蜀星
SUSTAR

Feed Every Ounce with Love

Copper hydroxychloride

Tribasic Copper Chloride

Cost reduction and benefit increasing

Energy conservation and emission reduction

Traditional feed additive copper sulfate has the disadvantages of caking due to moisture absorption, strong oxidability, damage to processing equipment and accelerated failure of nutrients, enzymes, vitamins and fat in feed, resulting in decreased palatability of feed. SUSTAR tri-basic copper chloride product features low hygroscopicity, good flowability, structural stability, weak oxidability and high bioavailability and is hailed as a “revolutionary” copper source.

Product Information

Chemical name: Tri-basic copper chloride
Molecular formula: $Cu_2(OH)_3Cl$
Molecular weight: 213.57
Character: Dark green or pale green powder, non-caking, with good physical and chemical flowability.

Physical Chemical Indicators

Ingredients	Index
$Cu_2(OH)_3Cl$,%	≥97.8
Copper content, %	≥58
Arsenic (subject to As), mg/kg	≤10
Plumbum (subject to Pb), mg/kg	≤10
Cadmium (subject to Cd), mg/kg	≤3
Mercury (subject to Hg), mg/kg	≤0.1
Moisture, %	≤0.5
Fineness (through W=250μm test sieve), %	≥95
Note: Dioxin and PCB contained in the product conform to EU standard	

Product Features

- Low hygroscopicity and not prone to deliquescence.

The product can effectively prevent caking arising from moisture absorption of tri-basic copper chloride and extend the storage life.

- Good uniformity

With grain diameter of 0.05-0.15mm and good flowability, it can avoid copper poisoning for not mixing with feed evenly.

- Effectively reduce nutrient loss of feed

Cu^{2+} is linked by covalent bond to improve structural stability and weaken the oxidation of vitamins, phytase and fat in feed.

- High biological value

With higher bioavailability, tri-basic copper chloride can reduce the dosage and promote growth.

- Good palatability

Palatability determines the absorption level of feed. Tri-basic copper chloride has good palatability since its pH value is approximate to a neutral value.

Application

(I)Weaned piglets

Adding appropriate tri-basic copper chloride into daily ration of weaned piglet can improve the

antioxidant enzyme activities of CER and Cu/Zn-SOD in serum of weaned piglet and reduce oxidative stress response and diarrhea rate of weaned piglet. copper chloride has good palatability since its pH value is approximate to a neutral value.

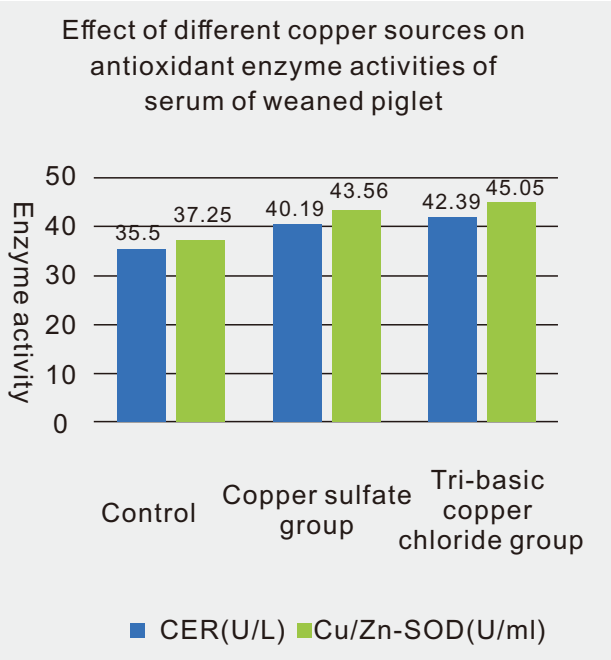

Fig.1 Effect of different copper sources on antioxidant enzymes of piglet

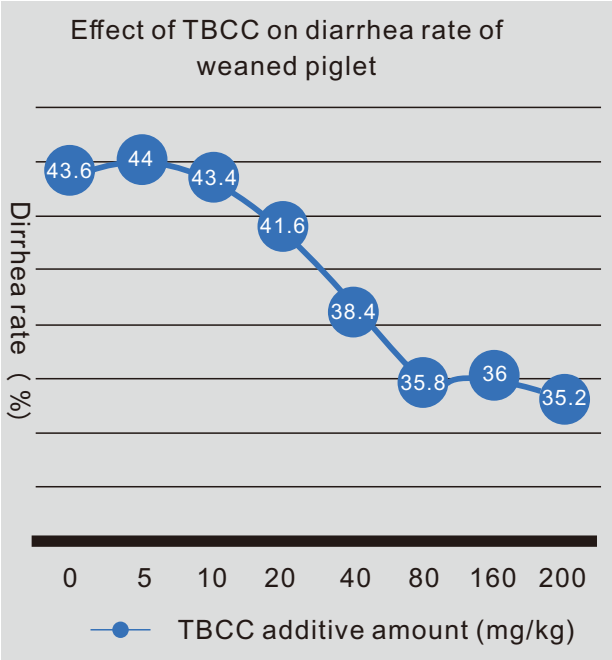

Fig.2 Effect of TBCC on diarrhea rate of weaned piglet

(II) Growing-finishing pig

Ensuring intestinal health of growing-finishing pig is the precondition for healthy growth of animals. The depth of intestinal crypts can represent the maturity of enterocyte. The shallower intestinal crypt is the stronger intestinal secretion function is. After growing-finishing pig is fed with tri-basic copper chloride, the depth of intestinal crypt decreases, the intestinal secretion function improves, and daily gain, feed conversion ratio and carcass weight increase.

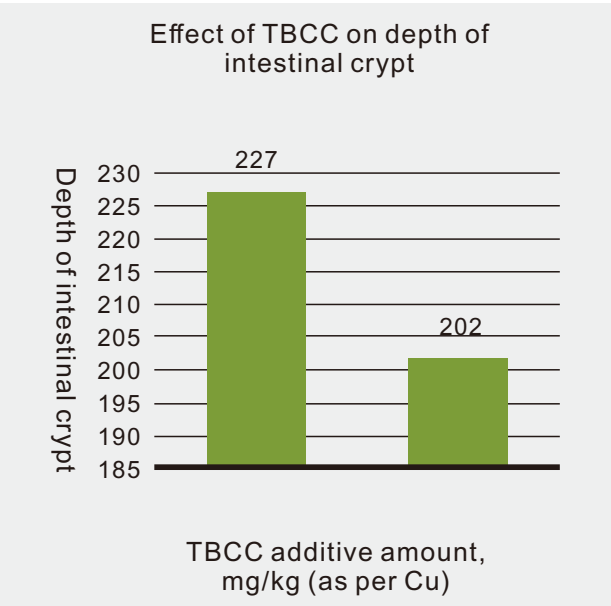

Fig.3 Effect of TBCC on intestinal tract of piglets

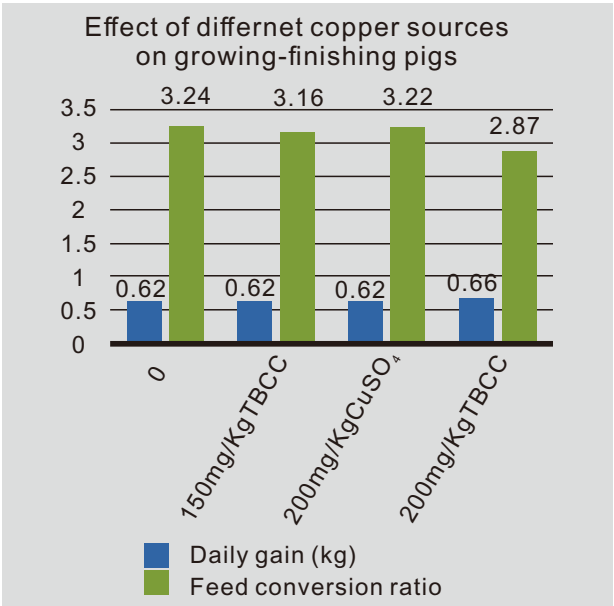

Fig.4 Effect of TBCC on intestinal tract of piglets

(III) Broiler duck

Research shows that adding 10mg/kg tri-basic copper chloride (as per Cu) into feed has the same effect on improving growth performance, intestinal morphology and mineral elements in tissues of broiler duck as 150mg/kg CuSO4 (as per Cu); while adding 150mg/kg tri-basic copper chloride (as per Cu) can better improve productivity and intestinal morphology of broiler duck.

(IV) Broiler chicken

Tri-basic copper chloride can stimulate secretion of hormones relating to growth and ingestion and improve immunity function and physical health of intestinal tract, in order to increase productivity of broiler chicken and feed reward and decrease the feed conversion ratio.

Table 1 Effect of different copper sources on growth performance of broiler chicken

Copper source	Copper level	Day1-21					Day22-42				Day1-42		
		BW1d g/bird	BW21d g/bird	AFI g/bird	BWG g/bird	F:G g:g	BW42d g/bird	AFI g/bird	BWG g/bird	F:G g:g	AFI g/bird	BWG g/bird	F:G g:g
CON	0	43.47	821.5*	1057*	778.0*	1.359	2491*	2897	1670	1.734	3954	2447*	1.614
CuS	40	43.5	847	1091	803.5	1.358	2514b	2901	1667	1.740	3993	2471b	1.616
	80	43.45	868.4	1139	825.2	1.381	2530b	2916	1662	1.755	4055	2487b	1.630
	120	43.47	872.2	1123	828.7	1.356	2533b	2887	1661	1.738	4010	2490b	1.611
	160	43.55	869.7	1121	826.2	1.356	2549b	2946	1679	1.754	4067	2505b	1.623
CuT	40	43.42	863.9	1101	820.7	1.341	2536b	2899	1672	1.733	4000	2493b	1.604
	80	43.50	903.8	1168	860.2	1.357	2637a	2978	1734	1.718	4147	2594a	1.599
	120	43.47	886.7	1126	843.2	1.335	2555b	2869	1668	1.720	3995	2511b	1.591
	160	43.48	897.6	1167	854.1	1.366	2548b	2857	1650	1.731	4023	2504b	1.607
SEM		0.04	12.87	19.83	12.86	0.012	12.03	42.14	19.48	0.020	40.73	12.02	0.014

Note: a-c values without the same superscript show a significant difference (P<0.05); CON: Control; CuS: CuS: Copper sulfate; CuT: Tri-basic copper chloride; AFI: Average feed intake; BWG: Body weight gain; F:G: Feed-gain ratio; * represents a significant difference in control and all copper groups (P<0.05).

(V) Ruminants

Tri-basic copper chloride is insoluble in water and releases a little Cu2+, so it does not have an antagonistic effect on Cu, S and Mo in the rumen but it can improve the bioavailability of copper and the digestibility of rumen. Moreover, it can better increase the daily gain and feed conversation ratio of ruminant and the culture benefit andreduce the feed cost than copper sulfate and cu-lys.

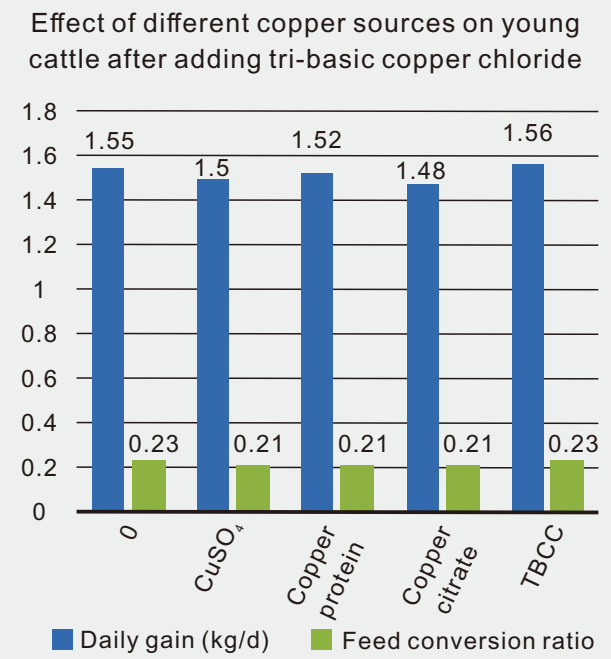

Fig.5 Effect of different copper sources on young cattle

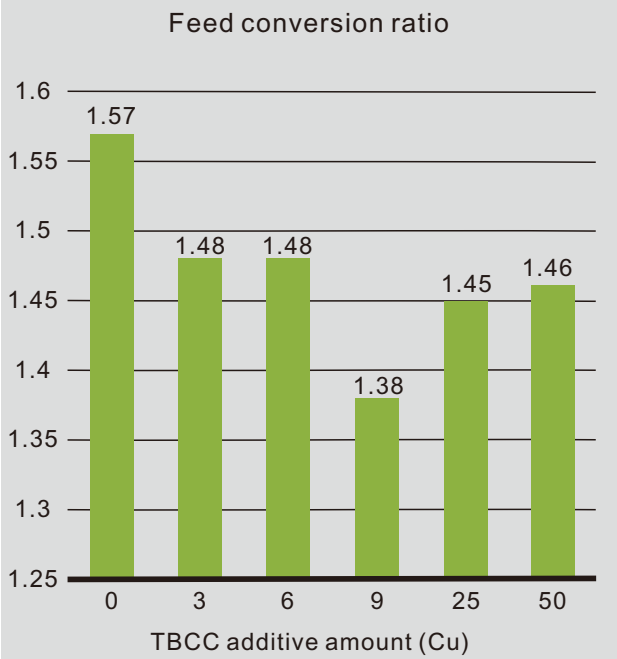

Fig.6 Effect of TBCC on carassius auratus gibelio

(VI) Aquatic livestock

Adding tri-basic copper chloride into aquatic feed can improve productivity, digestion rate and blood biochemical index of aquatic livestock and increase the intestinal microbial flora, so it has a certain potential value for the application of aquatic feed.

Usage and Dosage

- **Scope of application:**
  Weaned piglets, growing-finishing pigs, poultry, ruminants, fishes, shrimps and crabs, etc.
- **Usage and dosage:**
  Dosage of g/T mixed feed is shown below.

Additive amount, mg/kg (as per element)			
Animal category	Domestic recommended additive amount	Upper limit	SUSTAR recommended additive amount
Pig	3-6	125 (piglet)	6.0 –15.0
Chicken	6-10		8.0 - 15.0
Calf		15 (pre-ruminant)	5-10
		30 (other calves)	10-25
Sheep		15	5-10
Goat		35	10-25
Crustacea		50	15-30
Other		25	
Note: The recommended dosage can meet the basic need for copper. If there is special need, the dosage can be adjusted.			

- **Packing specification:**
  25kg/bag, duplex bag.
- **Storage method:**
  Sealed and stored in a cool, well-ventilated and dry place.
- **Storage life:**
  24 months.

EU standard for dioxin and PCBs

Item	Upper limit
Dioxin	1ng/kg
PCBs	0.35ng/kg
Sum of dioxin and dioxin PCBs	1.5ng/kg
Dioxin PCBs	10μg/kg

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