?
 - Salicylate distributed just after calving increases milk production with a long term effect.
 - Scutellaria Baicalensis, a plant extract with anti-inflammatory effect, extracts shows the same effect (Posters session)
- Everything that can increase the acute phase response would potentially reduce milk production.
- Everything that could reduce the acute phase response would potentially increase milk production
 - Consequences on health and reproduction should be evaluated.

Thank you for your attention !



***Scutellaria baicalensis* extract improves
milk production in dairy cows and sows.**

Poster session 43 and 45