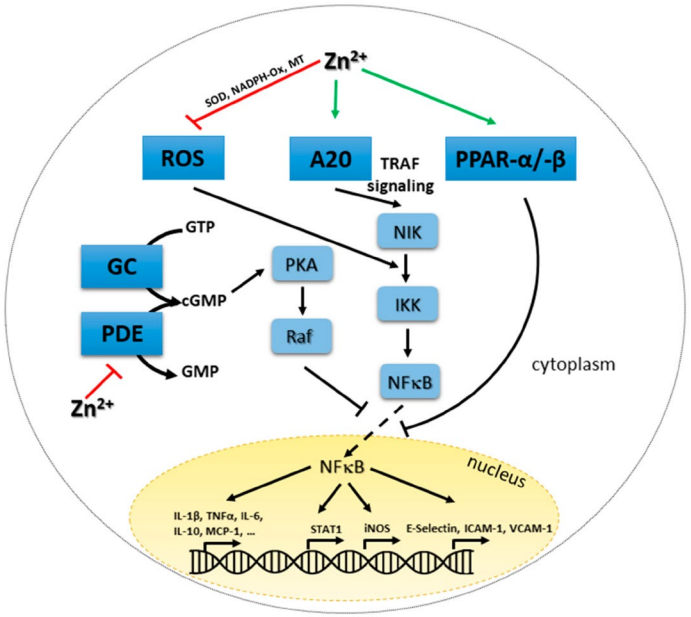
Development of eco-friendly feeding approaches in poultry. Assessment of different dietary zinc sources.

Sarmiento-García, A* & Olgun O..

asarmg00@usal.es

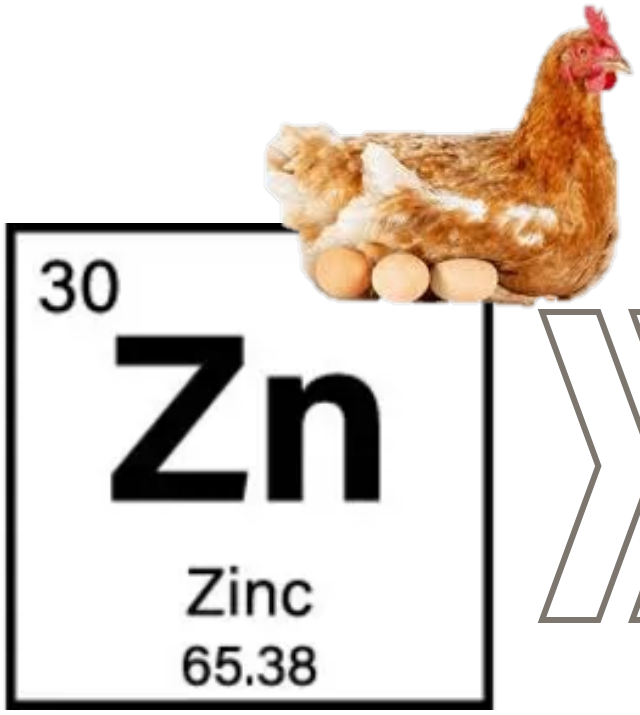
1. Introduction

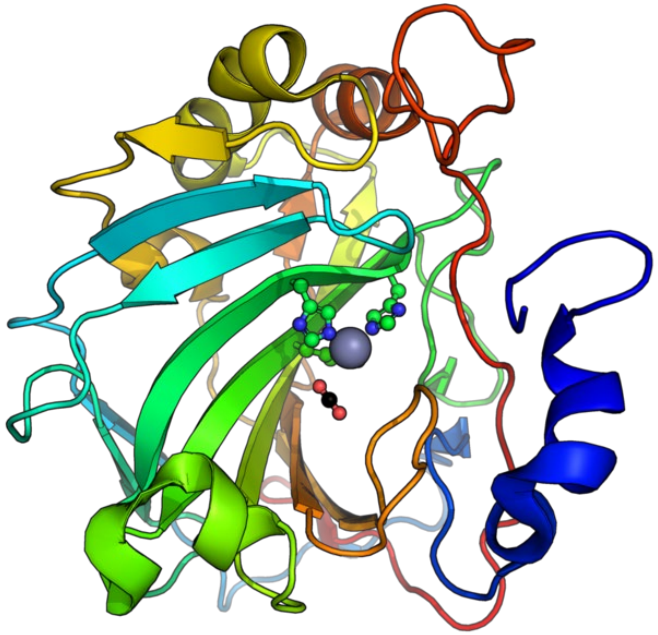
>200 metalloenzymes



- Performance
- Immune system
- Bone health

1. Introduction





Enzyme carbonic anhydrase (CA)

1. Introduction

- Inorganic salts (oxides, sulphates, or chlorides) ↓ Bioavailability ↓

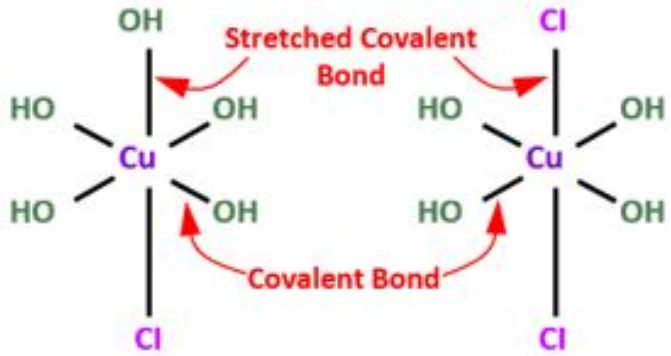
- Trace minerals (proteinate and amino acid forms) ↑ Bioavailability ↑

- Hydroxichloride forms → INORGANIC SOURCE

1. Introduction

➢ Hydroxichloride forms → INORGANIC SOURCE

- **Stronger bonds: (+) Stability, (-) Reactivity**
- **High concentration: 44-56%**
- **Cost-Effective**

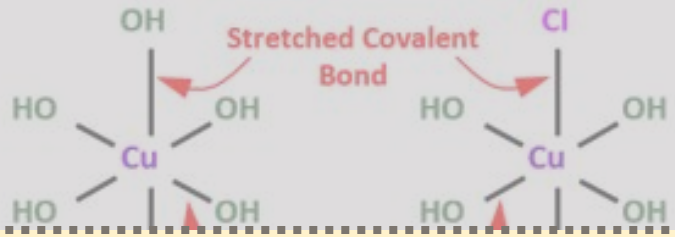


A specific metal bound via a coordinated covalent bond with a hydroxyl ligand.

1. Introduction

➢ Hydroxichloride forms → INORGANIC SOURCE

- Stronger bonds: (+) Stability, (-) Reactivity
- High concentration: 44-56%

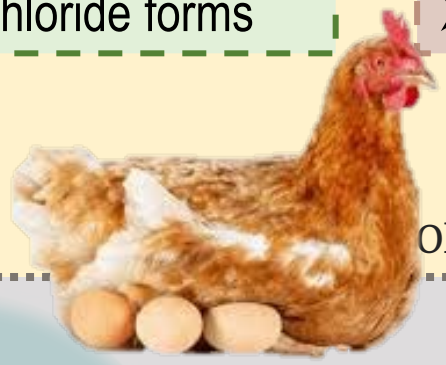


➢ Inorganic salts

➢ Hydroxichloride forms

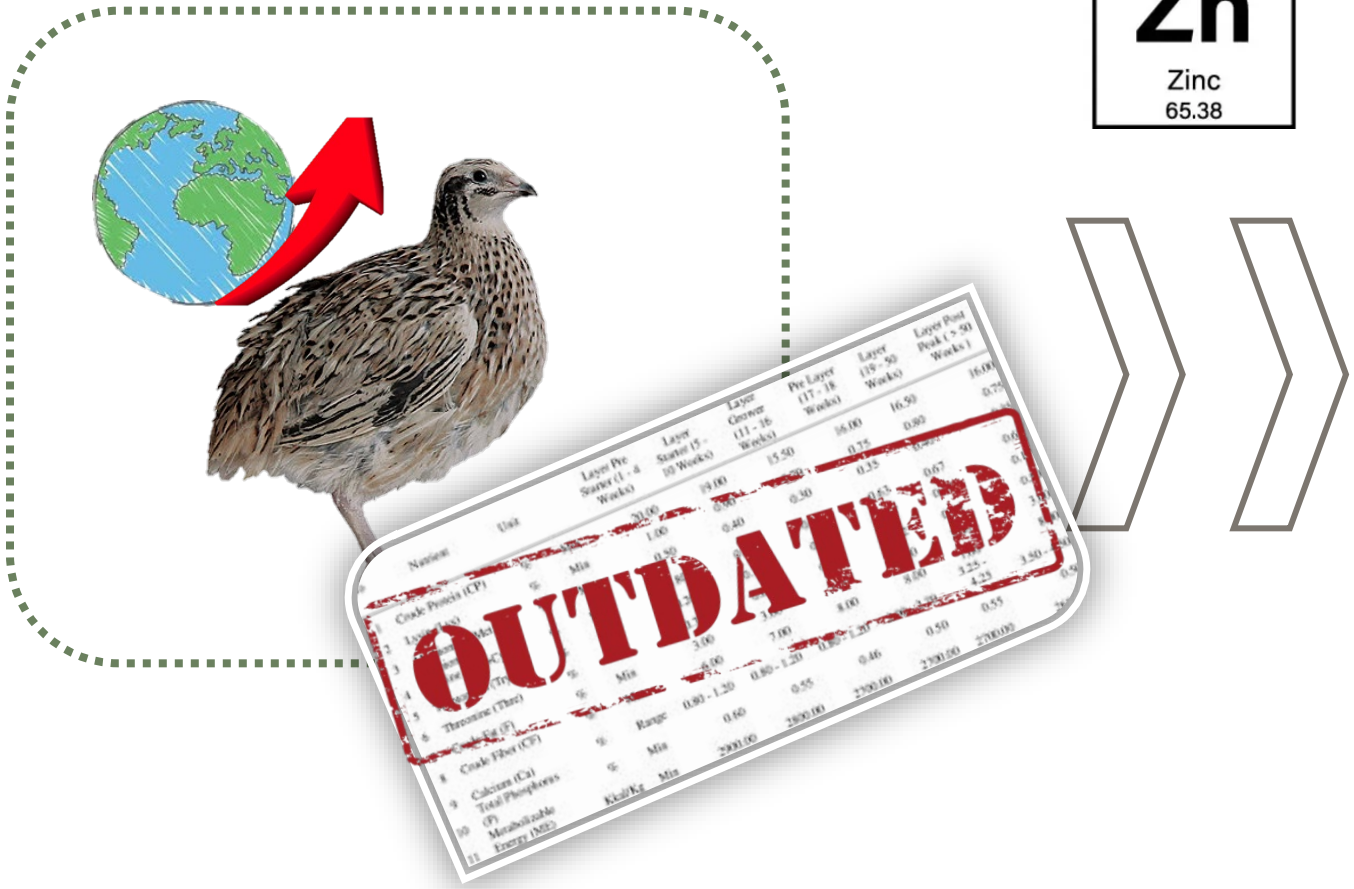
➢ Non-supplemented

➢ Trace minerals



Olouski et al. (2019)

2. Objectives



2. Experimental design

75cd → 5 replicates/5 quails

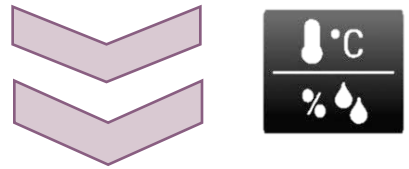
10 week-old

Meet NRC recommendations

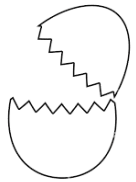
1)Zn-Sulphate (ZnS)
(BD (34.14 ppm Zn) + 15.86 ppm of Zn-Sulphate),

2) Zn-Glycine (ZnG)
(BD+ 15.86 ppm of Zn-glycine)

3) Zn-Hydroxichloride (ZnH)
(basal diet + 15.86 ppm of Zn-hydroxichloride)



12 weeks



2. Experimental design

(n=15)

(n=30)

WET DIGESTION METHOD

Olgun et al. (2017)

ICP-OES

Statistical analysis

- One-way ANOVA was performed using the SPSS 22.0 software package (SPSS Inc., Chicago, IL, USA)
- The cage was considered as the test unit.

3. Results

✓ No differences in performance parameters (P>0,05)

- Final body weight (g)
- Body weight gain (g/day)
- Feed intake (g/day/quail)
- Feed conversión ratio (g feed/g egg)

✓ No differences for egg production (P>0,05)

- Egg production (%)
- Egg weight (g)
- Egg mass (g/day/quail)

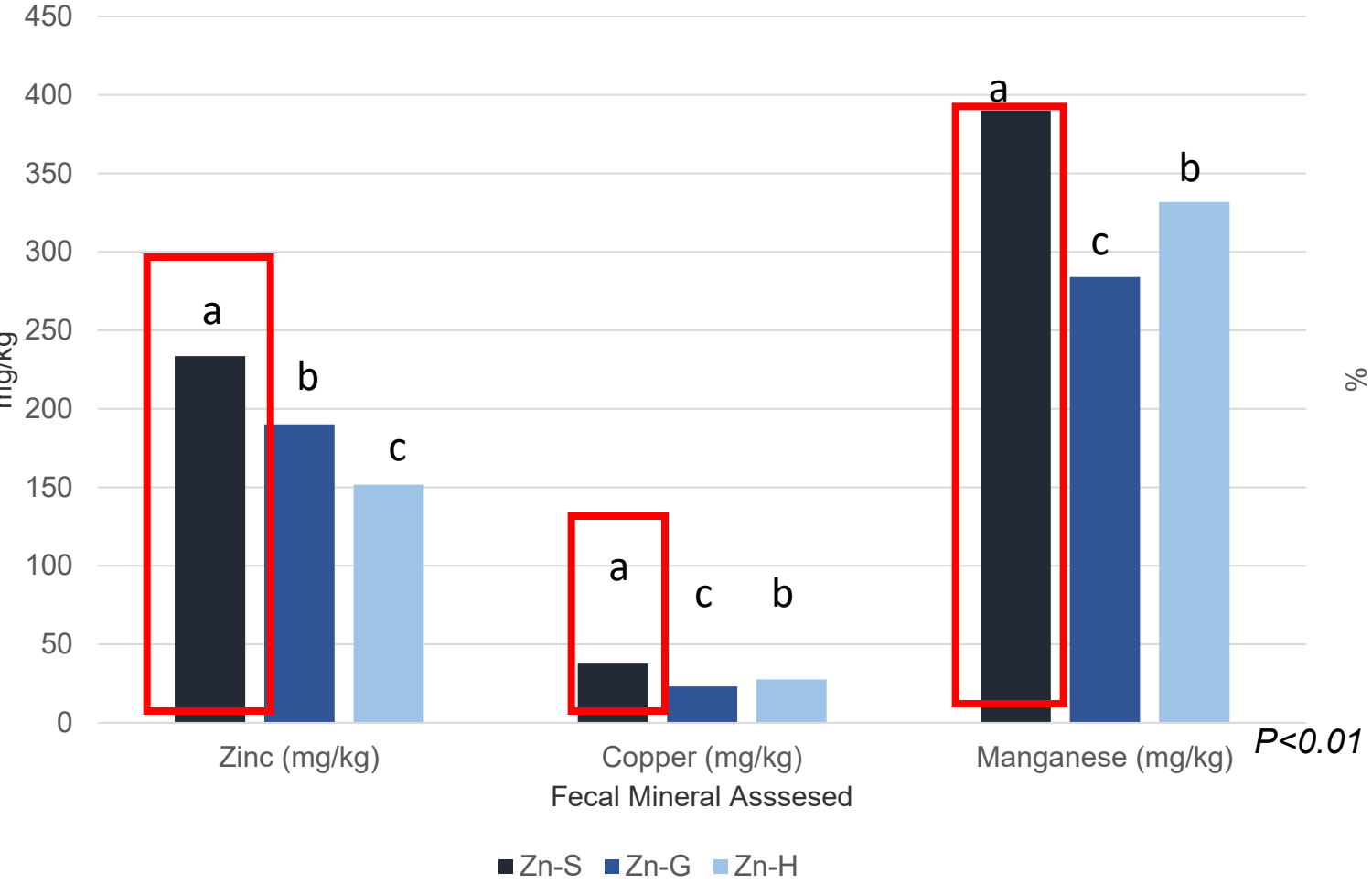
Olgun et al. (2017)
Cufadar et al. (2020)

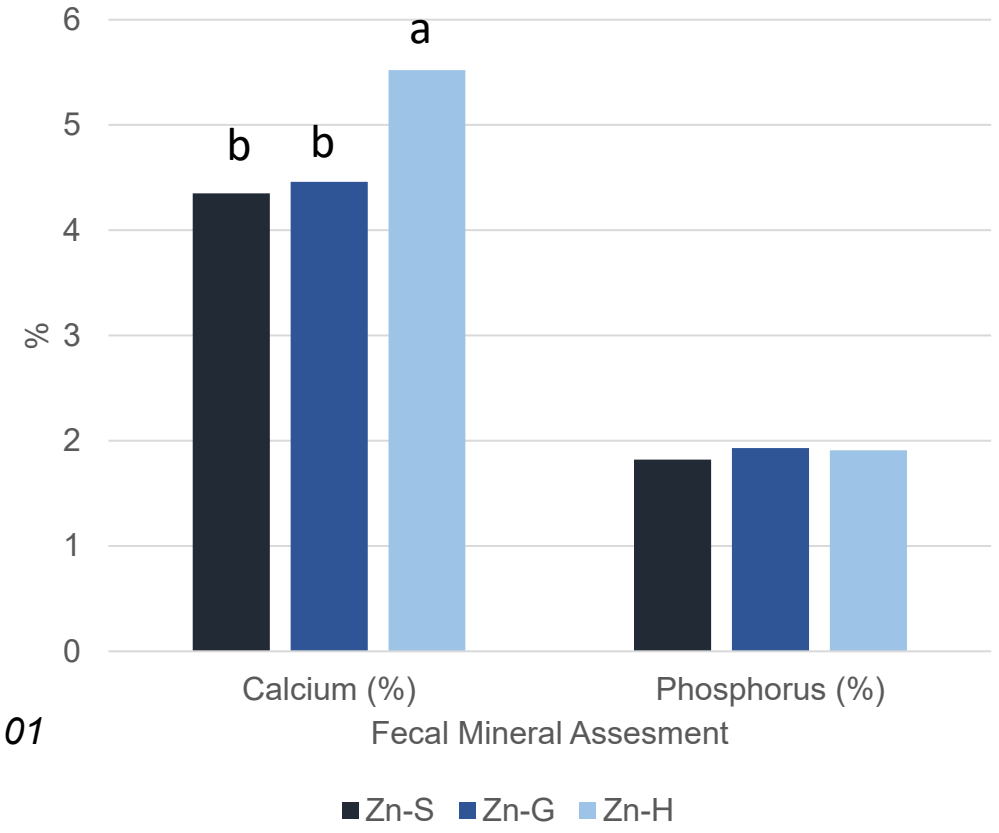
The results of the current research suggest that if dietary Zn requirements are met without stress conditions, the Zn dietary source would not impair quail development and egg production

(Franklin et al., 2022)

3. Results


30
Zn
Zinc
65.38

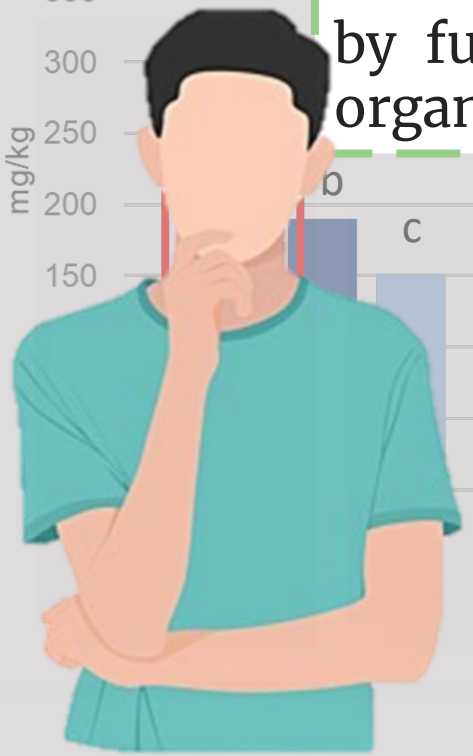

450
400
350
300
250
200
150
100
50
0
mg/kg
a
b
c
a
c
b
a
c
b
Zinc (mg/kg)
Copper (mg/kg)
Manganese (mg/kg)
P<0.01
Fecal Mineral Asssesed
Zn-S
Zn-G
Zn-H


6
5
4
3
2
1
0
%
b
b
a
Calcium (%)
Phosphorus (%)
Fecal Mineral Assesment
Zn-S
Zn-G
Zn-H

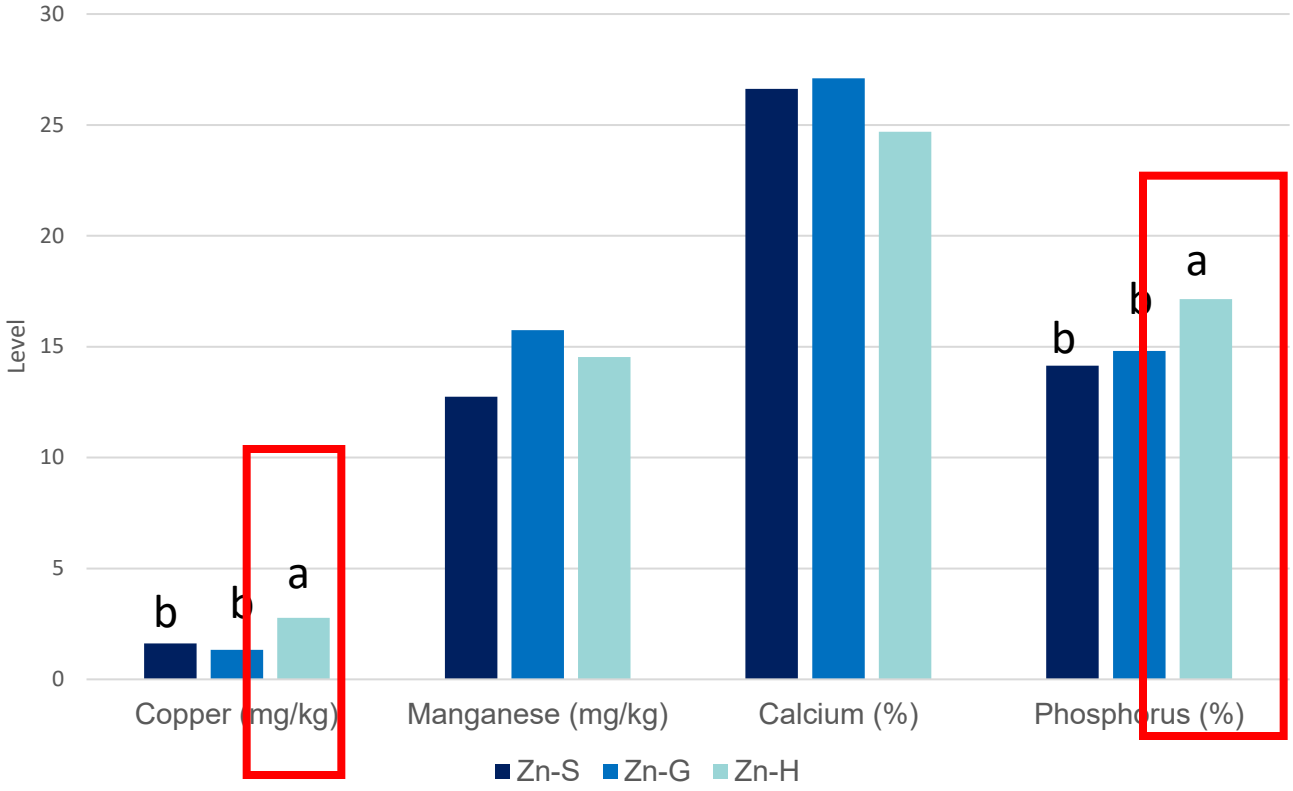
3. Results

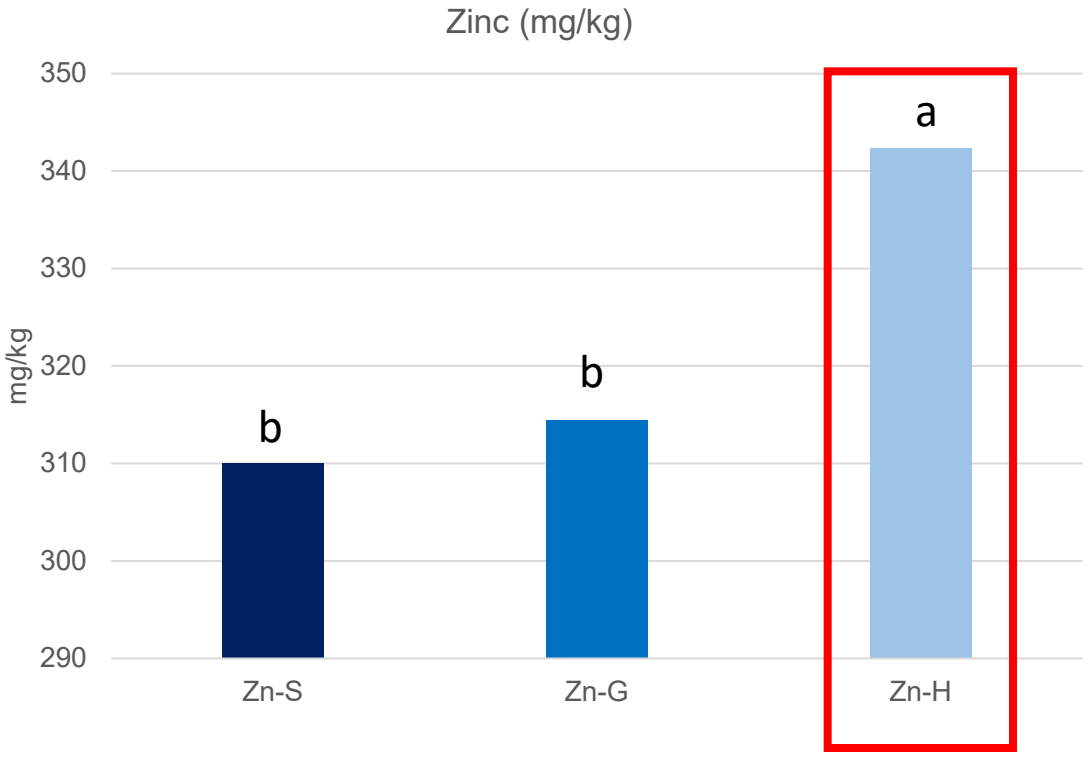
Zn-Glycine VS **Zn-Hydroxichloride**

The differences found in this study between **the Zn-G and Zn-H** forms have not been previously documented in quail. Hence, the results obtained in the current research could be better explained by further investigating the bioavailability of Zn-H concerning organic forms



3. Results

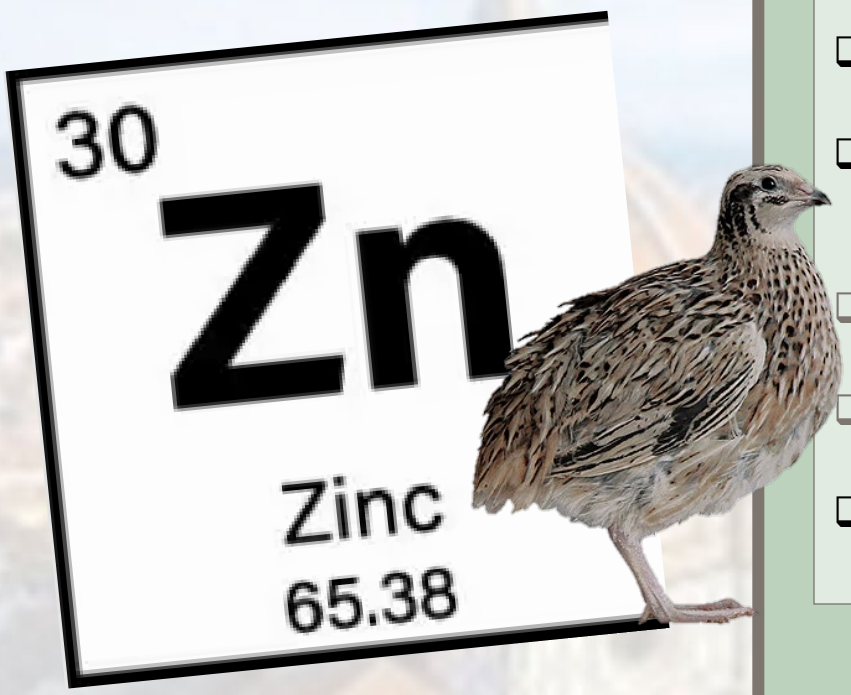




P<0.01

4. Conclusion

Zn sources



- None of the assessed Zn sources negatively impacted the performance or egg production of laying quails.
- Supplementation with Zn-H and Zn-G reduced Zn, Cu, and Mn excretion in faeces compared to Zn-S, benefiting the environment.
- Zn-H increased mineral concentration in bones, potentially improving bone health.
- Zn-H and Zn-G are suitable options to reduce TM excretion without compromising performance.
- Further studies are needed to clarify the differences between Zn-G and Zn-H supplementation

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