

Nutritional markers course after oral supplementation with different forms of iodine in Holstein non-lactating cows



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INTRODUCTION

Iodine (I) deficiency is commonly reported in cattle around the world and is often associated with clinical or sub-clinical diseases. As most of clinical signs are not pathognomonic, diagnosis has to be confirmed by biochemical analyses such as plasmatic inorganic iodine (PII) or urinary I. Different oral mineral forms of I are available in Europe for cattle. *The aim of the study was to compare the kinetic of I in blood and urine in non-lactating cows, following oral administration of different forms of I.*

MATERIAL & METHODS

Animals

⇒ 5 groups of 6 non-lactating cows (aged 6 ± 2 years, weight 604 ± 89 kg), receiving the same ration (11 kg dry matter) and housed in the same conditions (tied-stall and straw) underwent a double-blinded trial during 60 days.

Groups

- ⇒ Group A [control] } 0.5 ppm I/d
- ⇒ Group B [$\text{Ca}(\text{IO}_3)_2$] } 5 ppm I/d
- ⇒ Group C [KI] } 0→45 days
- ⇒ Group D [Organic form #1*]
- ⇒ Group E [Organic form #2*]

*formulas not public, covered by patent

Assays

- ⇒ Blood and urine: 0 day, 15 days, 30 days, 60 days
- ⇒ Assay of Thyroxine (T4) (0, 30, 60), PII & urinary I (all times)

Statistical evaluation

⇒ Student-*t* test and multiple comparisons of means (mix crossed model) were used to compare I and T4 concentrations between groups and times.

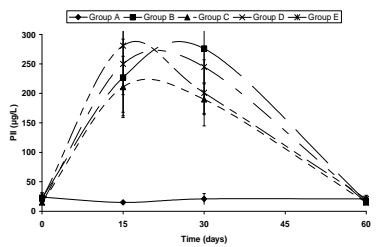
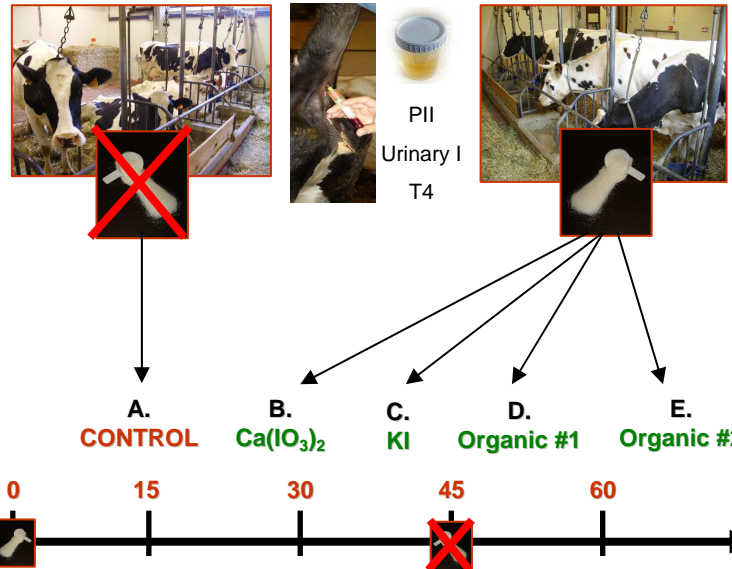


Figure 1: PII course

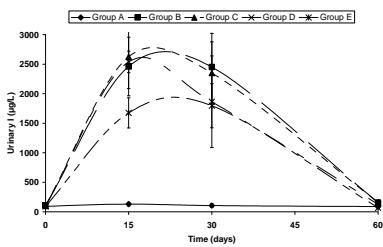


Figure 2: Urinary I course

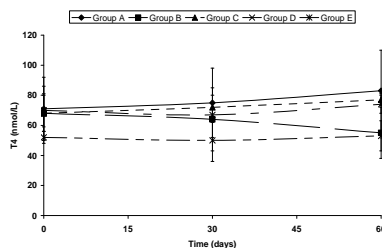


Figure 3: T4 course

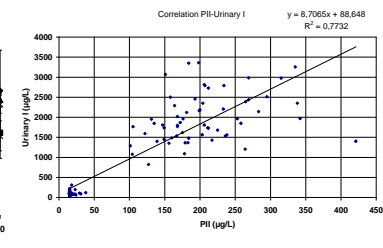


Figure 4: Correlation PII-Urinary I

RESULTS

- ⇒ Day 0: cows, PII, urinary I, T4 → no difference ($p > 0.1$)
- ⇒ Times of trial: → no difference ($p > 0.1$) between B, C, D, E
- ⇒ T4: → no difference ($p > 0.1$) for all groups and times
 - ⇒ 67 ± 10 nmol/L
- ⇒ PII, urinary I: A < B, C, D, E ($p < 0.01$) at 15 and 30 days
- ⇒ Highest [I]: reached at 15 days for B, D, E
 - ⇒ PII up to 242 ± 30 µg/L
 - ⇒ Urinary I up to 2326 ± 439 µg/L
- ⇒ T60: basal level reached in all groups
 - ⇒ PII 19 ± 4 µg/L
 - ⇒ Urinary I 110 ± 29 µg/L
- ⇒ Correlation PII – Urinary I: → $r^2 = 0.77$

DISCUSSION & CONCLUSIONS

PII and urinary I are good markers to assess I nutritional status. Furthermore, there is a good positive correlation between urinary I and PII. Urinary I could be used to assess the I nutritional status in cattle as it is easier to assay in routine laboratory. Nevertheless, further studies are needed in order to determine the influence of urinary volume, density and moment of the day on urinary I content.

No difference was found between either inorganic or organic forms of I, nor between them. Nevertheless, all forms studied worked and increased quickly the I content of plasma and urine. After stopping the supplementation, all groups showed a quick decrease of I content in plasma and urine. This shows that the tested organic forms of I could not either play a role of storage of I.

Concerning the mineral forms of I, $\text{Ca}(\text{IO}_3)_2$ might be preferably used because of its higher stability in the mineral complexes.

Recommended literature

Hemingway et al. Vet. J., 2001, 162: 158-160
Miller et al. J. Dairy Sci., 1975, 58: 1578-1593



Huszenicza et al. Vet.Med.-Czech, 2002, 47: 199-210
N.R.C., 7nd ed., 2001