SMART Hydroxy trace minerals

a top quality mineral supplement with superior characteristics

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Trace minerals such as copper, zinc and manganese are of great importance for optimal health and performance. An optimal trace element supply, provided by a high quality source of trace minerals is necessary to avoid deficiencies and associated health issues. The new generation hydroxy trace minerals (Excential Smart range by Orffa) are highly available to the animal without negatively influencing stability or uptake of surrounding nutrients, health of the intestinal tract and rumen health and function. They contribute to an optimal trace mineral supply to the animal, which results in improved animal health and performance.

COPPER, ZINC AND MANGANESE

Trace minerals are involved in various complex functions in the metabolism and deficiencies can lead to a variety of disorders. Copper, zinc and manganese play an essential role in several important enzyme activities as co-factor in metalloenzymes. Copper is needed for neutralization of free radicals and red blood cell maturation. Together with zinc it is essential for claw health, supporting bone and cartilage metabolism. Zinc is also important for skin health and immune function. Manganese is important for skeletal development and fertility.

IT'S ALL ABOUT SMART BONDING

Trace minerals are generally categorized as either organic or inorganic, but within these two categories there is a lot of difference. Inorganic sulphate and oxide sources are ionically bound which influences their solubility. Sulphates are highly soluble in water, already at a neutral pH. Released trace minerals are reactive and can degrade other nutrients or form complexes with surrounding minerals and other compounds, reducing their uptake. The new generation trace minerals, hydroxy trace minerals (Excential Smart range) are inorganic but have better bioavailability because of their unique covalent bonds and crystal matrix structure that provides excellent stability and low reactivity. The molecule structure of hydroxy trace minerals is stable and not soluble at neutral pH. The release of the trace mineral atoms starts when pH is decreased and provides a "slow release" effect to the product. This slow release ensures less reactivity and complex formation and results in trace minerals which become available during passage through the small intestine where they can be taken up by transporters to create an optimal trace mineral supply to the animals. Within the category of the organic trace elements, there is also a difference in solubility between sources. The type of bonding of the existing organic complexes can show variability and is very difficult to analyze.

MONOGASTRICS

Recently the allowed supplementation of trace minerals in feed was decreased within the EU, mainly for environmental reasons. These limitations force nutritionists to take the biological quality of the trace minerals used into account. This counts especially for copper and zinc which are well known in poultry and swine to sustain epithelium health (skin and especially footpad and claw health). The biological quality of hydroxy trace minerals as combined effect on zootechnical performance and on skin parameters was shown in a recent European broiler trial. Ross 308 birds received either 15 and 120 ppm Cu and Zn from sulphates (Control) or a reduced dosage of 10 and 80 ppm Cu and Zn, respectively, in the form of hydroxy trace minerals (XC Smart).

Footpad lesions were evaluated following a 0 – 4 score measurement. Results are shown in Figures 1 and 2. The results show the high biological quality towards lower footpad lesion scores for hydroxy minerals, meaning fewer lesions and healthier footpads. Liver copper levels were measured and indicated the higher bioavailability of the hydroxy trace minerals, although lower dosages of these elements were used.

Figure 1: Footpad lesion scores in broilers fed different trace mineral sources

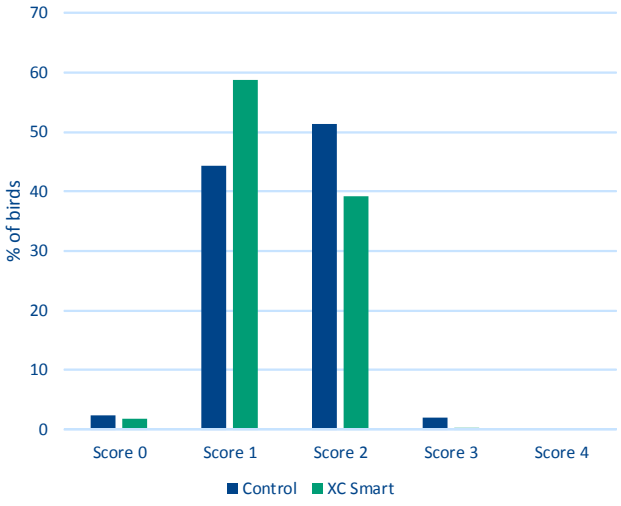
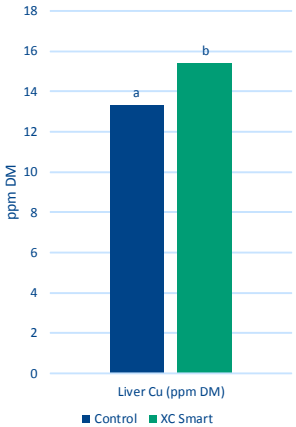
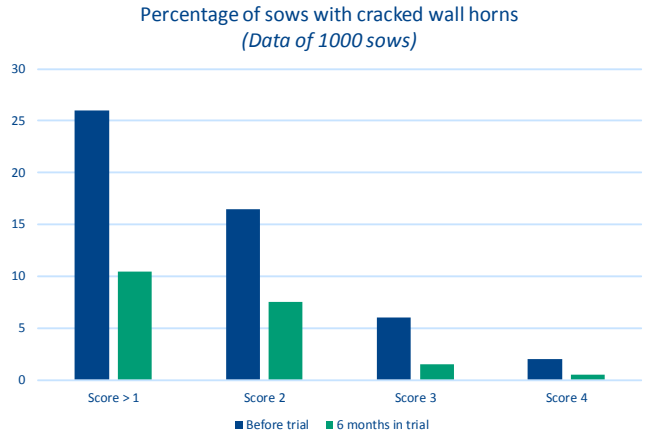


Figure 2: Liver Cu levels in broilers fed different trace mineral sources



In swine similar results were observed in a recent Scandinavian field trial comparing sulphates and hydroxy trace minerals in two herds of 500 sows each. Before the trial, a large number of sows suffered from a variable severity of cracked wall horn in their claws. Using a 1 – 4 scoring system the more bioavailable hydroxy trace minerals improved claw health of the sows in these practical circumstances. Results are presented in Figure 3.

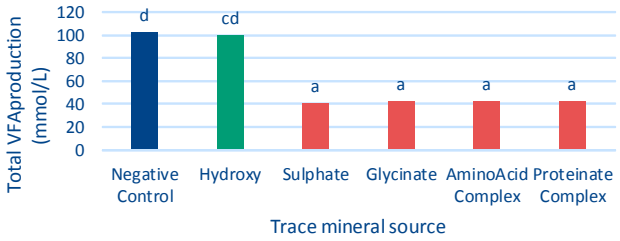
Figure 3: Distribution of cracked wall horns in sows fed hydroxy trace minerals compared to sulphates



RUMINANTS

Hydroxy trace minerals are characterized by their strong intramolecular bonds in comparison to the weak ionic bonds of sulphates and most of the organic minerals. Strong bonds provide excellent stability and low reactivity in the rumen and a slow release effect in the intestinal tract.

Optimal performance of dairy cows requires good rumen health. In the rumen, numerous nutrient interactions can cause disturbance of the rumen function and decrease fermentation, with impaired performance as a result. The higher the solubility at neutral pH, the more likely these interactions will occur in the rumen. Sulphate sources are highly water soluble under neutral pH circumstances, remembering the bright blue copper water baths that were used in the past to disinfect the hoofs of cattle. Soluble copper that is released in the rumen is highly reactive and causes impaired efficacy of the microbiota, negatively influencing fermentation, health and production. In recent laboratory trials (Figure 4), which represent a simulation of rumen fermentation, high copper and zinc sulphates led to a severe decrease of gas and volatile fatty acid (VFA) production, resulting in impaired energy production for maintenance and production of the animals. Hydroxy minerals have been demonstrated to have a significantly low impact, with a similar production of total VFA as the negative control, whereas sulphates and various organic trace mineral sources showed a big drop in VFA production.



When comparing hydroxy trace minerals with inorganic sulphate sources, hydroxy trace minerals show higher rumen fermentation, milk production, hoof health and fertility in various animal trials, both under practical and controlled conditions.

QUALITY PREVAILS

After a period of intensive research and development, Orffa launched the hydroxy trace minerals on the feed market.

Orffa created and selected the hydroxy trace mineral products (Excential Smart range) according to the strictest internal and external quality constraints. The Excential Smart products are regularly tested on full compliance with all requirements as laid down by EU Regulations 269/2012 and 991/2012 and EU Directive 2002/32, and they are consistently meeting the demanding quality standards of the EU. Based on all collected information, strict monitoring programs are implemented, allowing Orffa to guarantee the legally requested crystal structure.

Subsequent to this, production methods and delivered products are continuously audited and checked on the GMP+ / FAMIqs standards. Moreover each batch is analysed for the active contents, as well as for the different dioxin parameters such as pure dioxins, dioxin-like and non-dioxin-like PCBs and for heavy metal contaminations (Arsenic, Cadmium and Lead). In the table below the average values are given for the analyses of the year 2018.

The low level of heavy metal impurities in Excential Smart products, combined with a high level of active mineral content, makes the Excential Smart range one of the purest and safest trace mineral sources available to the animal feed industry. For heavy metals, the maximum levels in feedingstuffs are as low as 0.5 ppm Cadmium,

	Active ingredient	*Dioxins*	*Dioxins + DL-PCB's*	*Non DL-PCB's*	*As*	*Cd*	*Pb*
		[ng/kg]	*[ng/kg]*	*[µg/kg]*	*(ppm)*	*(ppm)*	*(ppm)*
Excential Smart C 2018 - average	54.8% Cu	0.24	0.42	0.59	<2.00	<1.00	12.56
Excential Smart Z 2018 - average	57.6% Zn	0.16	0.20	0.32	0.69	0.89	2.58
Excential Smart M 2018 - average	53.2% Mn	0.08	0.11	0.33	5.5	0.41	8.1
EU legal limit trace elements		1.0	1.5	10	30	10	100
EU legal limit Hydroxy Copper and Manganese		1.0	1.5	10	50	10	100

and for complete and complementary feedingstuffs respectively, 5 or 10 ppm Lead and 2 or 4 ppm Arsenic. For Hydroxy Copper the legal maximum limit for Arsenic was increased from 30 to 50 ppm and recently the same increase is regulated for Hydroxy Manganese upon a producers' request. However, Excential Smart products easily meet the lowest standards since Arsenic levels are largely below 10 ppm. It is our duty and engagement to keep these levels as low as possible, and to ensure that our customers use the safest and purest trace element sources available

Hydroxy trace minerals (Excential Smart range by Orffa) are the best choice to optimize the trace mineral supply to your customers' animals. They have a high mineral content compared to inorganic as well as organic minerals, are not hygroscopic and are dust-free enabling perfect flowability and are cost effective in use in feed, premix and mineral mix. They are the safest and purest mineral source available to the industry.

Excential Smart C
EU 3b409 (> 54% Cu)
Crystalline Dicopper chloride trihydroxide

Excential Smart Z
EU 3b609 (> 56% Zn)
Crystalline Zinc chloride hydroxide monohydrate

Excential Smart M
EU 3b507 (> 50% Mn)
Crystalline Dimanganese chloride trihydroxide

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