

Biochemical shifts induced by exercise and interest of high quality food supplemented in antioxidant and omega-3 fatty acid in working dogs

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9 th International Working Dog Conference,
2015, La Grande Motte, France



1. INTRODUCTION
2. OBJECTIVES
3. MATERIALS AND METHODS
4. RESULTS
5. CONCLUSION



1. INTRODUCTION

Scientific context

- Significant modifications in physiological and biochemical parameters are induced by exercise in utility dogs
- Omega-3 polyunsaturated fatty acids (EPA/DHA) have important health benefits

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2. OBJECTIVES

- To evaluate the benefit effects of high quality food (Royal Canin® TRAIL 4300) associated with a regular training on health of working dogs
- To determine the biochemical shifts with blood markers of systemic inflammation and oxidative stress induced by a moderate-intensity short-duration activity and the effect of EPA/DHA.

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3. MATERIALS AND METHODS

DOG SELECTION

40 military working dogs living outside in kennel

- Breed : 24 Belgian malinois shepherd
14 Deutch shepherd
2 Dutch shepherd
- Mean age : 4 years [1-8]
- Sex : 39 males and 1 female (group 2)

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3. MATERIALS AND METHODS

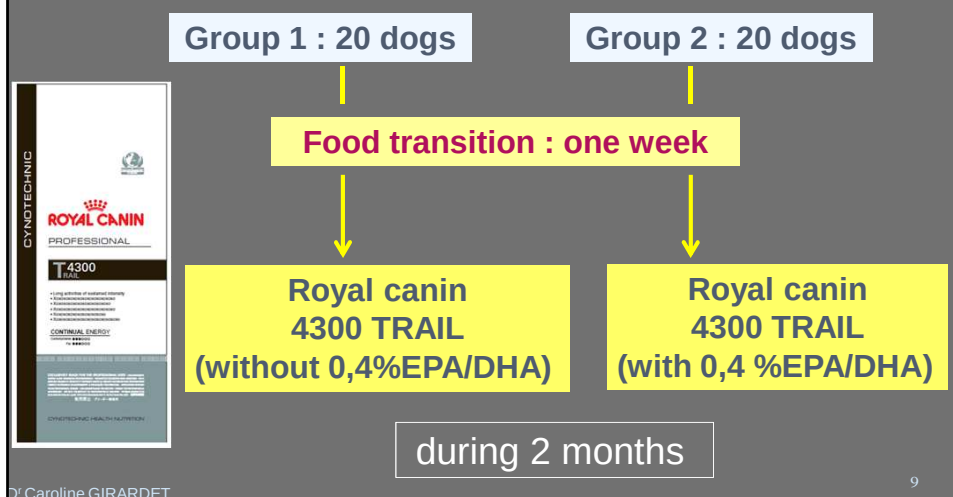
A DOUBLE-BLIND STUDY



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3. MATERIALS AND METHODS



3. MATERIALS AND METHODS

DOG TRAINING

- Regular training during two months
- A standardized effort at the end of the period

Bikejoring during
30 minutes at 16 km/h



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3. MATERIALS AND METHODS

PARAMETERS STUDIED

- Body weight
- Body condition score
- Fecal score

Measured
before and after food transition
and every two weeks

Scoring system for

Body condition score : 1 to 9
Fecal score : 1 to 5

BODY CONDITION SCORE - LARGE DOG

ROYAL CANIN

TOO THIN



IDEAL



OVERWEIGHT



TOO HEAVY



Faecal Scoring System

Dogs

	Score 1: Entirely liquid stool (no texture)		Score 1.5: Liquid stool with minimal consistency
	Score 2: Very wet, but not liquid, stool. It retains the water that is nevertheless visible between its different constituent parts.		Score 2.5: A moist stool, with little consistency and no real shape, it holds water well. No floating "stool-water" is visible.
	Score 3: A moist stool with no cracks. It does have a distinct shape. This stool's different "components" stick to one another.		Score 3.5: A moist stool that's starting to lose its shape and cracks. This stool's "components" are more separate and the cracks are still visible.
	Score 4: This stool has a clearly defined shape with visible cracks. It leaves very little residue on the ground when picked up.		Score 4.5: This stool has very clearly defined cracks. The outside is very dry and the inside is almost dry. Leaves no residue on the ground when picked up.
	Score 5: Hard, dry, crumbly stool (crumbs). It tends to split apart rather than being crushed.		

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3. MATERIALS AND METHODS

PARAMETERS STUDIED

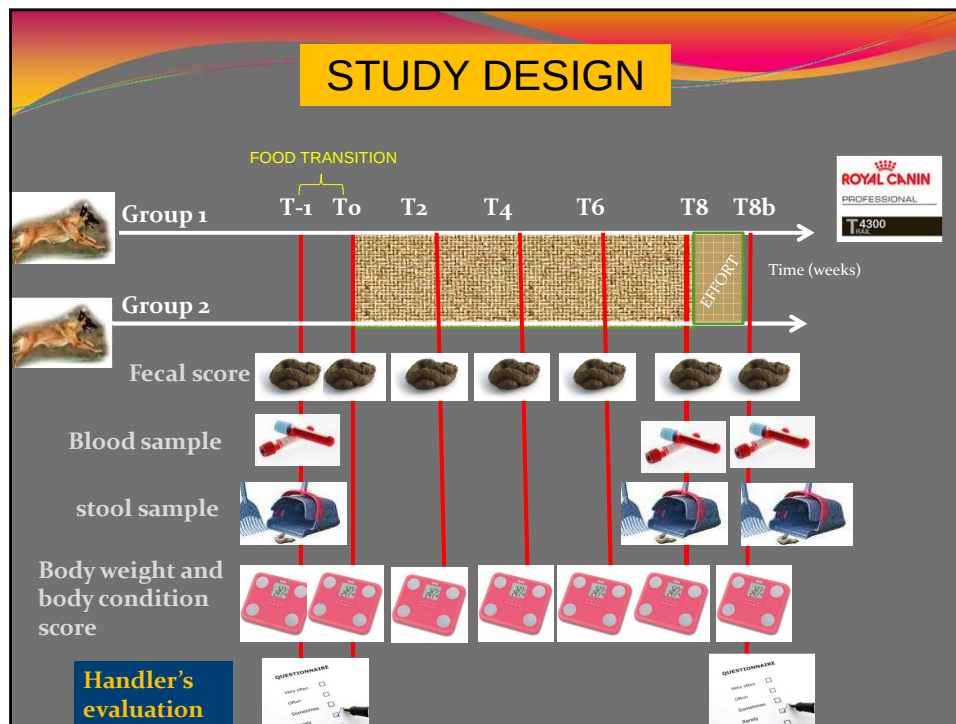
Blood samples

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before food transition, just before bikejoring and immediately after exercise

- Marker of systemic inflammation : C reactive protein
- Marker of oxidative stress : glutathione peroxidase
- Marker of muscular activity : creatine kinase

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4. RESULTS

Out of 40 dogs, 39 dogs finished the study :
one of them was sent on mission
(one belgian shepherd of the group 1)

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4. RESULTS

Parameters studied during the two months of
the study

- Body condition score
- Body weight
- Fecal score

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Body condition score : mean value (group 1+2)



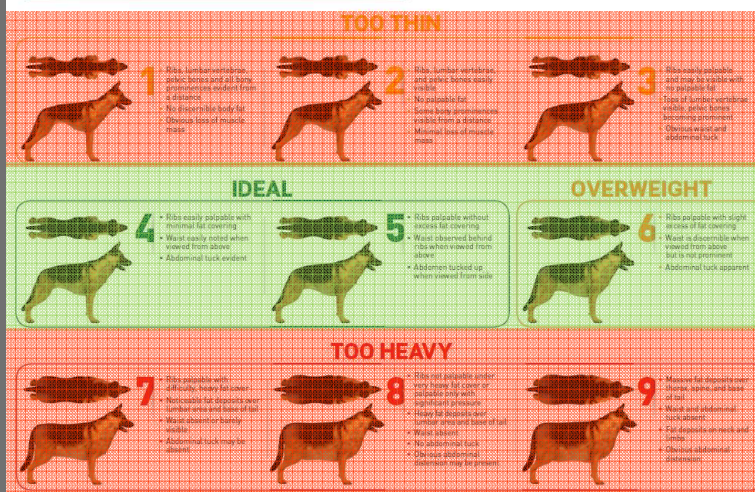
Body condition score significantly increased between the beginning and the end of the study :
 4.1 [1-7] vs 5.4 [2-8] respectively, $p < 0.001$

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BODY CONDITION SCORE - LARGE DOG

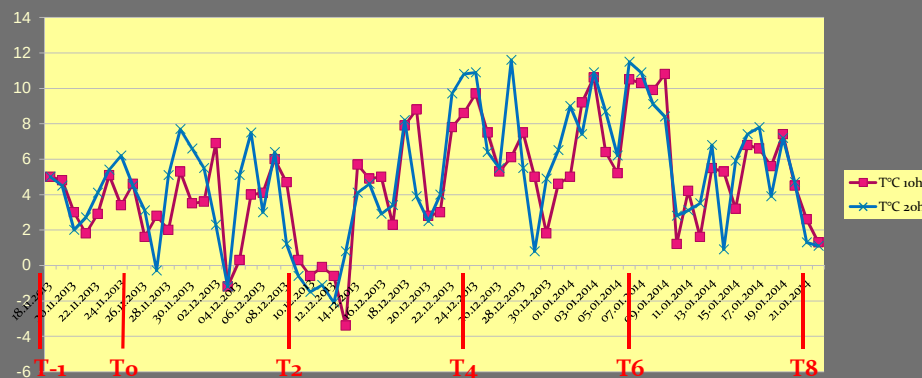
ROYAL CANIN



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External temperatures



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Body weight

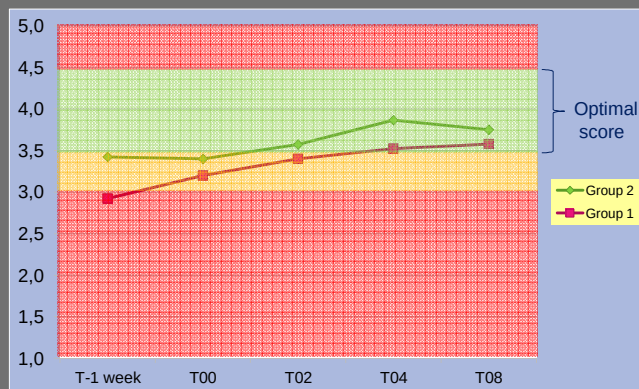
MOYENNE	T-1week	T00	T02	T04	T06	T08	Total général
Group 2	30,9	31,0	30,7	30,9	30,9	31,3	30,9
Group 1	29,5	29,4	28,9	28,8	29,2	29,3	29,2
Total général	30,2	30,2	29,8	29,9	30,0	30,3	30,1

Preservation of dog body weight despite regular exercise and hard environmental conditions : outside night and day, in cold weather with high level of humidity

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Fecal score



Fecal score was significantly higher in the two groups of dogs at the end of the study compare to the beginning :
Mean values = 3,2 [2-4] vs 3,7 [3-4], $p < 0.001$

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Faecal Scoring System

Dogs



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4. RESULTS

Parameters studied before and after standardized exercise

- C reactive protein
- Glutathione peroxidase
- Creatine kinase
- Body temperature
- Fecal score

Their concentrations were significantly higher after exercise than just before

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C reactive protein : marker of systemic inflammation



C reactive protein was significantly higher in the two dogs groups after exercise than just before :
 5,3 [2-12] vs 6,1 [5-12], $p=0.005$

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Glutathione peroxidase : marker of stress oxidative

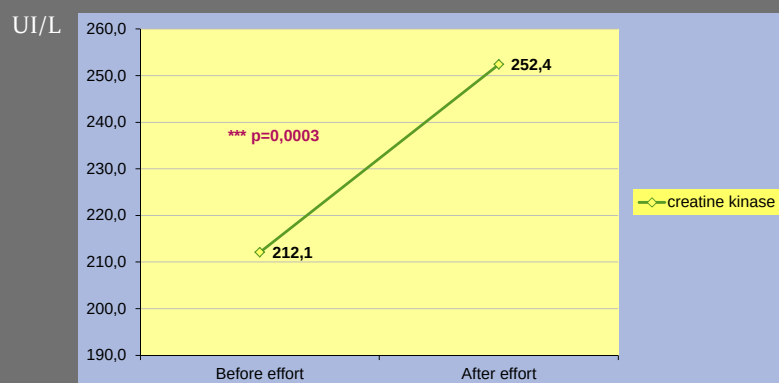


Glutathione peroxidase was significantly higher in the two dogs groups after exercise than just before :
 425,3 [310-603] vs 478,6 [335-645], $p=0.002$

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Creatine kinase : marker of muscular activity



Creatine kinase was significantly higher in the two dogs groups after exercise than just before :
 212,1 [103-378] vs 252,4 [115-405], $p<0.001$

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Body temperature

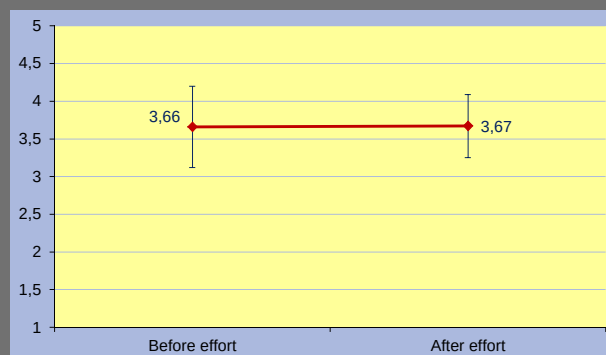


Body temperature increased significantly in the two dogs groups after effort compare to before effort : exercise (intensity and duration) was efficient

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Fecal score



Fecal score was not significantly different in the two dogs groups after effort compare to before effort:

3,67 [2,5-4,5] vs 3,66 [2,5-4,5] respectively, p=0.225

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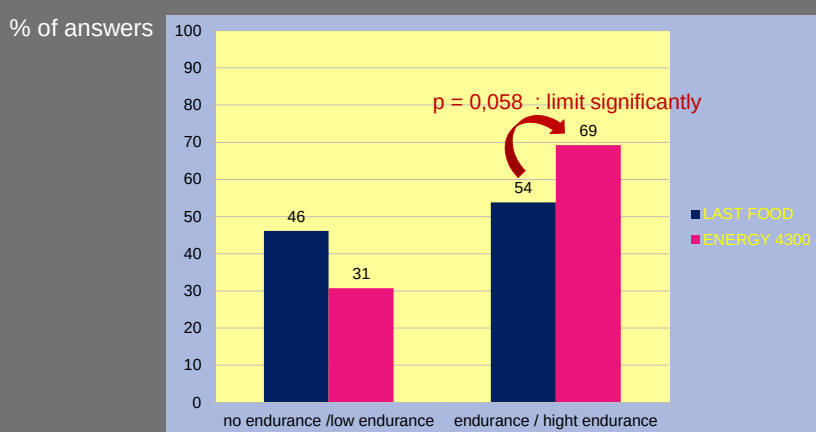
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Handler's evaluation : how is performance ?

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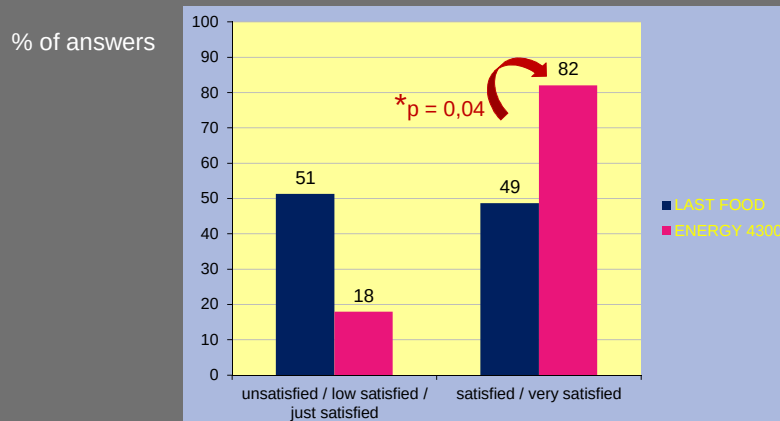
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Handler's evaluation : how is endurance ?

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Handler's evaluation : how is your satisfaction ?



Dog motivation to work was improved with Royal Canin® 4300 TRAIL with better performance and endurance

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5. CONCLUSION

Our study demonstrates :

1. a moderate-intensity, short-duration activity performed by healthy army dogs causes significant increases of inflammatory and oxidative stress markers
 - but within the established normal reference ranges
 - perhaps due to an exercise too short
 - perhaps due to the quality of the both diet with specific nutrients with an antioxidative effect (vitamine E, lutein, betacaroten)

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5. CONCLUSION

Our study demonstrates :

2. No effect of exercise on feces quality was observed
 - Royal Canin® TRAIL 4300 contain several components (prebiotics (mannan-oligoasaccharides), sugar beet pulp, psyllium, vitamin E, C, A and lutein) which help to protect the digestive mucosa, to reduce intestinal and systemic inflammation and oxidative stress

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5. CONCLUSION

Our study shows :

- A high quality dietary supplemented in antioxidants and omega-3 fatty acids helps in preventing digestive problem.
- Nutrition and physical training association helps to maintain working dogs health and so improves stamina and performance.