

# Bioavailability of Copper-Lysinate in weaning piglets

K. Reckmann<sup>a</sup> and M. Rimbach<sup>b</sup>

<sup>a</sup>Provita Supplements GmbH, Gierlichsstraße 6, D-53840 Troisdorf

<sup>b</sup>ISF GmbH, Wiesenweg 32, D-23812 Wahlstedt

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## INTRODUCTION

Several inorganic and organic copper sources are registered as feed additives within the EU. Thereof, organically bounded trace elements show higher absorption rates compared to inorganic compounds.

The bioavailability of copper-lysinate was assessed in an experiment. It is the first and only copper source based on lysine-chelates which is registered for all animal species in the EU. MAXLYSINAT Cu has been developed by the ISF GmbH, being produced for Provita Supplements GmbH in a patented production process.

## MATERIAL AND METHODS

A trial at the Free University of Berlin assessed the use of different copper compounds in weaning piglets. Piglet feed of 60 male and female cross-breeds (Large White x Landrace) were supplemented with different copper compounds. The control group (no copper supplementation) as well as three experimental groups were each kept in 5 pens with 3 animals.

The trial started with a **depletion** of 14 days (LD 25-39) without any supplementation of trace elements. The ration (Tab. 1) was formulated according to nutrient recommendations of the GfE (2006), whereas the copper content was underdosed. In the following **repletion** period, trace elements were supplemented as recommended (GfE, 2006) from LD 40 to 48 (Tab.2). During this time, digestibilities of different copper sources were assessed in a differential experiment. **Partial digestibilities** of the copper sources (groups B, C and D) were calculated based on faecal digestibilities which were determined using a marker method.

## RESULTS

**Partial copper digestibilities** (Fig. 1) of organic sources were considerably enhanced compared to inorganic sources. Copper-lysinate showed an increased partial digestibility by 52% compared to the sulfate compound.

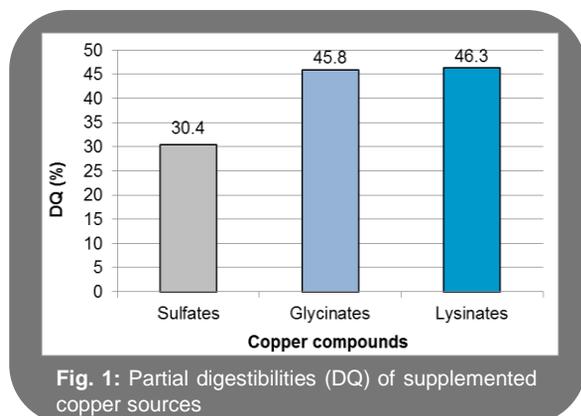
**Zootechnical performances** were improved when supplementing copper-lysinate compared to an addition of glycine-chelates, using equal trace element concentrations and lysine contents in feeds (Fig. 2). Daily weight gains were highest with a supplementation of lysinate and increased by 7.5% opposite to an addition with sulfate. The feed conversion decreased by 6.6%. Performances of group C (Cu-Glycinate) improved less compared to supplemented sulfate.

**Tab. 1:** Ingredients and nutrient levels of depletion feed (LD 25-39)

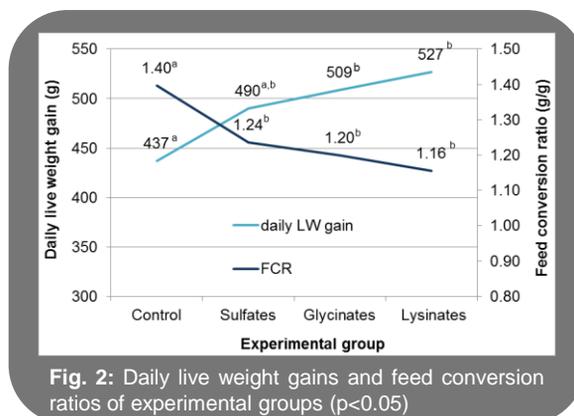
Ingredients		
Barley	%	54.8
Skim milk powder	%	37.7
Corn starch	%	3.0
Lignocellulose	%	1.4
Soy oil	%	0.5
Mineral feed	%	2.6
Nutrient levels		
Energy (ME)	MJ/kg	13.2
Crude protein	%	18.8
Lysine	%	1.3

**Tab. 2:** Calculated copper contents in feed mixtures

Experimental group	Copper
Native content	mg/kg 2.0
Recommendation	5.0
Supplementation	3.0
Supplementation	
Group A: Control	0
Group B: Cu-Sulfate	12.0
Group C: Cu-Glycinate	12.6
Group D: Cu-Lysinate	22.9



**Fig. 1:** Partial digestibilities (DQ) of supplemented copper sources



**Fig. 2:** Daily live weight gains and feed conversion ratios of experimental groups (p<0.05)

## SUMMARY

The supplementation of piglet feed with copper-lysinate according to nutritional recommendations (GfE, 2006) showed considerable benefits in comparison to the use of sulfate or glycinate compounds. Partial digestibility was increased. Live weight gain as well as feed conversion ratio were improved considerably. Moreover, the addition of **MAXLYSINAT Cu** allows a reduced supplementation of lysine in the feed mixture.

## LITERATURE

GfE (2006): Empfehlungen zur Energie- und Nährstoffversorgung von Schweinen. Hrsg.: Ausschuss für Bedarfsnormen der Gesellschaft für Ernährungsphysiologie. DLG-Verlags-GmbH, Frankfurt am Main.