Schothorst Feed Research

Total or partial replacement of copper sulfate by copper bis-glycinate on performance of weaned pigs

R. Davin[1], Y. C. Link[2], S.-C. Wall[2], F. Molist[1]

[1]Schothorst Feed Research, The Netherlands
[2]Phytobiotics Futterzusatzstoffe GmbH, Germany

Copper as nutrient

- Essential trace element in monogastric animals
  - (metalloenzymes, Fe metabolism, antioxidant, etc.)
- Interactions with Zn, Fe, phytic P
- Nutrient requirements in post-weaning pigs: 5 - 6 mg/kg
  (NRC, 2012; GfE, 2008)
- Several Cu sources are used in commercial pig diets:
  - Inorganic: Cu sulfate, Cu oxide, Cu hydroxychloride (TBCC)
  - Organic: Cu amino acid chelates, or complexes

Copper as growth promotant

- Pharmaceutical levels: 250 mg/kg
- First references in 1950s

- Cromwell, 2002 – summary $CuSO_4$ promoting effect

23 experiments

18 experiments

Stage	Added Copper (ppm)[a] 0	200 to 250	Improvement (%)
Starting period (8 to 20 kg)[b]			
Daily gain (kg)	0.34	0.38	11.9
Feed/gain	1.87	1.78	4.5
Growing period (18 to 56 kg)[c]			
Daily gain (kg)	0.67	0.71	6.9
Feed/gain	2.80	2.70	3.6
Growing–finishing period (18 to 93 kg)[c]			
Daily gain (kg)	0.71	0.74	3.1
Feed/gain	3.18	3.10	2.5

New legislation in EU

- 2003- Aug 2019. Previous max. Cu: **170 mg/kg** Until 12 wk age
- 2016: EFSA FEEDAP, New proposed max Cu: **25 mg/kg**
  - Requirements, Environment, Microbiota resistance
- 2018: Regulation EU 2018/1039. Entry into force: Aug 2019

Until 4 weeks post-weaning	**150 mg/kg**
5th to 8th week post-weaning	**100 mg/kg**
All other pig groups	**25 mg/kg**

Interest to find new Cu sources with positive effect on performance and health

Objective

Determine the effect of copper bis-glycinate, as total or partial replacement of copper sulphate, on the growth performance of weaned pigs.

Materials and methods

- 384 twenty-six d-old piglets. iBW= 7.6kg
- 64 pens (6 piglets/pen; male:female ratio 1:1)

- 4 dietary treatments – 16 reps/ treatment

Exp. Diets	Treatment	Test Product	Added Cu (mg/kg)
1	CuSO-120	$CuSO_4$	120
2	Plexo-60	Cu bis-glycinate*	60
3	Plexo-120	Cu bis-glycinate*	120
4	Combo	$CuSO_4$ & Cu bis-glycinate*	120

* Plexomin® Cu, Phytobiotics

Materials and methods

Measurements:

- BW, FI at the beginning and end of each phase; FCR calculated
- Mortality
- Faecal score at the beginning and end of each phase

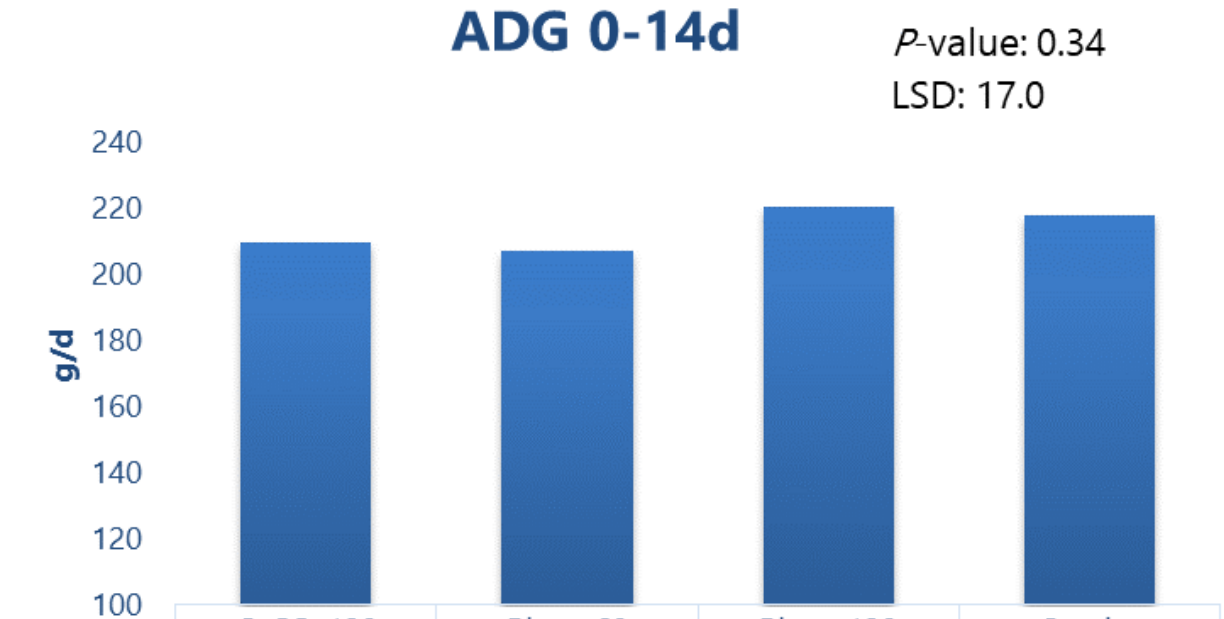
- All measurements were conducted on a pen-bases

Statistical analyses:

- One-way ANOVA – GenStat 19th Ed.
  - Treatment
  - Replicate as blocking effect
  - Fisher's test

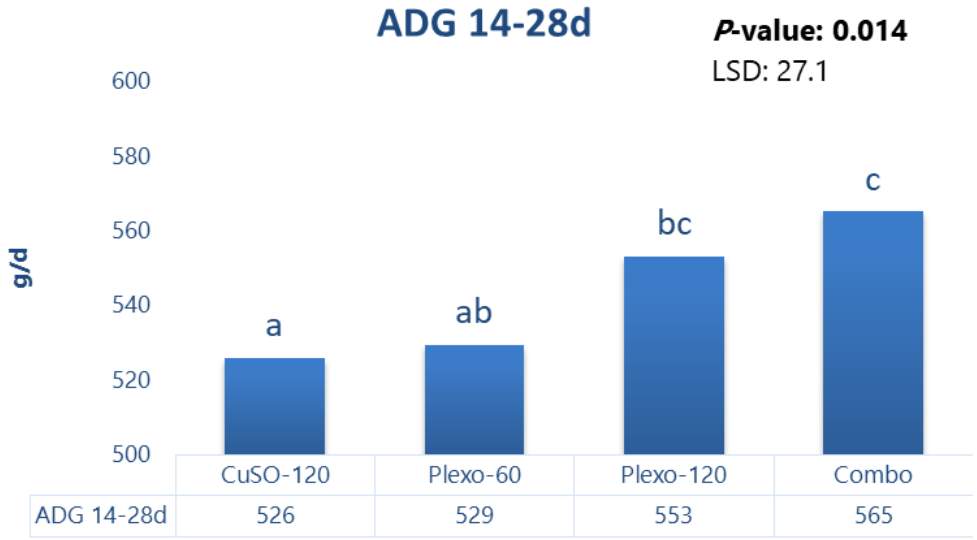
RESULTS

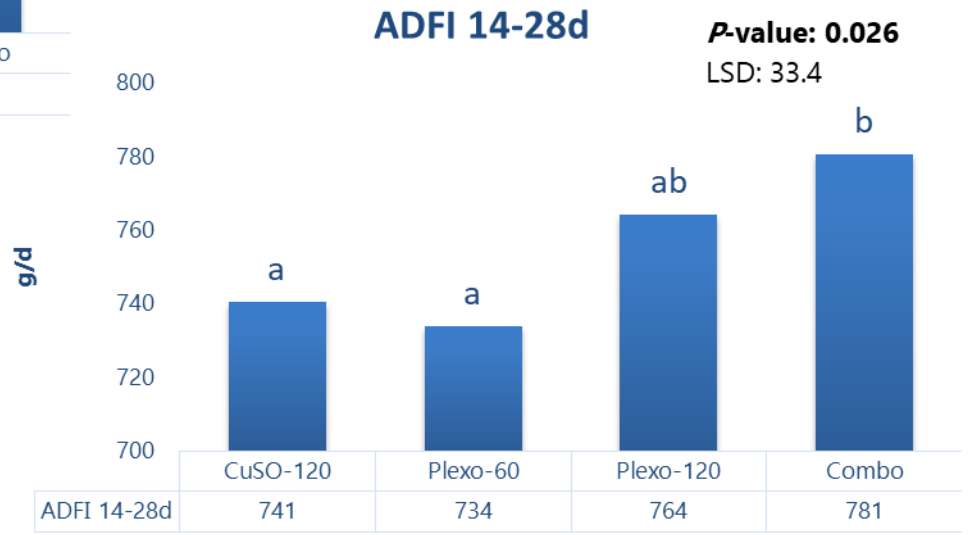
Performance. Pre-starter (0-14d)



All treatments had a similar ADG, ADFI (P = 0.62) and FCR (P = 0.24

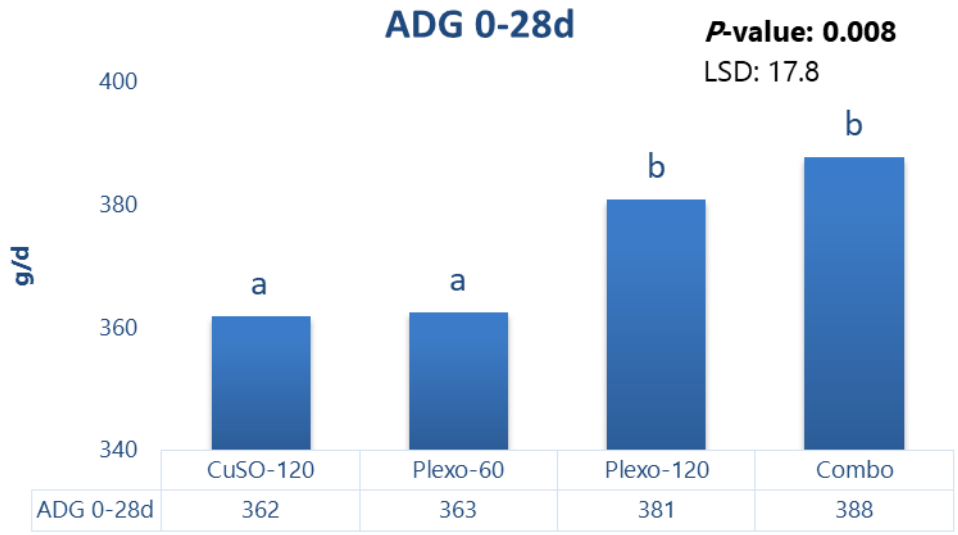
Performance. Starter (14-28d)

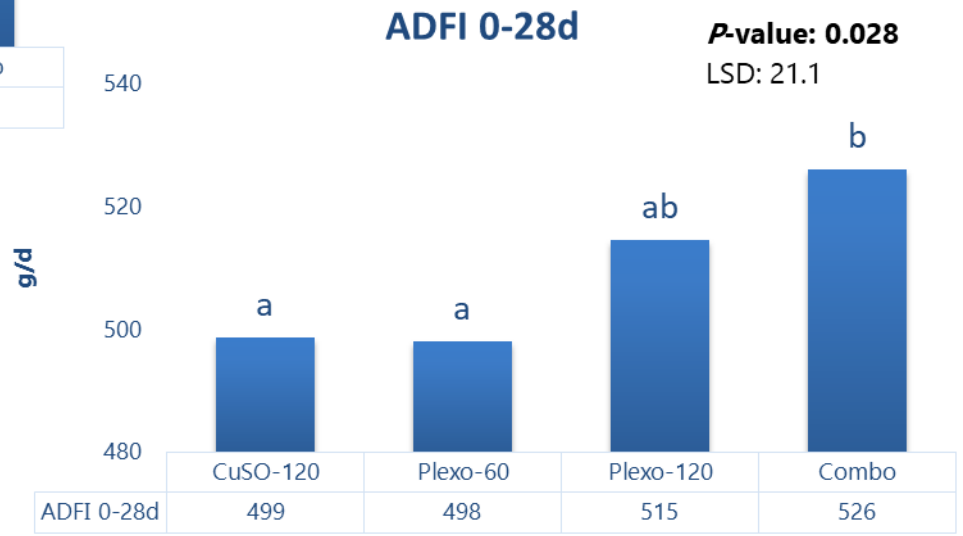




All treatments had a similar FCR (*P* = 0.23)

Performance. Overall (0-28d)





All treatments had a similar FCR (*P* = 0.12)

Conclusion

Copper bis-glycinate can improve the piglets' performance compared to copper sulphate when fed at an equivalent copper level, or maintain it when fed at 60 mg/kg.

Acknowledgements

PHYTOBIOTICS
Be curious. Be brave. Be genius.

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Thank you for your attention

rdavin@schothorst.nl