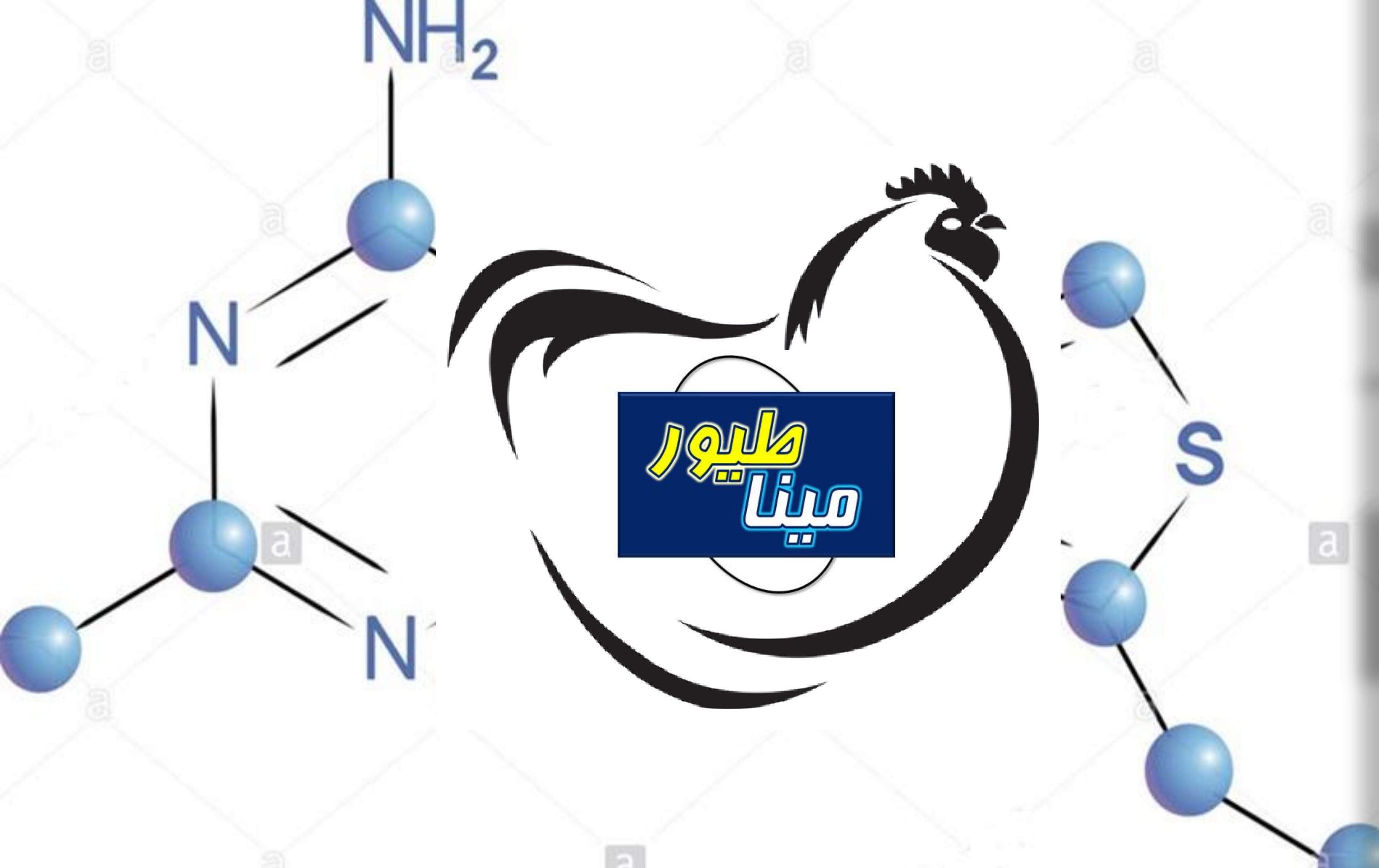


تولیدکننده مکمل، پریمیکس، کنسانتره و خوراک طیور

Since 1994

چالش های تامین ویتامین ها و مواد معدنی

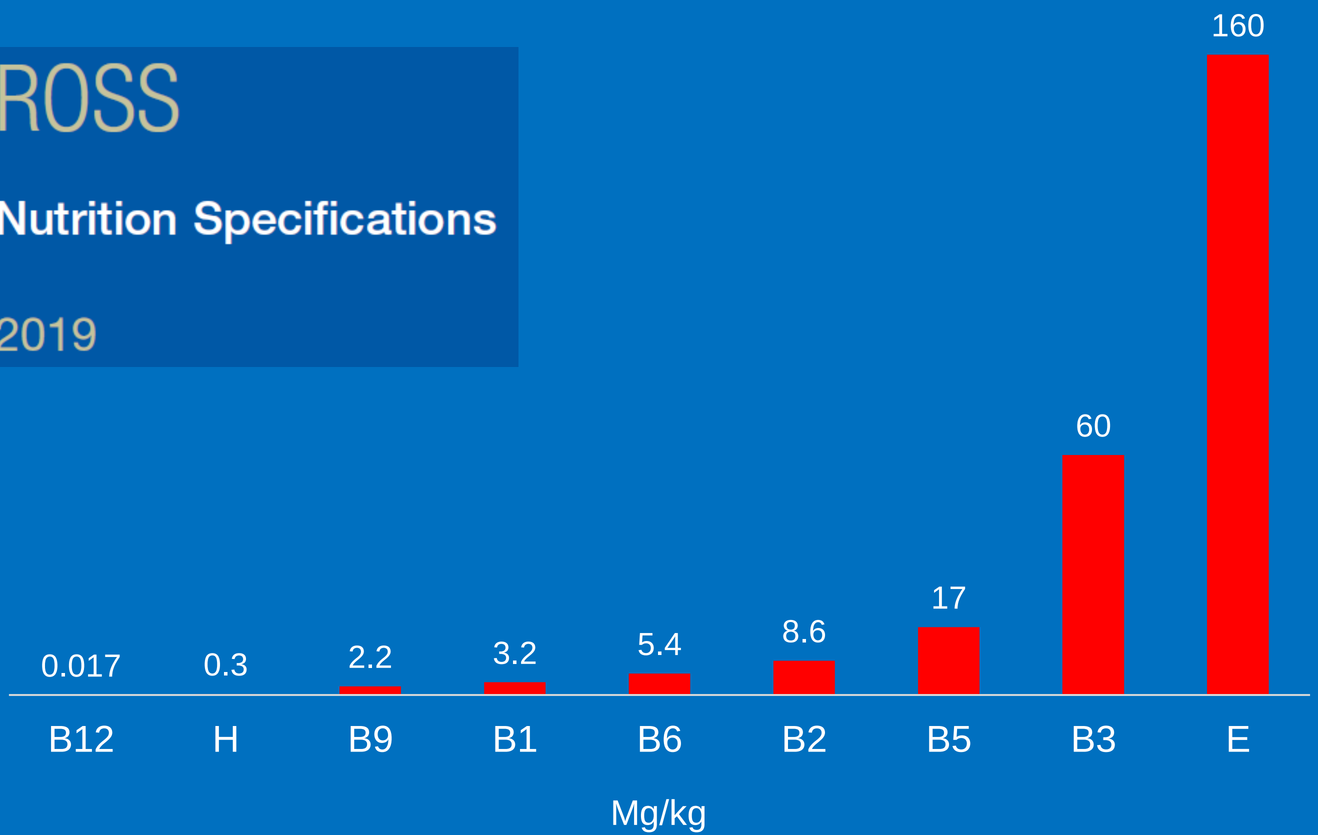
ویتامین ها

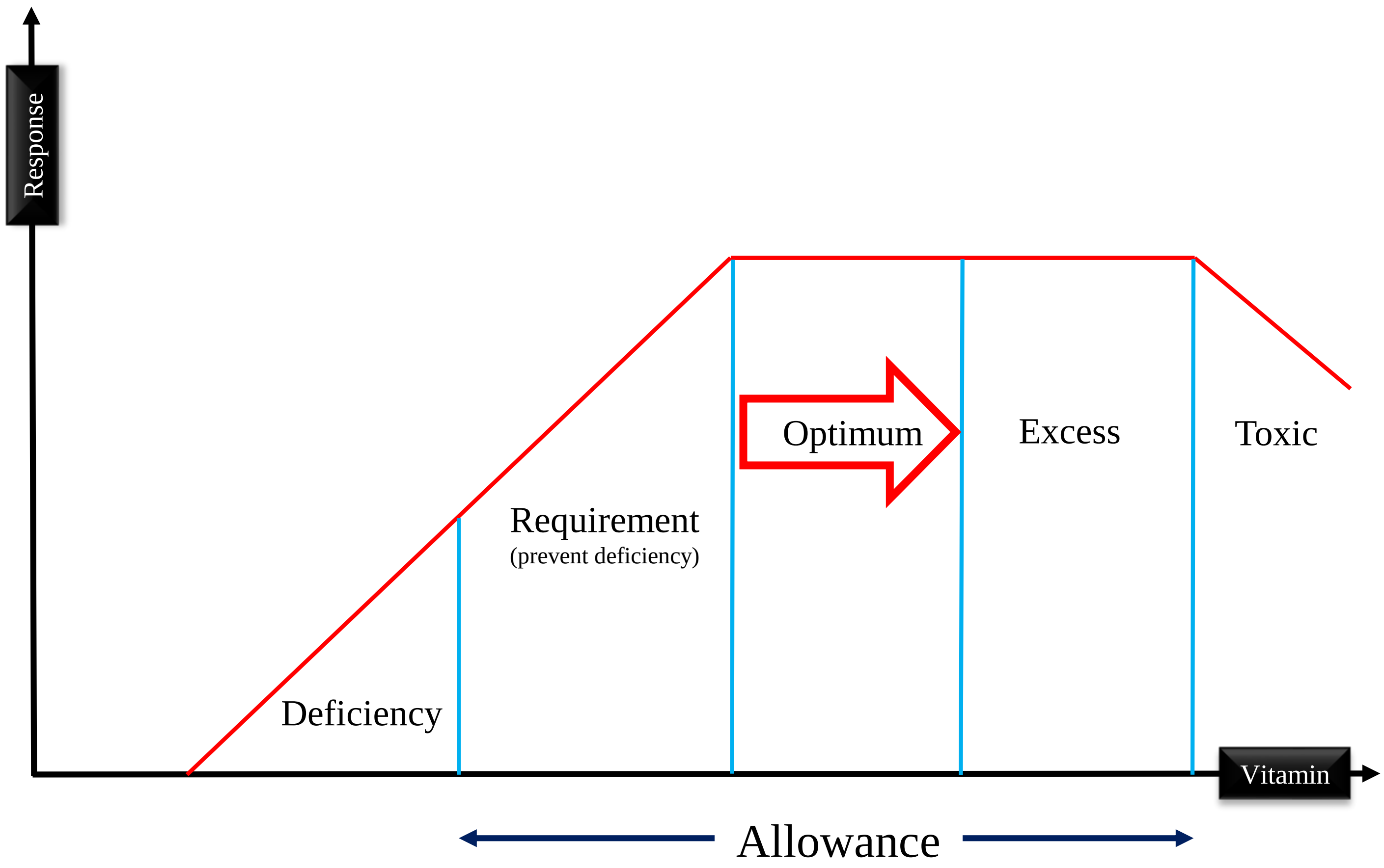
Requirement of vitamins

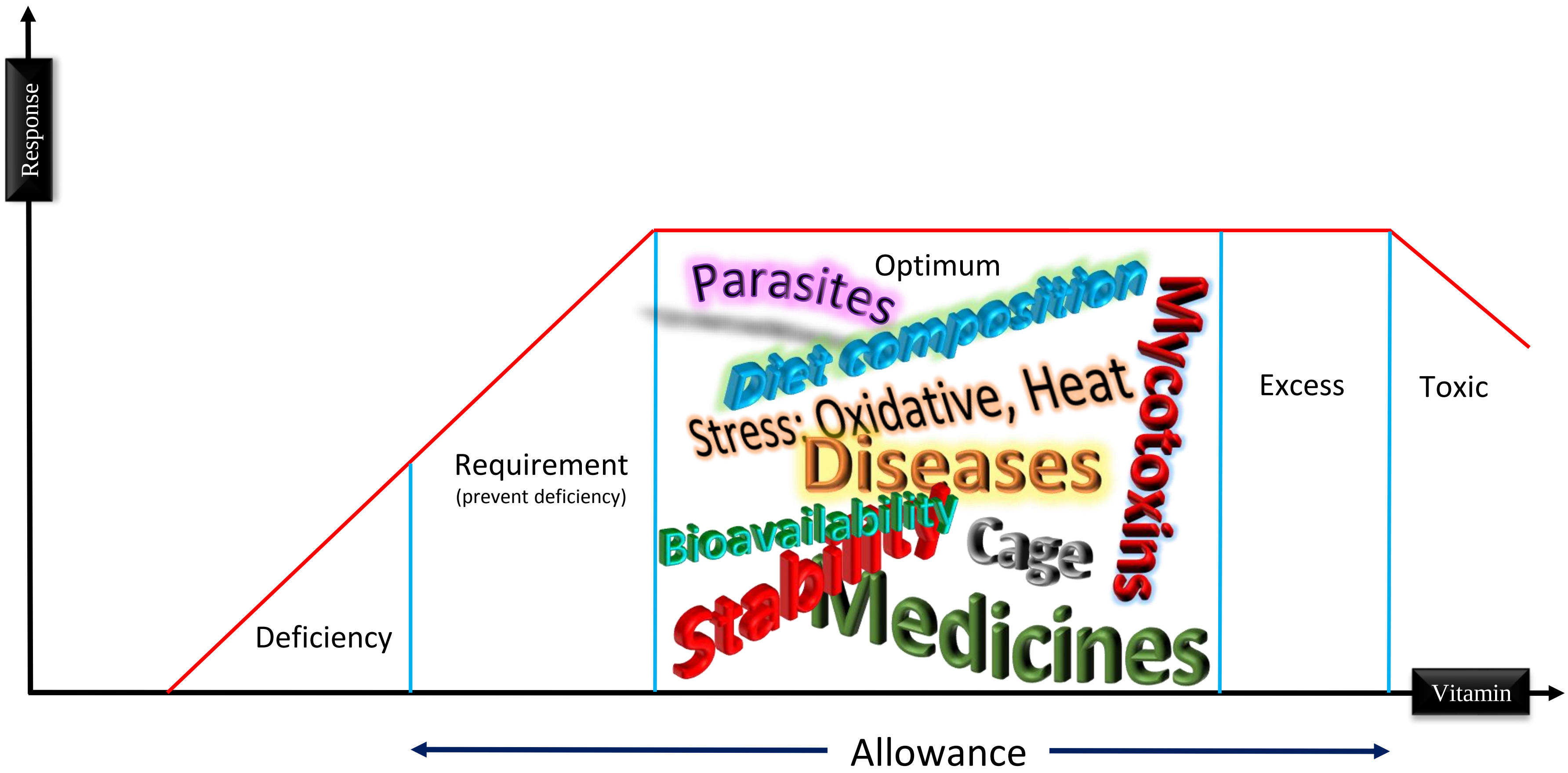
ROSS

Nutrition Specifications

2019



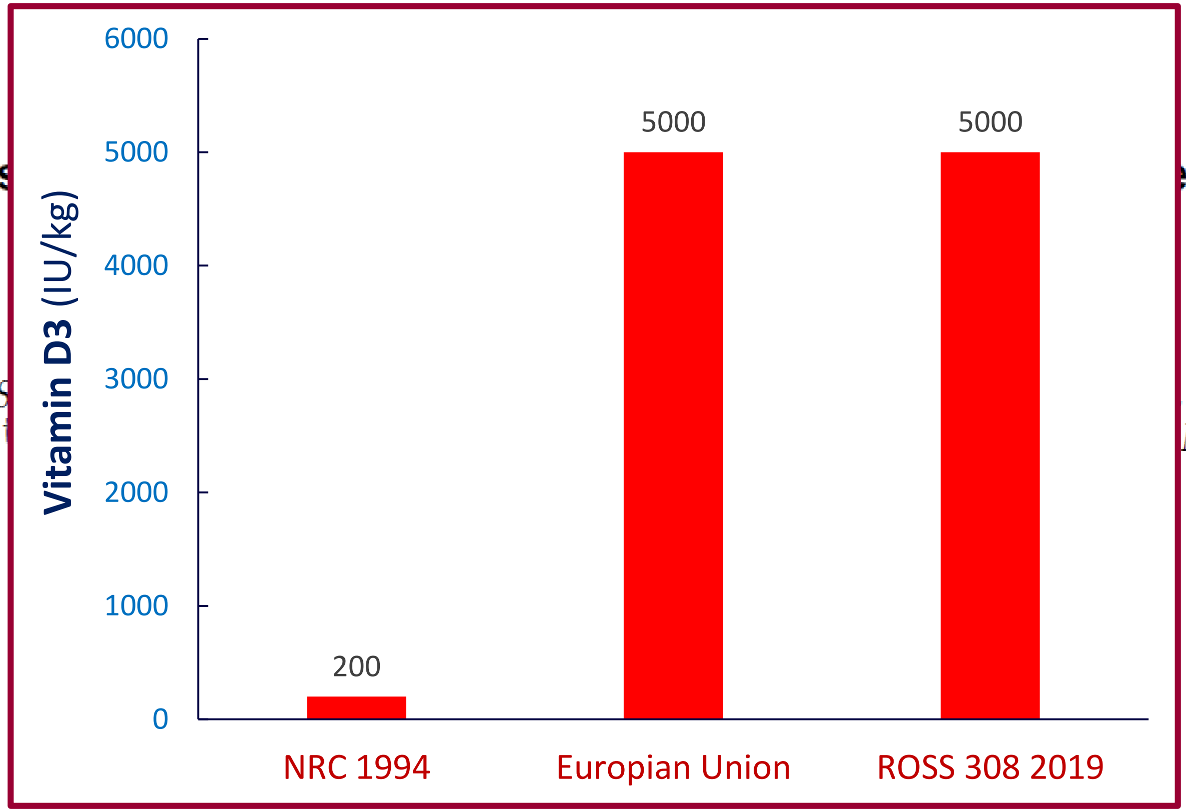

Response
Optimum
Excess
Toxic
Requirement
(prevent deficiency)
Deficiency
Vitamin
Allowance



Response
Optimum
Parasites
Diet composition
Stress: Oxidative, Heat
Diseases
Mycotoxins
Bioavailability
Cage
Stability
Medicines
Requirement
(prevent deficiency)
Deficiency
Excess
Toxic
Vitamin
Allowance

A reassess … enotypes

*Agriculture, S … Tyne, NE1
7RU, UK; and … Newcastle on



2019 Poultry Science 98:330–340

A reassess ... enotypes

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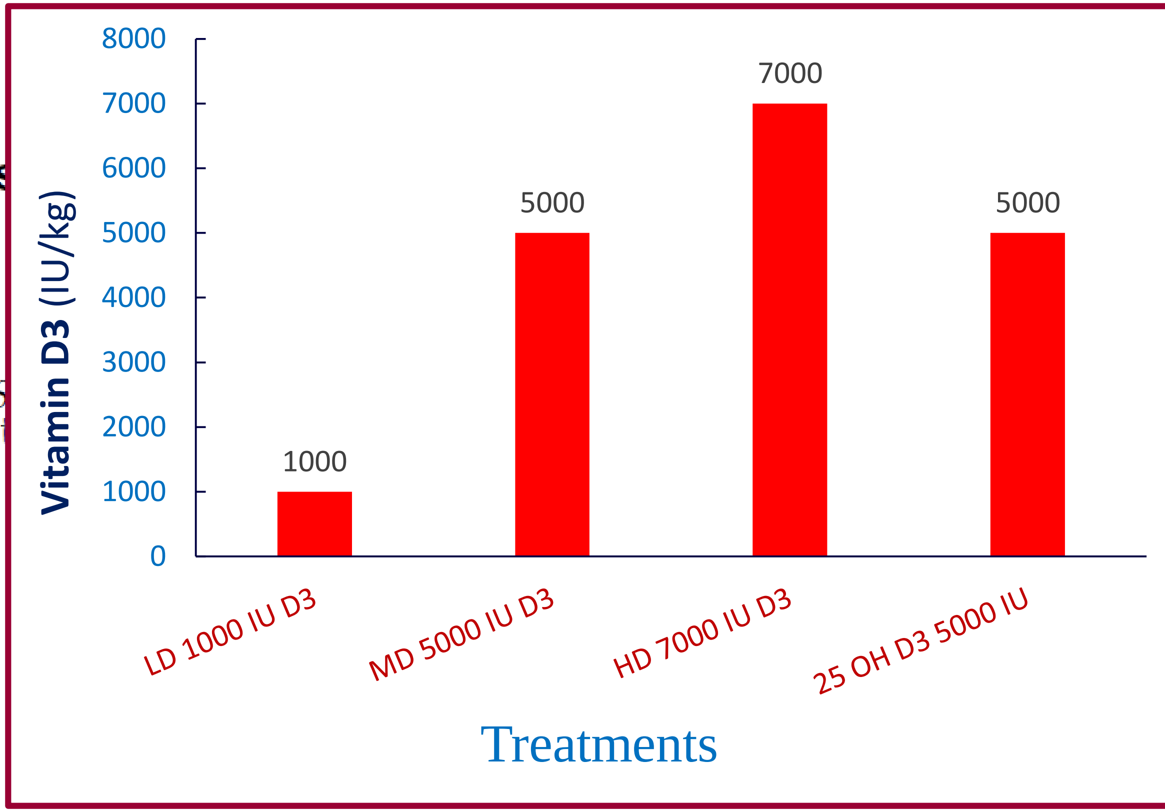

2019 Poultry Science 98:330–340

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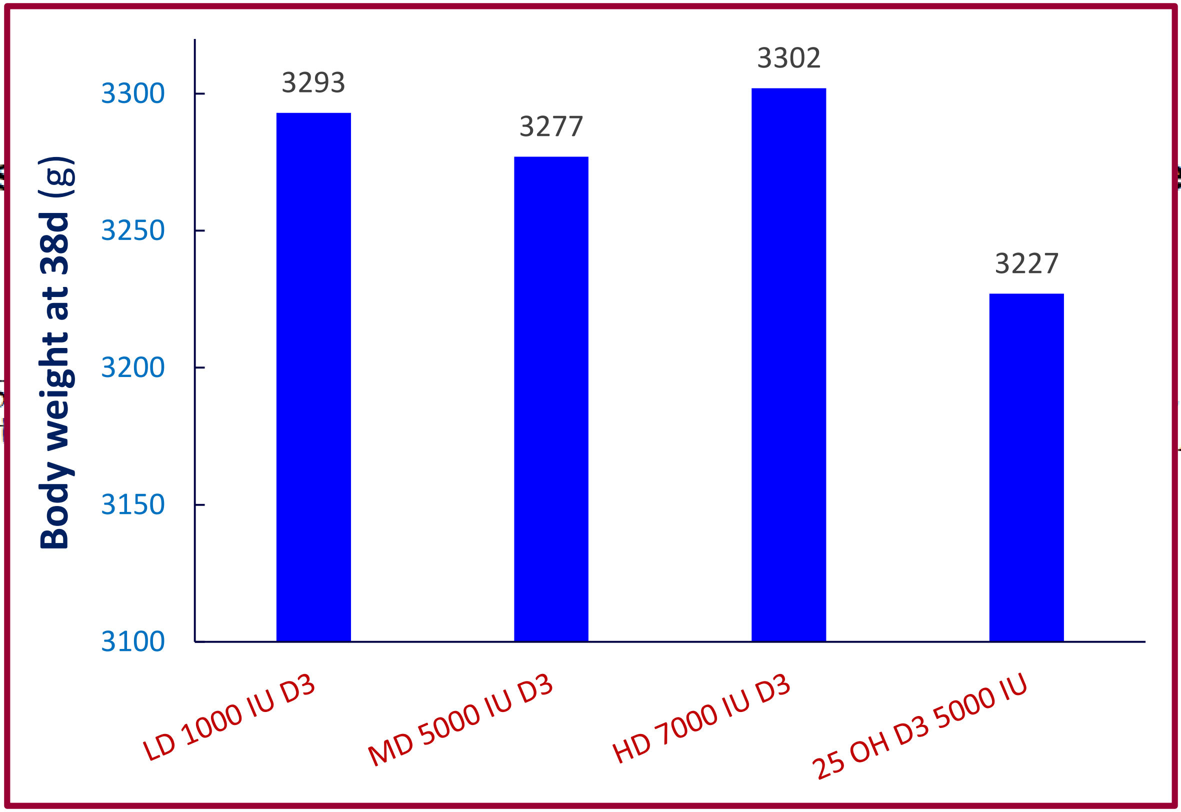

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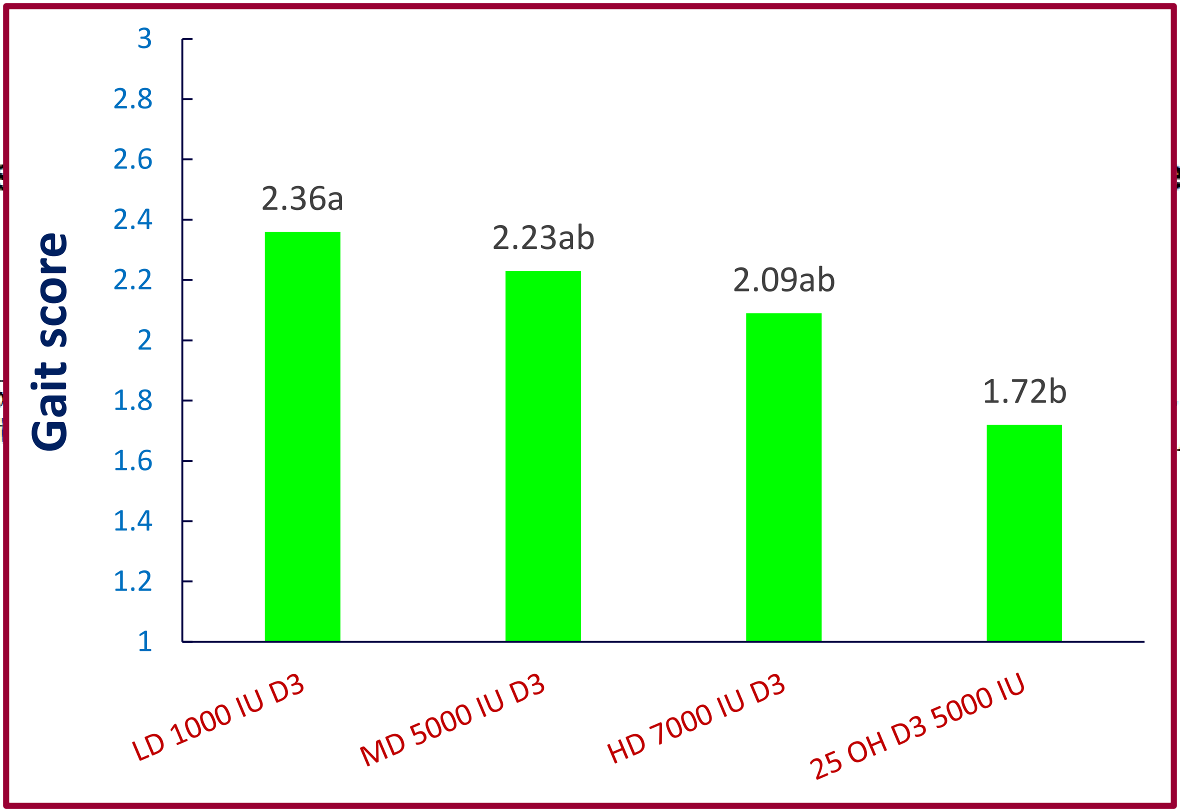
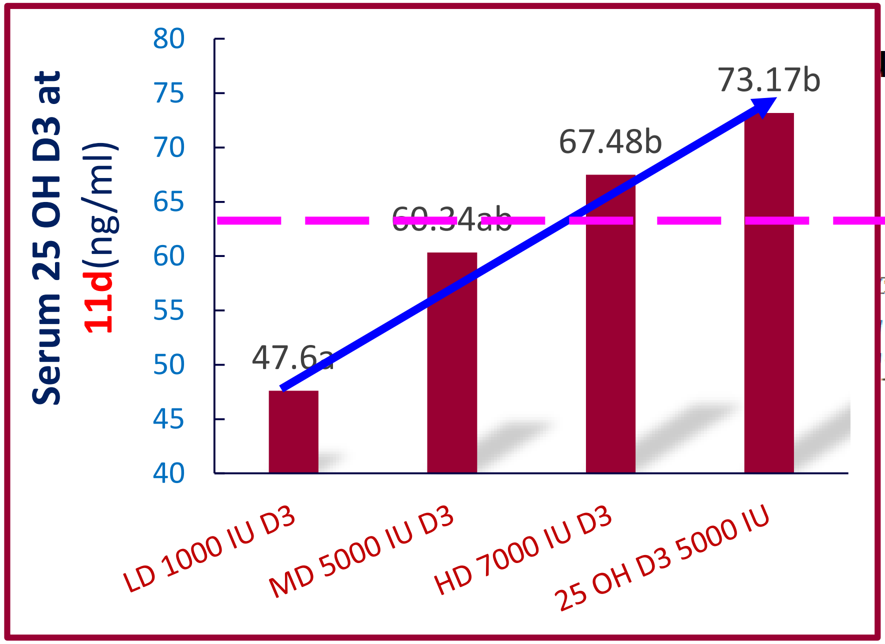
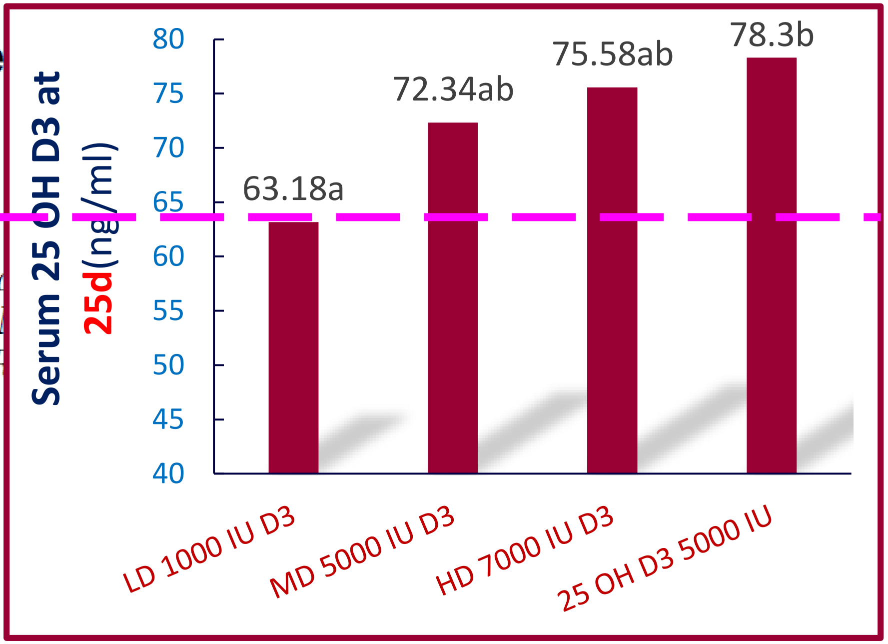


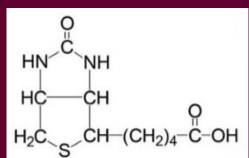
2019 Poultry Science 98:330–340





2019 Poultry Science 98:330–340

New biochemical function



Carboxylases

Gene expression

- Development
- Immunity
- Growth
- Metabolism
- Reproduction

CHEMICAL STRUCTURE, PROPERTIES, AND ANTAGONISTS

The chemical structure of biotin in metabolism includes a sulfur atom in its ring (like thiamin) and a transverse bond across the ring (Fig. 11.1). The empirical formula for biotin is $C_{11}H_{18}O_3N_2S$. Biotin is a fusion of an imidazolidone ring with a tetrahydrothiophene ring bearing a valeric acid side chain. It is a monocarboxylic acid with sulfur as a thioether linkage. Biotin, with its rather unique structure, contains three asymmetric carbonations, and therefore eight different isomers are possible. Of these isomers only one contains vitamin activity, *d*-biotin. The stereoisomer *l*-biotin is inactive.

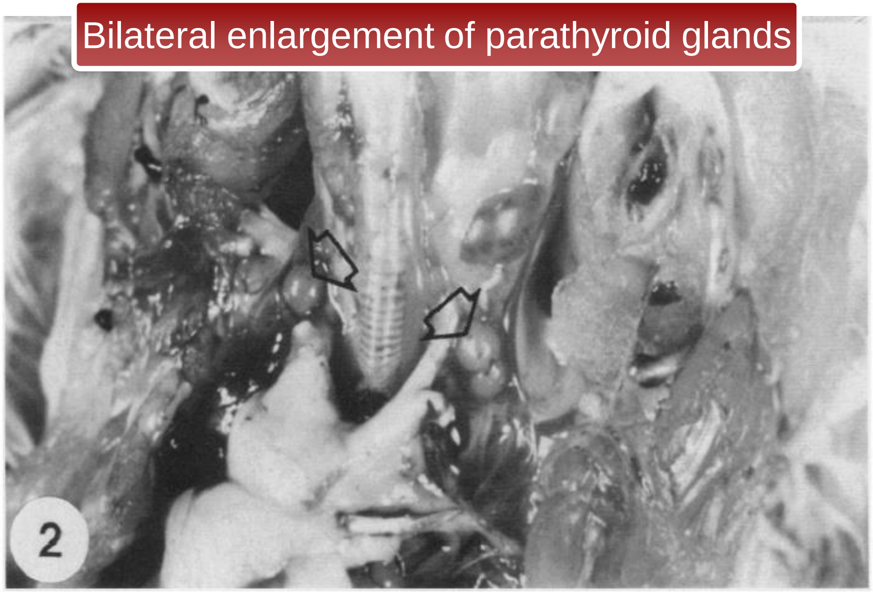
Biotin crystallizes from water solution as long, white needles. Its melting point is 232 to 233°C. Free biotin is soluble in dilute alkali and hot water and practically insoluble in fats and organic solvents. Biotin is quite stable under ordinary conditions. It is destroyed by nitrous acid, other strong acids, strong bases, and formaldehyde and is inactivated by rancid fats and choline (Scott et al., 1982). It is gradually destroyed by ultraviolet radiation.

مازاد ویتامین ها

Hypervitaminosis

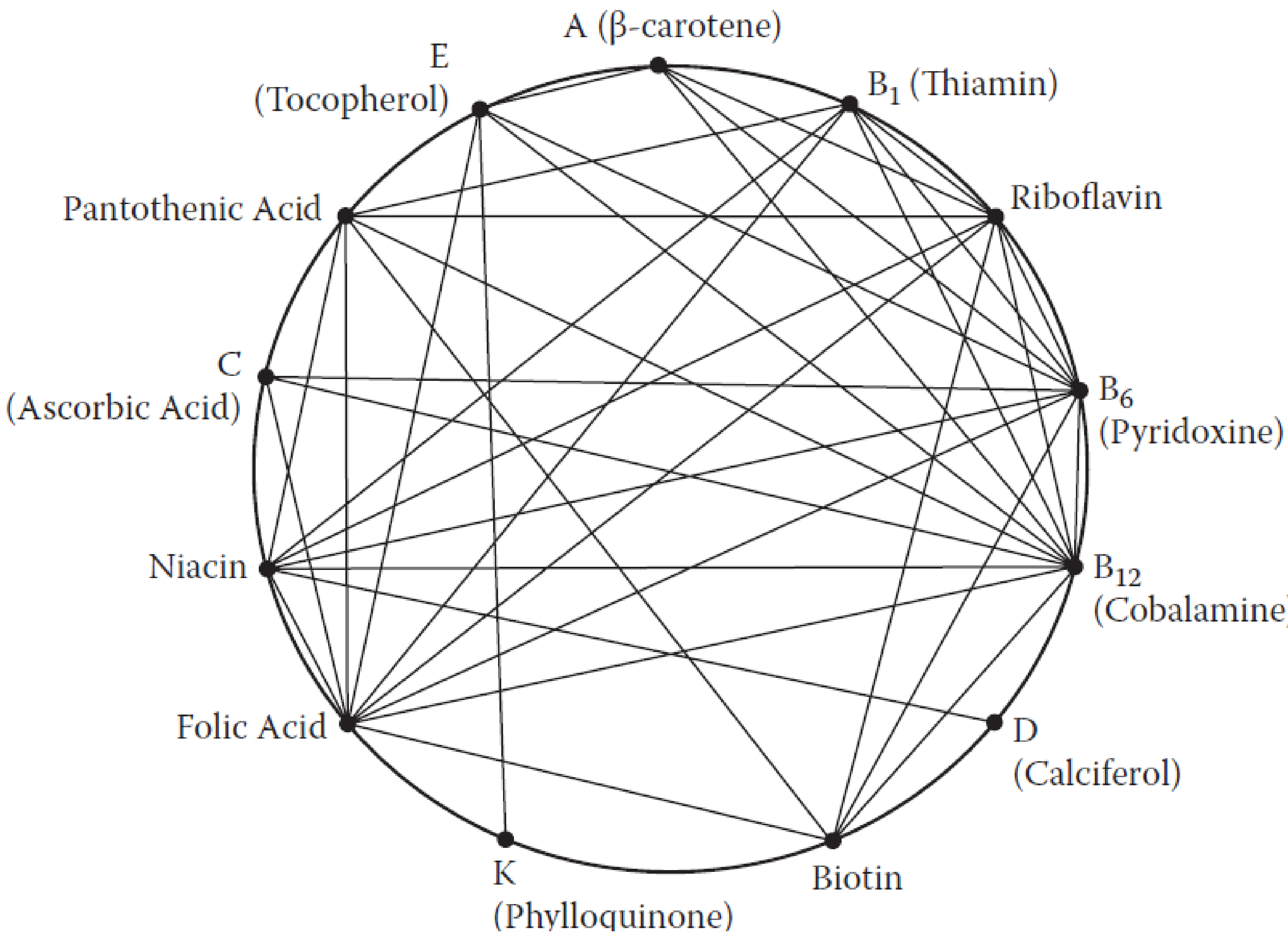
Clinical signs of hypervitaminosis A in broilers and leghorns

- Anorexia
- Ataxia
- Growth retardation
- Decrease of skin’s yellow color
- Conjunctivitis with sealed eyelids
- Osteodystrophy
- Mortality
- Parathyroid gland hyperplasia

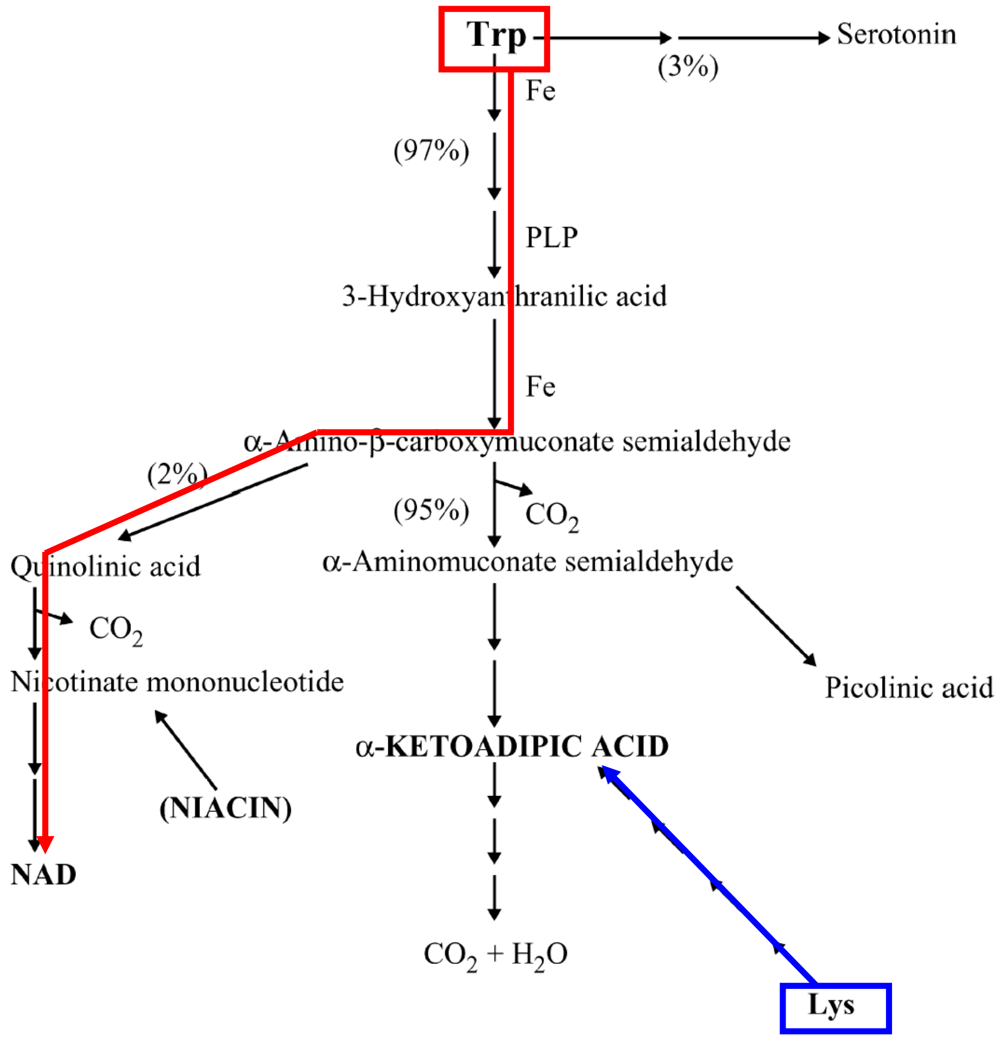


Bilateral enlargement of parathyroid glands

اثرات متقابل



Amino acid chelation in human and animal nutrition, H. DeWAYNE ASHMEAD



Trp
Serotonin
(3%)
Fe
(97%)
PLP
3-Hydroxyanthranilic acid
Fe
α-Amino-β-carboxymuconate semialdehyde
(2%)
(95%)
CO_2
Quinolinic acid
α-Aminomuconate semialdehyde
CO_2
Nicotinate mononucleotide
Picolinic acid
α-KETOADIPIC ACID
(NIACIN)
NAD
$CO_2 + H_2O$
Lys

ماندگاری
ویتامین ها


ویتامین ها
دما
رطوبت
اسیدیته
اکسیژن
نور و تشعشع
کاتالیزورها مانند آهن یا مس
بازدارنده ها
اثرات متقابل عوامل مختلف
انرژی
زمان


Summary of lost activity rankings in a commercial premix
%
80
70
60
50
40
30
20
10
0
Calcium pantothenate
Vitamin E
Riboflavin
Biotin
Niacin
Vitamin D3
Choline
Folic acid
Vitamin B12
Thiamin
Pridoxine
Vitamin A
Vitamin K3


ویتامین ها
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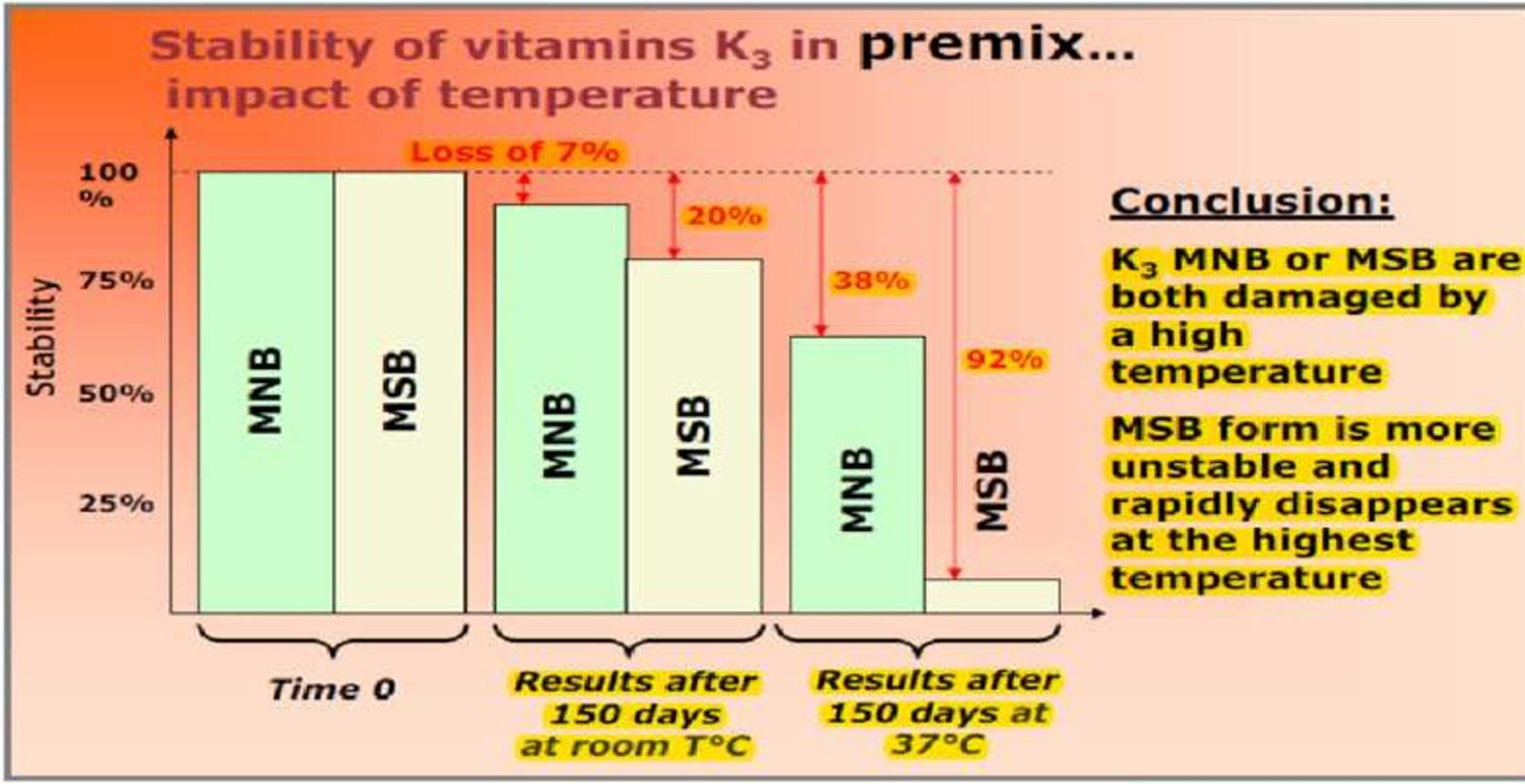
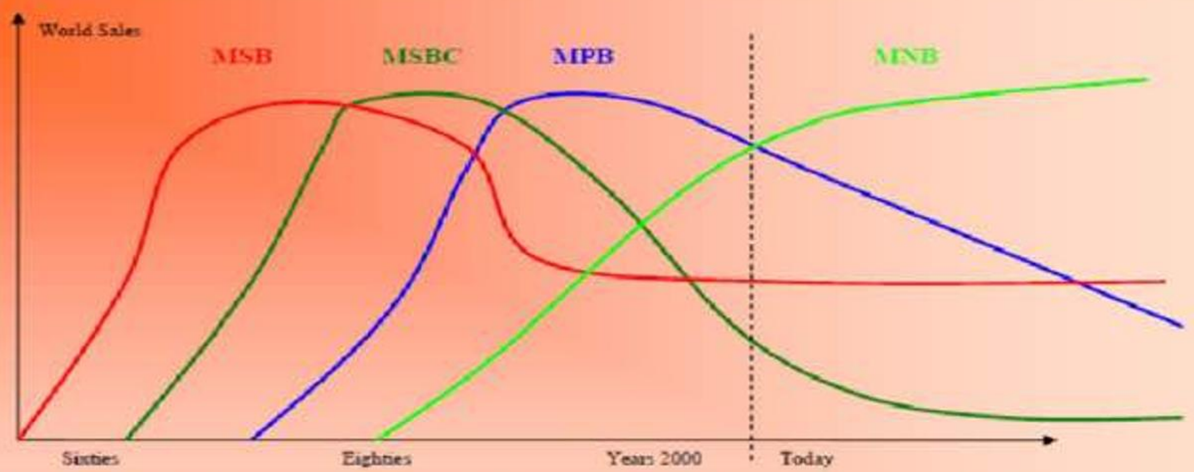
زمان


Stability of vitamins K3 in premix...
impact of temperature
Stability
100 %
75%
50%
25%
MNB
MSB
Loss of 7%
20%
38%
92%
Time 0
Results after 150 days at room T°C
Results after 150 days at 37°C
Conclusion:
K3 MNB or MSB are both damaged by a high temperature
MSB form is more unstable and rapidly disappears at the highest temperature



- MSB is still used for some specific applications (soluble products)
- MSBC has disappeared
- MPB is declining.
- MNB is the new standard (Microvit® K_3)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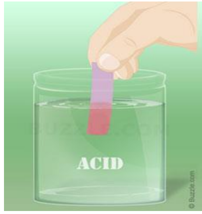
زمان

		O_2				
A	××	××	×	××	×	
D3	×	××	×	×	×	
E	×		×	×	×	×
K3	××	×	××	×	××	
B1	×	×	×	×		××
B2			×	×		
B6	××		×	×	×	
B9	××		×	××	××	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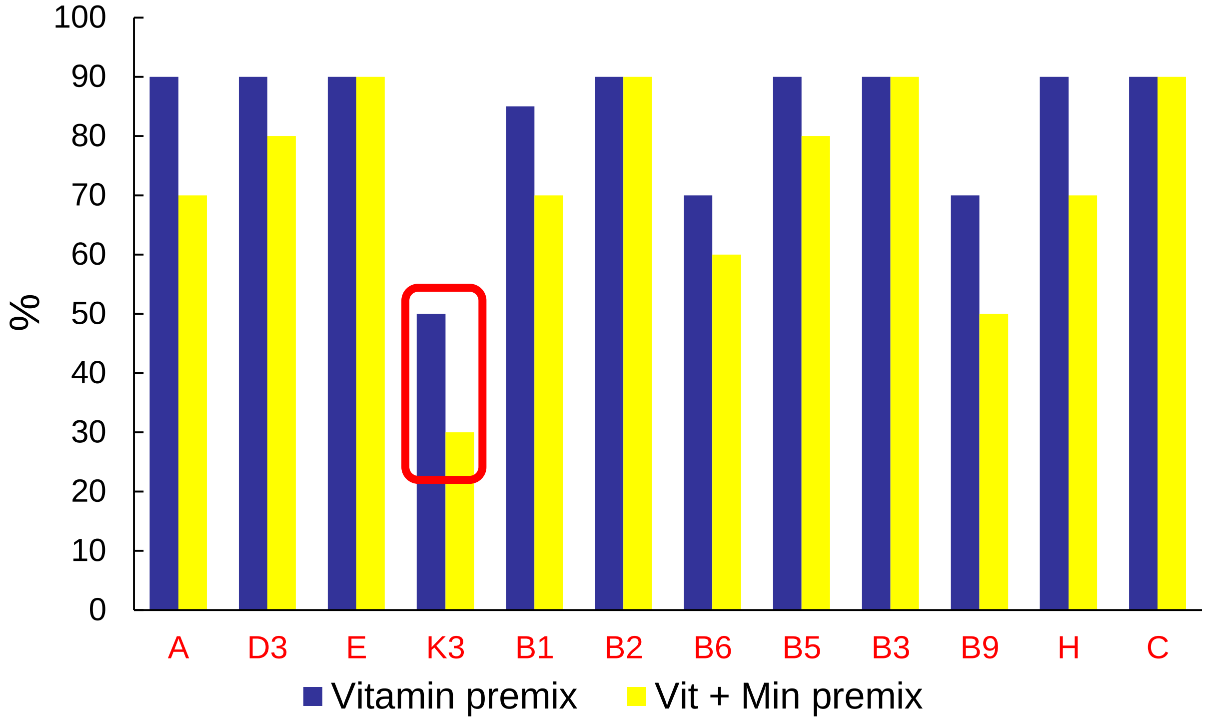
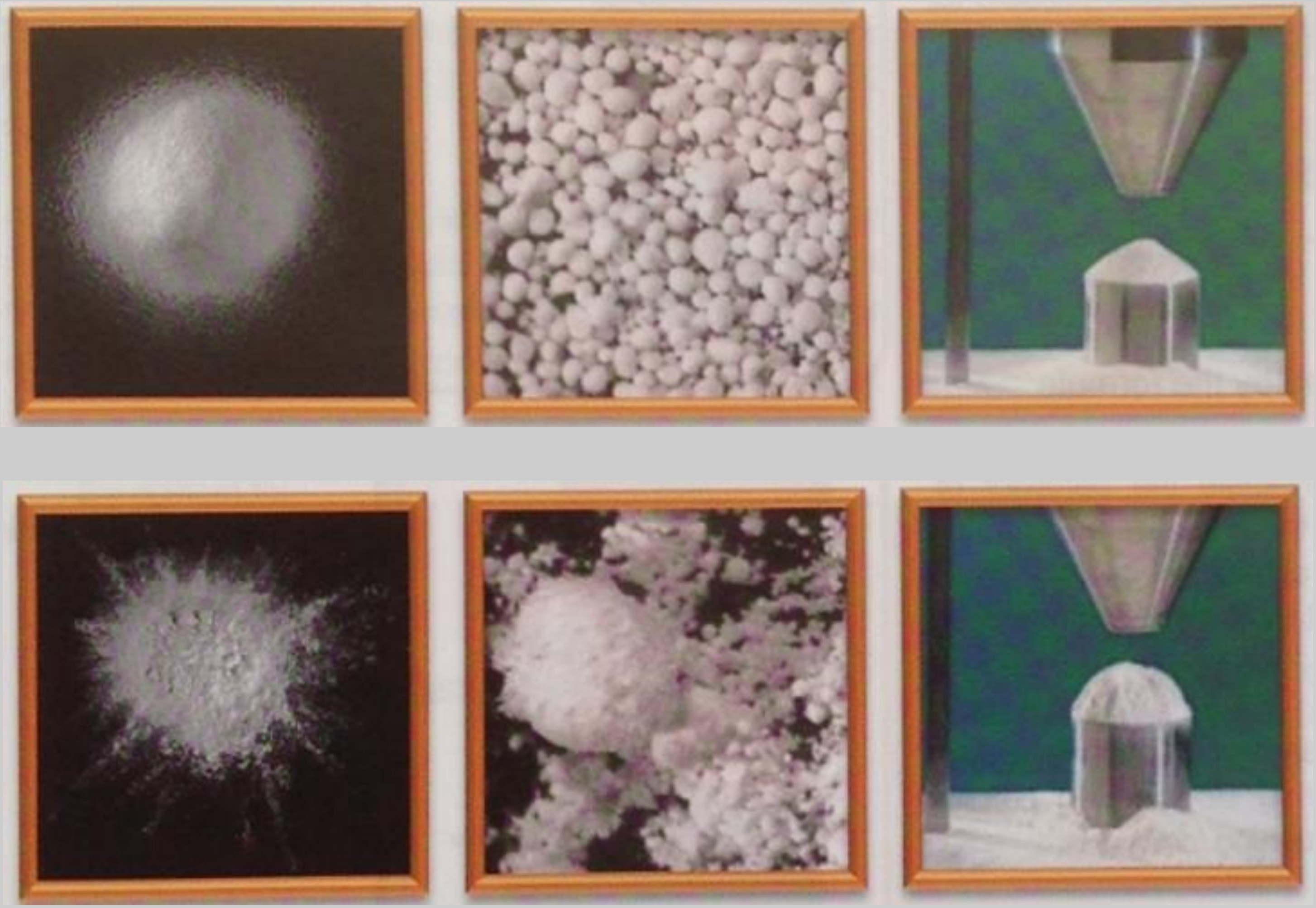
انرژی
زمان

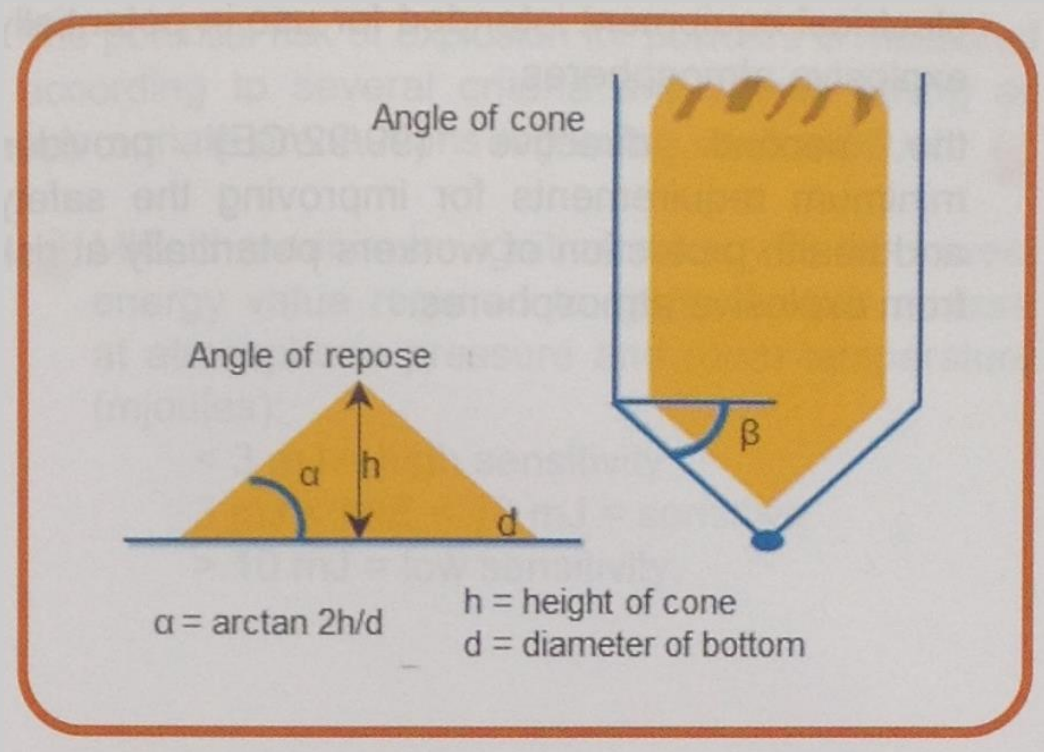
Retention of vitamin after 3 months



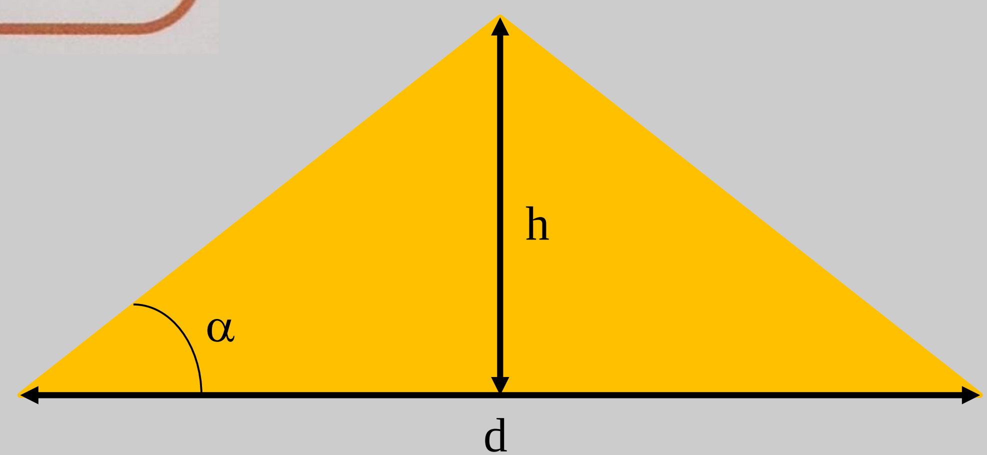

شکل فیزیکی

Comparison of two sources of vitamin E





Angle of repose



$\alpha = \arctan 2h/d$


COPLEY


4
36
7
28

Now, gently and smoothly but rapidly move the knob of the shutter arm to the right to allow the powder to flow freely though the nozzle such that it forms a conical pile on the test platform.

The *tangent* of the angle of repose θ can be determined by reading off the height of the powder cone in mm from the digital display of the height gauge and dividing it by 50. Take the *inverse tangent* of this figure to obtain the angle in degrees.

$$\tan\theta = \frac{\text{Height of Cone (mm)}}{\text{Half of Cone Base Diameter}} \quad \therefore \quad \theta = \tan^{-1}\left(\frac{\text{Height of Cone (mm)}}{\text{50mm}}\right)$$

If a cone of powder is not forthcoming, this method is not appropriate.

A stirrer (optional) can be provided to assist in the flow of more difficult products.

The following table of Flow Properties and Corresponding Angles of Repose may prove helpful.

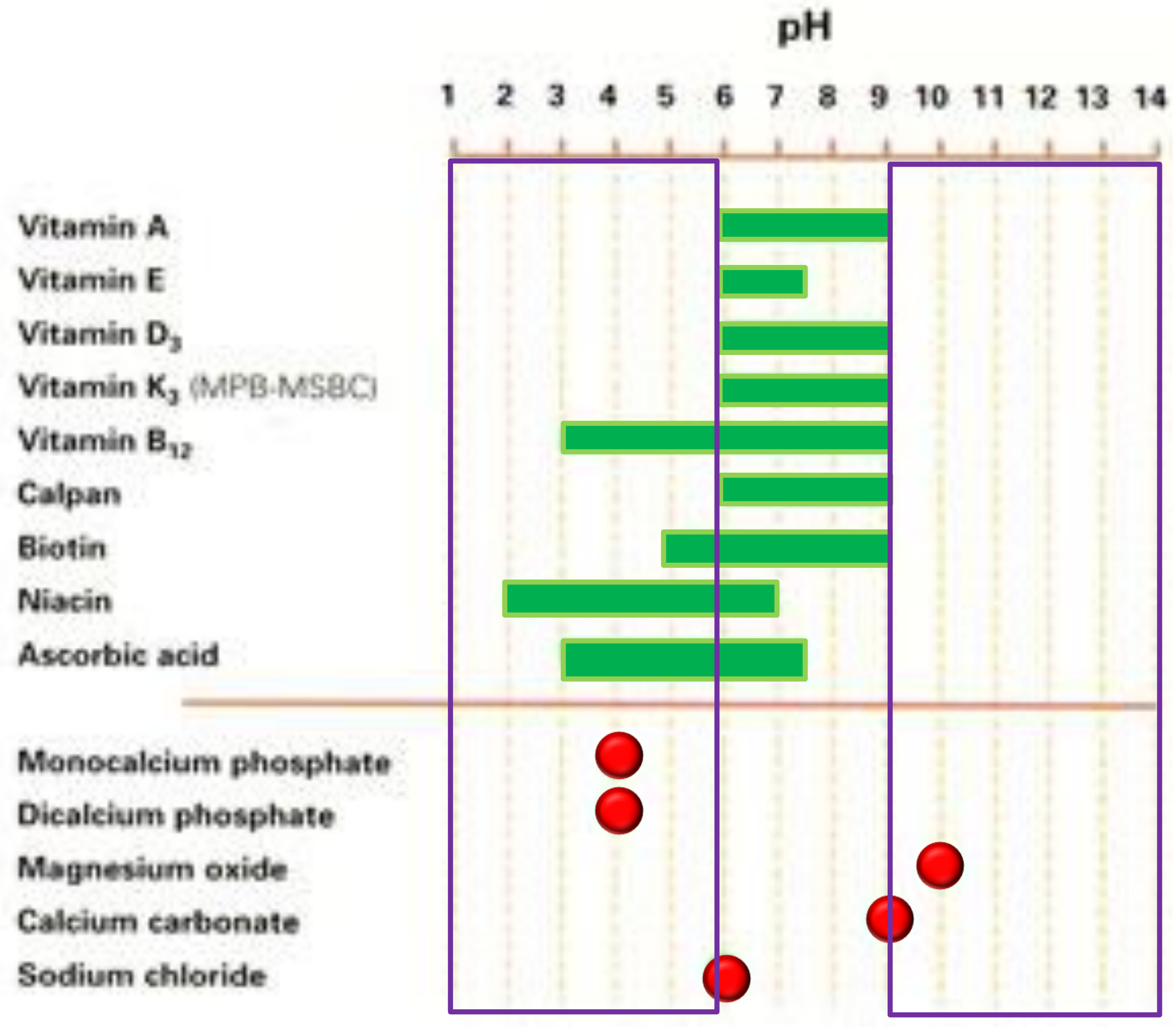
Flow Properties and Corresponding Angles of Repose

Flow Property	**Angle of Repose (degrees)**
Excellent	25 - 30
Good	31 - 35
Fair – aid not needed	36 - 40
Passable – may hang up	41 - 45
Poor – must agitate, vibrate	46 - 55
Very poor	56 - 65
Very, very poor	>66

مواد ناقل و
رقیق کننده

pH:

In premixes, the pH becomes a factor when the amount of free water is sufficient to allow the release of cations and anions from soluble components.



Most vitamins show greatest stability at approximately pH **5.5**

Redox activity of minerals and trace minerals (according to NFIA 1992)	
Trace Mineral	**Redox activity**

Redox activity of minerals and trace minerals (according to NFIA 1992)	
Trace Mineral	**Redox activity**
Cu CO_3	+
Cu O	+
Cu SO_4, 5 H_2O	+++

Redox activity of minerals and trace minerals (according to NFIA 1992)	
Trace Mineral	**Redox activity**
Cu CO_3	+
Cu O	+
Cu SO_4, 5 H_2O	+++
Ca $(IO_3)_2$	++
KI	+

Redox activity of minerals and trace minerals (according to NFIA 1992)	
Trace Mineral	**Redox activity**
Cu CO_3	+
Cu O	+
Cu SO_4, 5 H_2O	+++
Ca $(IO_3)_2$	++
KI	+
Fe CO_3	+
Fe_2 O_3	-
Fe SO_4, 7 H_2O	++
Fe SO_4, 1 H_2O	+

Redox activity of minerals and trace minerals (according to NFIA 1992)	
Trace Mineral	**Redox activity**
Cu CO_3	+
Cu O	+
Cu SO_4, 5 H_2O	+++
Ca $(IO_3)_2$	++
KI	+
Fe CO_3	+
Fe_2 O_3	-
Fe SO_4, 7 H_2O	++
Fe SO_4, 1 H_2O	+
Mn O	+
Mn SO_4	++

Redox activity of minerals and trace minerals (according to NFIA 1992)	
Trace Mineral	**Redox activity**
Cu CO_3	+
Cu O	+
Cu SO_4, 5 H_2O	+++
Ca $(IO_3)_2$	++
KI	+
Fe CO_3	+
Fe_2 O_3	-
Fe SO_4, 7 H_2O	++
Fe SO_4, 1 H_2O	+
Mn O	+
Mn SO_4	++
Zn O	+
Zn SO_4, 1 H_2O	++

Carrier	Straight through flow	Angle of repose	Bulk density	Moisture	Absorption of moisture		pH
	mm orifice	degree	Lb/ft3	%	day	%	
Ground rice hulls	26	41	18.7	5	1 3 7	0.06 0.82 2.25	6.3
Fine limestone	26	70	62.4	0.2	1 3 7	0.02 0.02 0.02	9.2
Course limestone	7	27	71.2	0.4	1 3 7	0.27 0.35 0.44	9.0
Wheat midds	28	48	20.6	11.3	1 3 7	0.30 1.87 4.34	6.7
Dry wheat midds	35	47	22.5	5	1 3 7	5.31 8.94 11.7	6.9
Ground corn cob	20	50	25.5	5	1 3 7	2.69 5.66 8.13	5.4
Dicalcium phosphate	5	29	58.7	2.8	1 3 7	3.84 5.34 6.20	3.4
Dicalcium propionate	24	57	33.7	1.3	1 3 7	0.27 0.67 1.66	6.7
Vermiculite	9	28	8.1	5.1	1 3 7	0.39 0.48 3.37	6.3
Silicon dioxide	4	33	14.3	4.4	1 3 7	3.50 5.08 5.75	6.9

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Fine limestone	26	70	62.4	0.2	1 3 7	0.02 0.02 0.02	9.2
Course limestone	7	27	71.2	0.4	1 3 7	0.27 0.35 0.44	9.0
Wheat midds	28	48	20.6	11.3	1 3 7	0.30 1.87 4.34	6.7
Dry wheat midds	35	47	22.5	5	1 3 7	**5.31** **8.94** **11.7**	6.9
Ground corn cob	20	50	25.5	5	1 3 7	2.69 5.66 8.13	5.4
Dicalcium phosphate	5	29	58.7	2.8	1 3 7	3.84 5.34 6.20	3.4
Dicalcium propionate	24	57	33.7	1.3	1 3 7	0.27 0.67 1.66	6.7
Vermiculite	9	28	8.1	5.1	1 3 7	0.39 0.48 3.37	6.3
Silicon dioxide	4	33	14.3	4.4	1 3 7	3.50 5.08 5.75	6.9

Carrier	Straight through flow	Angle of repose	Bulk density	Moisture	Absorption of moisture		pH
	mm orifice	degree	Lb/ft3	%	day	%	
Ground rice hulls	26	41	18.7	5	1	0.06	6.3
					3	0.82	
					7	2.25	
Fine limestone	26	70	62.4	0.2	1	0.02	9.2
					3	0.02	
					7	0.02	
Course limestone	7	27	71.2	0.4	1	0.27	9.0
					3	0.35	
					7	0.44	
Wheat midds	28	48	20.6	11.3	1	0.30	6.7
					3	1.87	
					7	4.34	
Dry wheat midds	35	47	22.5	5	1	5.31	6.9
					3	8.94	
					7	11.7	
Ground corn cob	20	50	25.5	5	1	2.69	5.4
					3	5.66	
					7	8.13	
Dicalcium phosphate	5	29	58.7	2.8	1	3.84	**3.4**
					3	5.34	
					7	6.20	
Dicalcium propionate	24	57	33.7	1.3	1	0.27	6.7
					3	0.67	
					7	1.66	
Vermiculite	9	28	8.1	5.1	1	0.39	6.3
					3	0.48	
					7	3.37	
Silicon dioxide	4	33	14.3	4.4	1	3.50	6.9
					3	5.08	
					7	5.75	

Carrier	Straight through flow	Angle of repose	Bulk density	Moisture	Absorption of moisture		pH
	mm orifice	degree	Lb/ft3	%	day	%	
Ground rice hulls	26	41	18.7	5	1 3 7	0.06 0.82 2.25	6.3
Fine limestone	26	70	62.4	0.2	1 3 7	0.02 0.02 0.02	**9.2**
Course limestone	7	27	71.2	0.4	1 3 7	0.27 0.35 0.44	9.0
Wheat midds	28	48	20.6	11.3	1 3 7	0.30 1.87 4.34	6.7
Dry wheat midds	35	47	22.5	5	1 3 7	5.31 8.94 11.7	6.9
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Vermiculite	9	28	8.1	5.1	1 3 7	0.39 0.48 3.37	6.3
Silicon dioxide	4	33	14.3	4.4	1 3 7	3.50 5.08 5.75	6.9

Carrier	Straight through flow	Angle of repose	Bulk density	Moisture	Absorption of moisture		pH
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Ground rice hulls	26	41	18.7	5	1 3 7	0.06 0.82 2.25	6.3
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Silicon dioxide	4	33	14.3	4.4	1 3 7	3.50 5.08 5.75	6.9

New generation:

Activated peptide

(pH, flowability, particle size, no water absorption, porosity)

Vit Supplement Formulation

Formula Code: VIT00005

Date: 03/09/2018

Formula Name: MINA TOYOOR

Birds Type: Broiler breeder

Stage: Laying

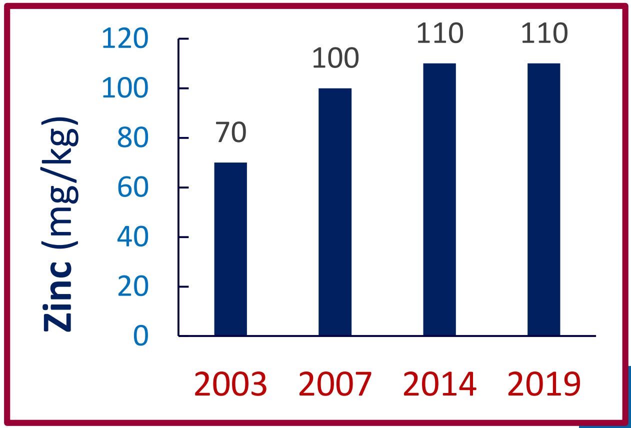
Strain: Ross 308

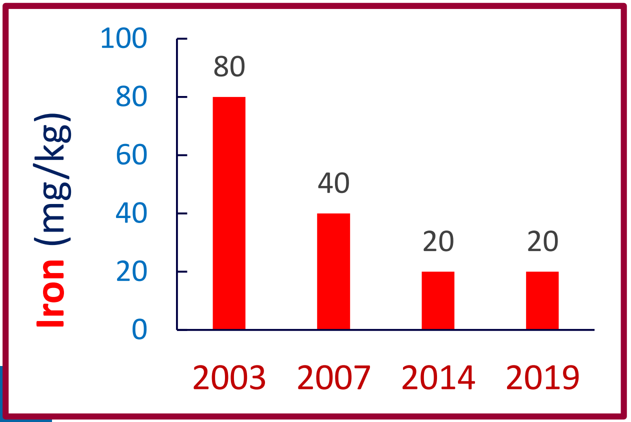
Ingredients	Description	Requirement	Unit	Concentration	Unit	Purity	Bioavalibility	Days PPD**	Density (g/cm3)	Price (Rial/kg)
Vit A	All Tra Retinol	11000	(IU/Kg)	1000000000	(IU/Kg)	1	1	0	0.5	23000000
Vit D3	Cholecalciferol	3500	(IU/Kg)	500000000	(IU/Kg)	1	1	0	0.5	5200000
Vit E	DLaTocophery	100	(IU/Kg)	500000	(IU/Kg)	1	1	0	0.5	1100000
Vit K3	MNBS	5	(mg/Kg)	96	(%)	0.4552	1	0	0.5	1700000
Vit B1	TMN	3	(mg/Kg)	98	(%)	0.92	1	0	0.5	5300000
Vit B2	Riboflavine	12	(mg/Kg)	80	(%)	1	1	0	0.5	3570000
Vit B3	Nicotinic Acid	55	(mg/Kg)	99.5	(%)	1	1	0	0.5	550000
Vit B5	D Ca Pantothena	15	(mg/Kg)	98	(%)	0.92	1	0	0.5	5200000
Vit B6	Pyridoxin-HCl	4	(mg/Kg)	99	(%)	0.823	1	0	0.5	4700000
Vit B9	Folic Acid	2	(mg/kg)	95	(%)	1	1	0	0.5	4700000
Vit B12	Cyanocobalamin	0.03	(mg/kg)	10000	(mg/kg)	1	1	0	0.5	10000000
Vit H2	Biotin	0.25	(mg/Kg)	2	(%)	1	1	0	0.5	1700000
Choline	Choline chloride	0	(mg/Kg)	60	(%)	0.86	1	0	0.5	90000
AntiOxid	200		(g/1000 Kg)						0.5	150000
Corn Cob	100000		(g/1000 Kg)			Filler & Carrier			0.4	2000
Active Peptid	200000		(g/1000 Kg)						0.8	2000
CaCo3									0.7	1500

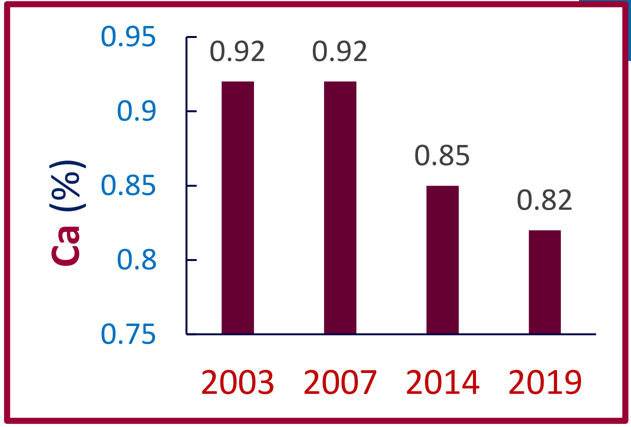
** Days Past from Production Date

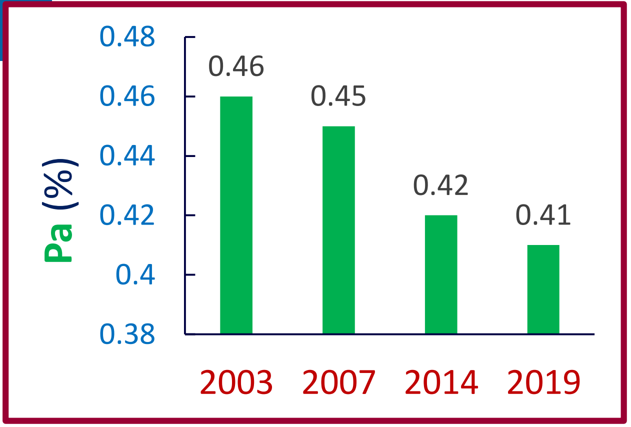
Save Data | Close | Save Values | Show

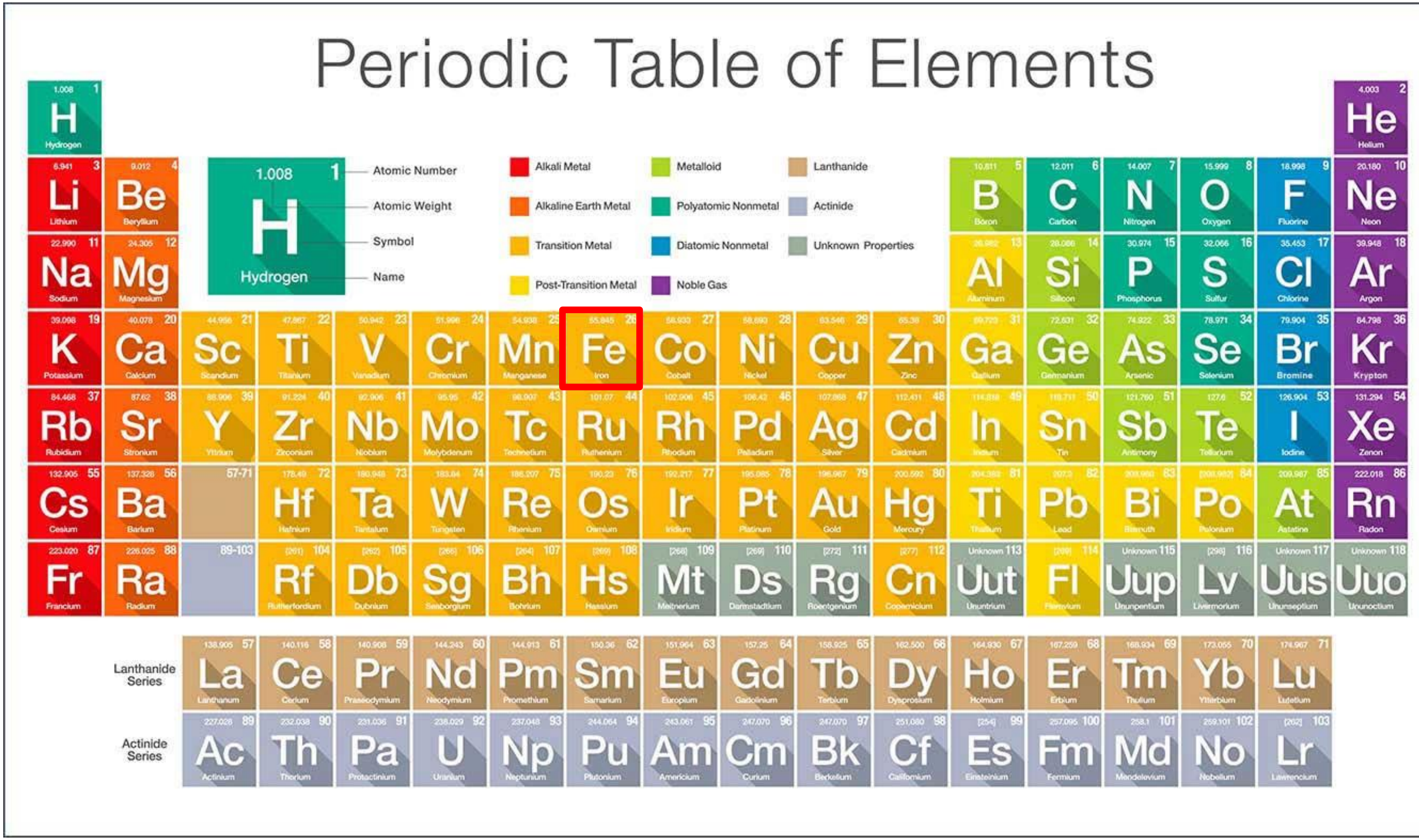

مواد معدنی


Zinc (mg/kg)
120
100
80
60
40
20
0
70
100
110
110
2003
2007
2014
2019


Iron (mg/kg)
100
80
60
40
20
0
80
40
20
20
2003
2007
2014
2019

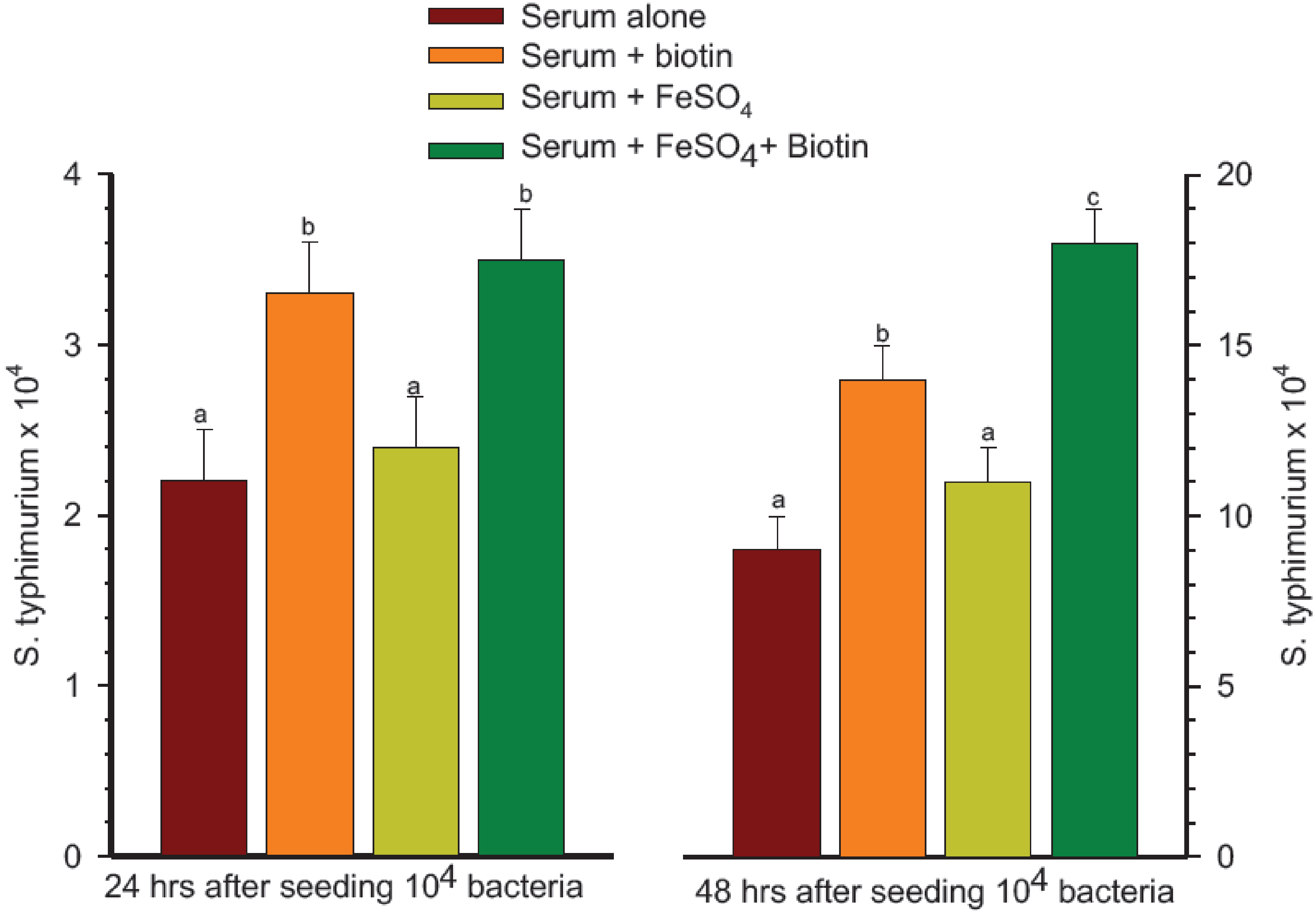

Ca (%)
0.95
0.9
0.85
0.8
0.75
0.92
0.92
0.85
0.82
2003
2007
2014
2019


Pa (%)
0.48
0.46
0.44
0.42
0.4
0.38
0.46
0.45
0.42
0.41
2003
2007
2014
2019

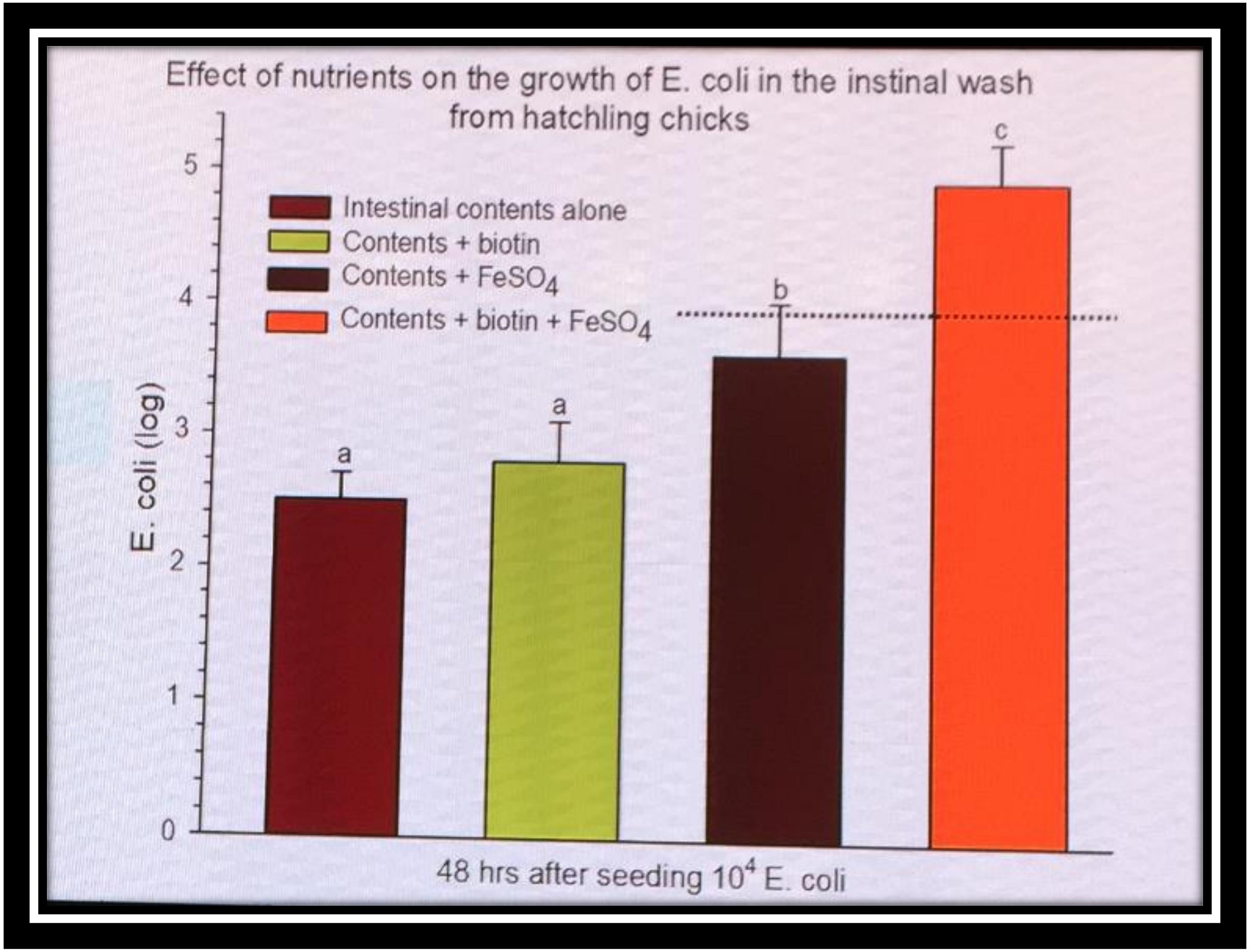


Periodic Table of Elements
1.008 1 H Hydrogen
Atomic Number
Atomic Weight
Symbol
Name
Alkali Metal
Alkaline Earth Metal
Transition Metal
Post-Transition Metal
Metalloid
Polyatomic Nonmetal
Diatomic Nonmetal
Noble Gas
Lanthanide
Actinide
Unknown Properties
H He
Li Be B C N O F Ne
Na Mg Al Si P S Cl Ar
K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr
Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe
Cs Ba 57-71 Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn
Fr Ra 89-103 Rf Db Sg Bh Hs Mt Ds Rg Cn Uut Fl Uup Lv Uus Uuo
Lanthanide Series
La Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu
Actinide Series
Ac Th Pa U Np Pu Am Cm Bk Cf Es Fm Md No Lr

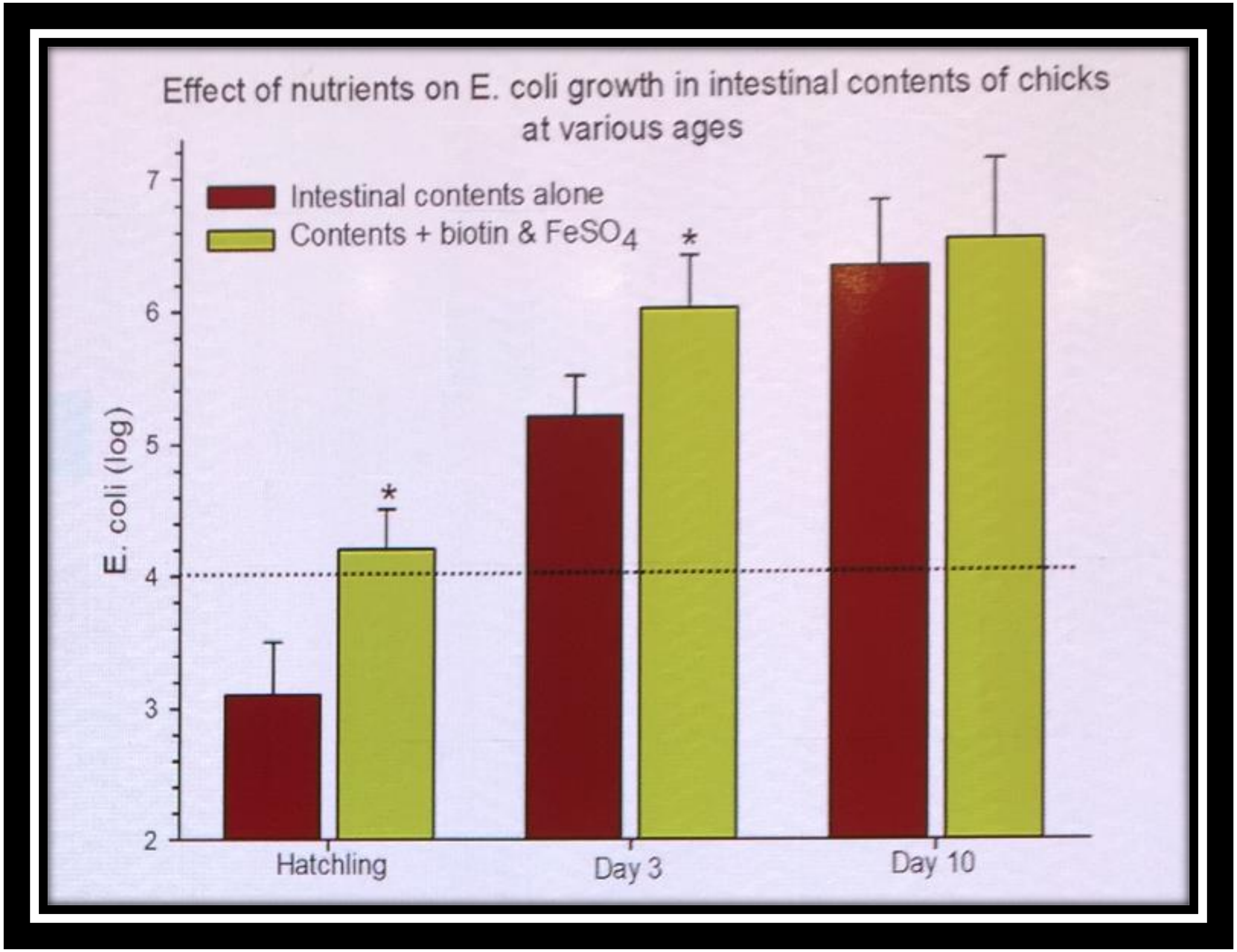
Iron is the second limiting nutrient in acute phase serum.

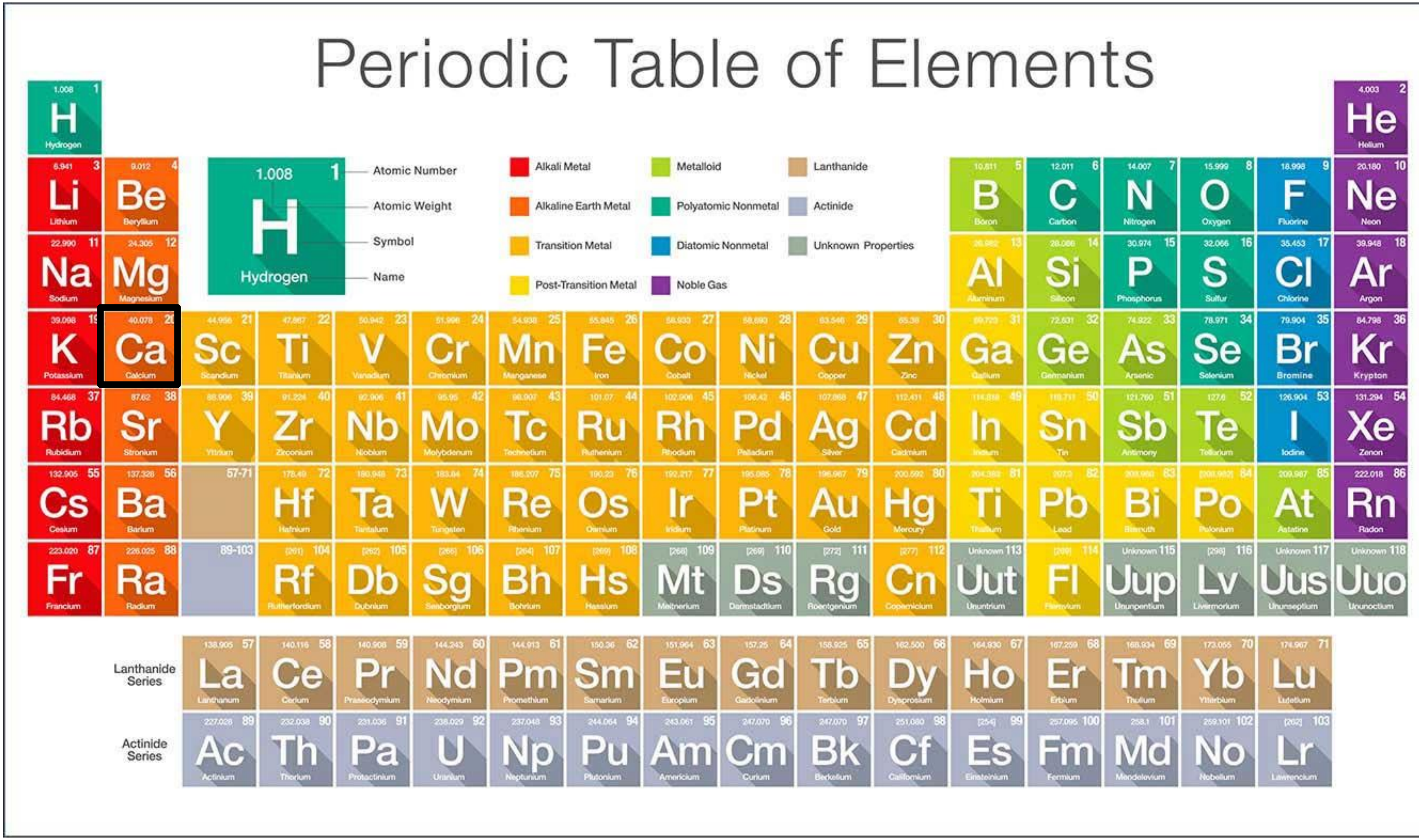


n = 6 wells per treatment; Serum was taken from broiler chicks 24 hrs after LPS challenge.



Effect of nutrients on the growth of E. coli in the instinal wash from hatchling chicks
E. coli (log)
0
1
2
3
4
5
Intestinal contents alone
Contents + biotin
Contents + FeSO4
Contents + biotin + FeSO4
a
a
b
c
48 hrs after seeding 10^4 E. coli


Effect of nutrients on E. coli growth in intestinal contents of chicks at various ages
Intestinal contents alone
Contents + biotin & FeSO4
E. coli (log)
7
6
5
4
3
2
*
*
Hatchling
Day 3
Day 10


Periodic Table of Elements
Atomic Number
Atomic Weight
Symbol
Name
1.008
1
H
Hydrogen
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Alkaline Earth Metal
Transition Metal
Post-Transition Metal
Metalloid
Polyatomic Nonmetal
Diatomic Nonmetal
Noble Gas
Lanthanide
Actinide
Unknown Properties
H He
Li Be B C N O F Ne
Na Mg Al Si P S Cl Ar
K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr
Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe
Cs Ba 57-71 Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn
Fr Ra 89-103 Rf Db Sg Bh Hs Mt Ds Rg Cn Uut Fl Uup Lv Uus Uuo
Lanthanide Series
La Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu
Actinide Series
Ac Th Pa U Np Pu Am Cm Bk Cf Es Fm Md No Lr

Massey University

Towards a digestible calcium and phosphorus system

V. Ravindran
Massey University, Palmerston North
NEW ZEALAND

- Ca and P are considered together because of close biochemical relationship between them

Ca total : P available

- Imbalance of this ratio will lead to serious skeletal malformation

- Ca and/ or P excesses are far more common than deficiencies
- High levels of Ca and P are detrimental

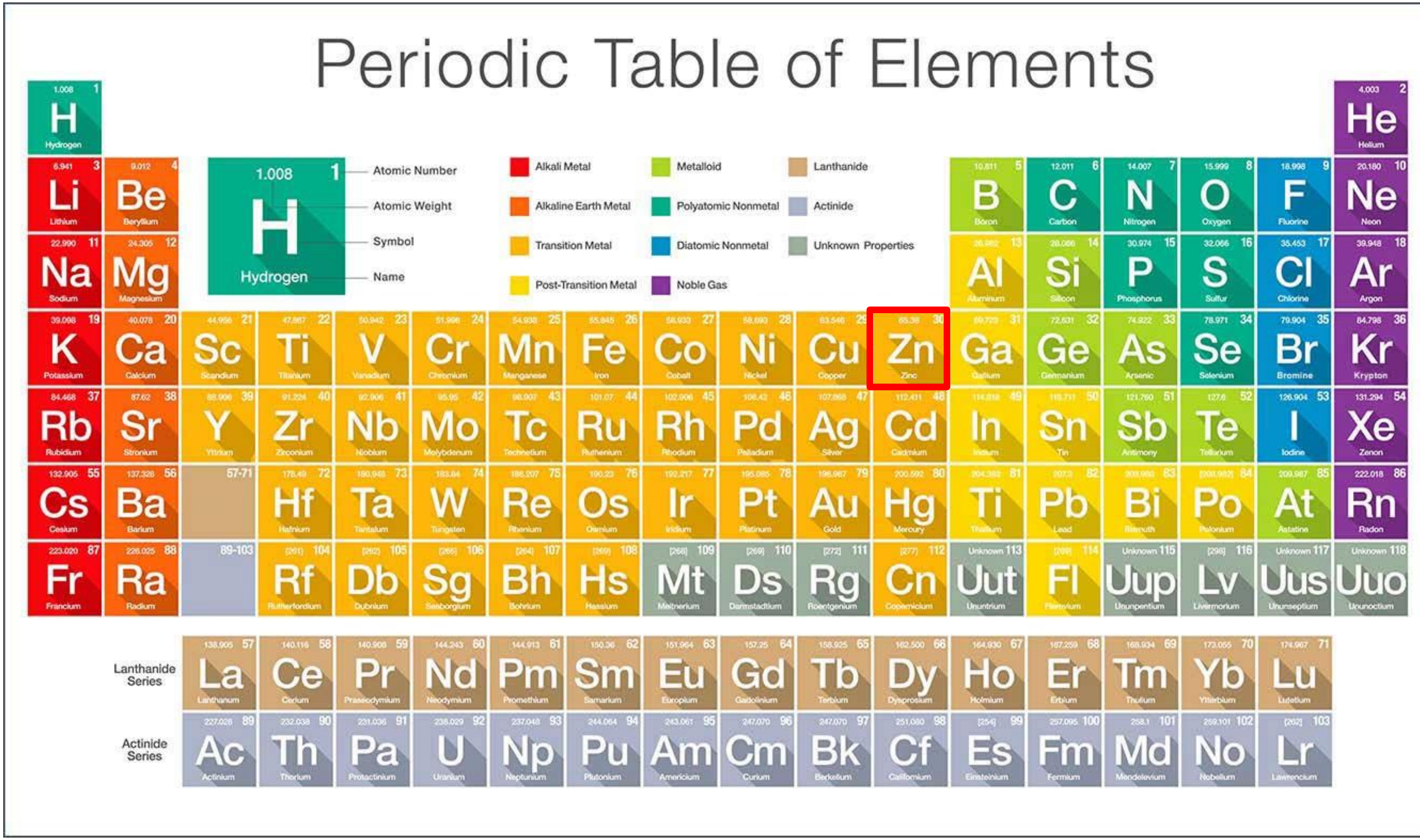
A problem with high Ca

- High contents lower the utilisation of several nutrients - energy, lipids, protein, P

- Effects are greater with limestone compared to meat and bone meal

  - buffering action
  - gizzard pH
  - effect on enzyme efficacy. e.g. phytase

	Ca digestibility
Limestone	
Ca:P = 1.50	65
Ca:P = 2.00	55
Ca:P = 2.50	49
Limestone	
< 0.5 mm particle size	41
1-2 mm particle size	72
Oyster shell	
< 0.5 mm particle size	36
1-2 mm particle size	59



Periodic Table of Elements
1.008 1 H Hydrogen
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Atomic Weight
Symbol
Name
Alkali Metal
Alkaline Earth Metal
Transition Metal
Post-Transition Metal
Metalloid
Polyatomic Nonmetal
Diatomic Nonmetal
Noble Gas
Lanthanide
Actinide
Unknown Properties
H He
Li Be B C N O F Ne
Na Mg Al Si P S Cl Ar
K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr
Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe
Cs Ba 57-71 Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn
Fr Ra 89-103 Rf Db Sg Bh Hs Mt Ds Rg Cn Uut Fl Uup Lv Uus Uuo
Lanthanide Series
La Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu
Actinide Series
Ac Th Pa U Np Pu Am Cm Bk Cf Es Fm Md No Lr

Some studies showing the zinc requirement of broiler chickens

References	Year	Sex	Age (Day)	Diet type	Traits evaluated	Estimated requirement (mg kg^{-1})
Rossi, *et al.*	2007	M [a]	0-42	Corn-soy	Skin tearing	105
Vieira *et al.*	2013	M	0-42	Corn-soy	Footpad integrity	
Gomez	2008	M and F	8-21	Practical	Tibia Zn	85
Huang *et al.*	2007	M	0-21	Corn-soy	Weight gain	84
Mohanna and Nys	1999	-	5-21	Corn-soy	Tibia and plasma Zn	75
Bao *et al.*	2009	-	14-35	-	Weight gain	68
Xiudong Liao *et al.*	2013	-	22-42	Corn-soy	Tibia Zn	62
Ao *et al.*	2007	M	0-21	Corn-soy	Weight gain	37
Wedekind and Baker	1990	M	8-12	Semi purified	Weight gain	38
Ao *et al.*	2006	M	0-21	Corn-soy	Weight gain	32.8
Steinruck and Kirchgessner	1993	-	72-107	Semi purified	Weight gain	32
Zeigler *et al.*	1961	-	-	Semi purified	Weight gain	28
Batal *et al.*	2001	F [b]	1-3	Semi purified	Weight gain	27.1
Dewar and Downie	1984	M and F	0-3	Purified	Live weight	
Emmert and Baker	1995	-	8-22	Purified	Weight gain	10

[a] Male, [b] Female.

Feed Ingredients	Zinc content (mg/kg)
Corn	18

Feed Ingredients	Zinc content (mg/kg)
Corn	18
Soybean meal	40

Feed Ingredients	Zinc content (mg/kg)
Corn	18
Soybean meal	40
Wheat	34

Feed Ingredients	Zinc content (mg/kg)
Corn	18
Soybean meal	40
Wheat	34
Wheat bran	100

Feed Ingredients	Zinc content (mg/kg)
Corn	18
Soybean meal	40
Wheat	34
Wheat bran	100
Barley	30

Feed Ingredients	Zinc content (mg/kg)
Corn	18
Soybean meal	40
Wheat	34
Wheat bran	100
Barley	30
Canola meal	71

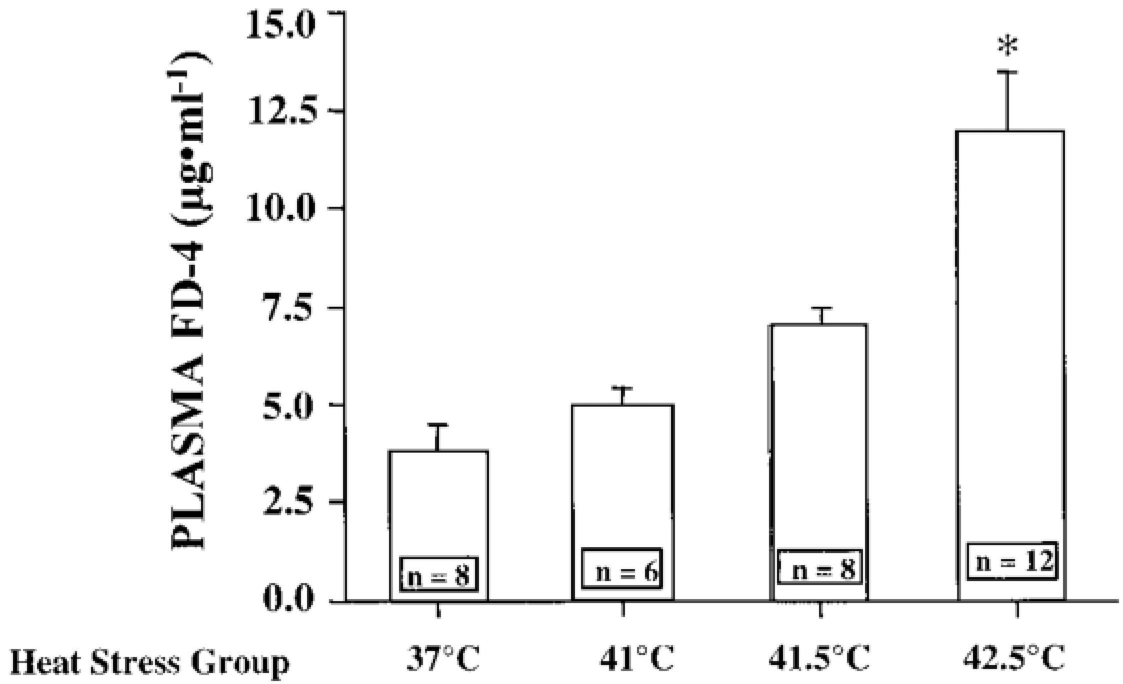
Feed Ingredients	Zinc content (mg/kg)
Corn	18
Soybean meal	40
Wheat	34
Wheat bran	100
Barley	30
Canola meal	71
Corn gluten	33

Feed Ingredients	Zinc content (mg/kg)
Corn	18
Soybean meal	40
Wheat	34
Wheat bran	100
Barley	30
Canola meal	71
Corn gluten	33

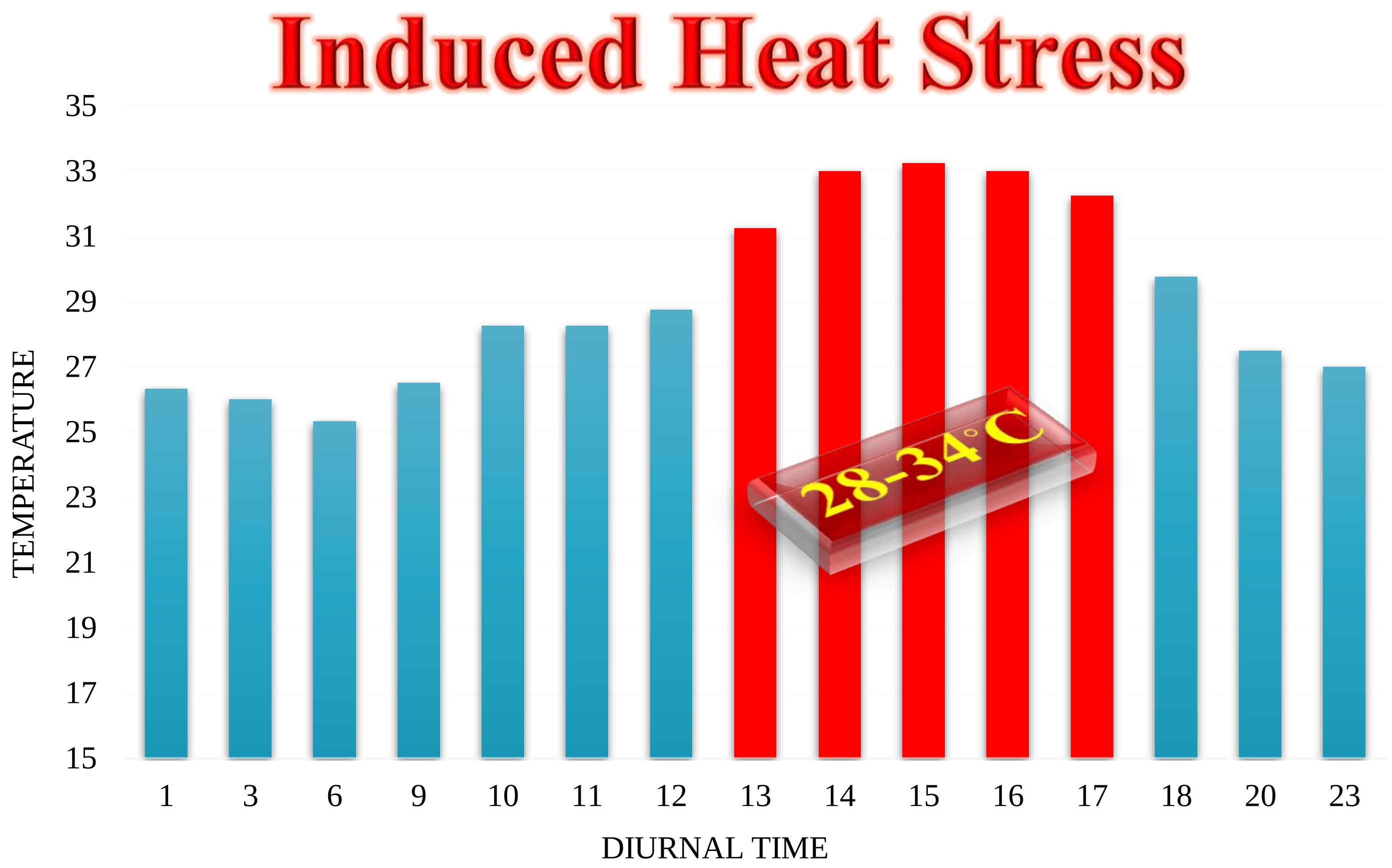
What does it means?

Natural Zn concentrations in feedstuffs are generally lower than the daily Zn requirement for broiler chickens leading to the necessity of dietary Zn supplementation.

Heat Stress



PLASMA FD-4 (µg•ml-1)
15.0
12.5
10.0
7.5
5.0
2.5
0.0
*
n = 8
n = 6
n = 8
n = 12
Heat Stress Group
37°C
41°C
41.5°C
42.5°C



Average diurnal house temperature during 21 to 24 days of age

(Red bar show the temperature at daily heat stress period)

Effect of experimental diets on carcass fractional weights (%) of male broiler chickens (d 42).

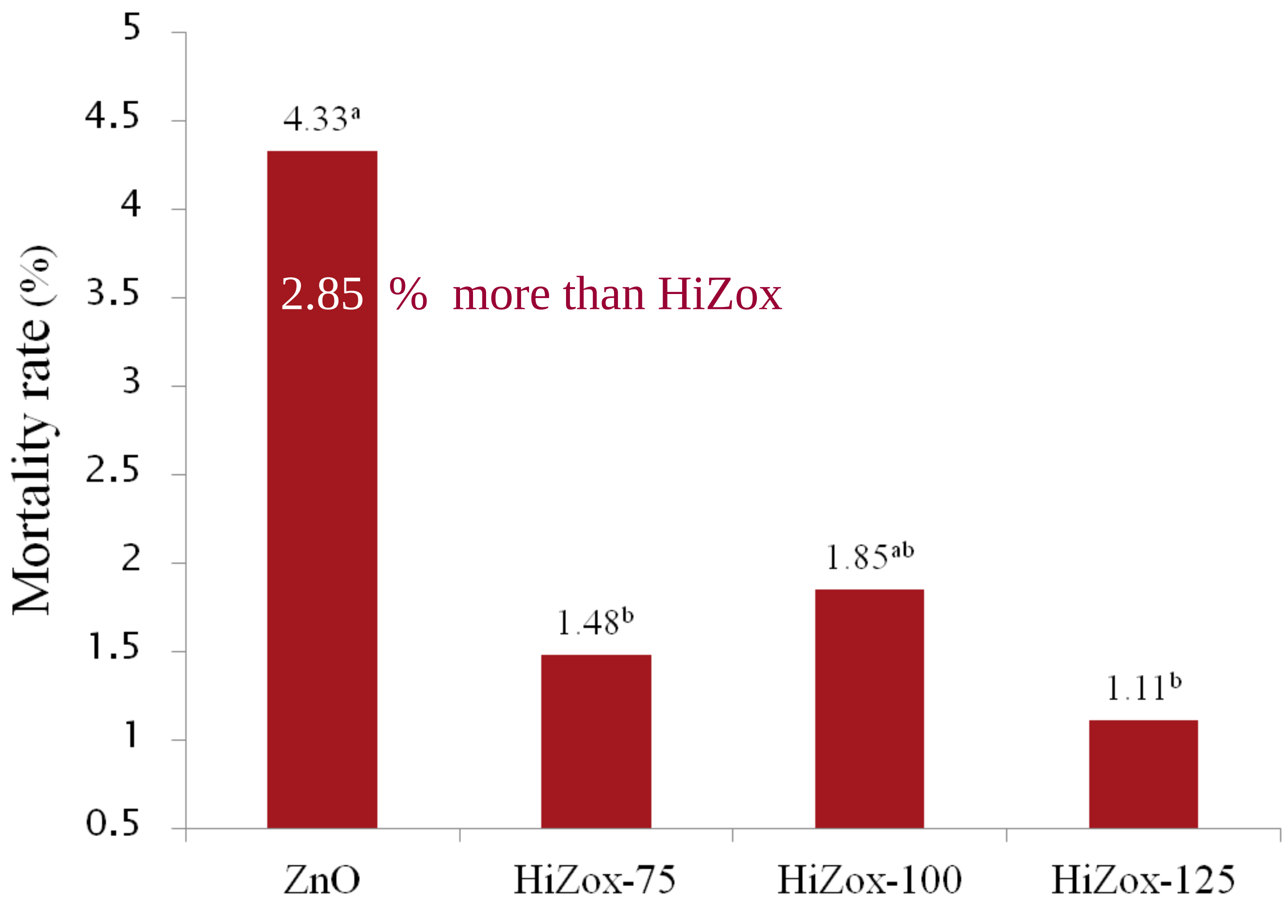
Treatment	Carcass	Breast	Thighs	AFP[1]	Liver
ZnO-100	75.6	26.8	21.0	1.16	1.67[b]
HiZox-75	75.6	27.2	21.0	1.21	1.80[ab]
HiZox-100	75.4	26.8	20.6	1.27	1.90[a]
HiZox-125	75.5	26.8	20.7	1.33	1.83[ab]
SEM	0.28	0.38	0.17	0.08	0.05
P-Value	0.95	0.84	0.20	0.45	0.04

1. Abdominal fat pad

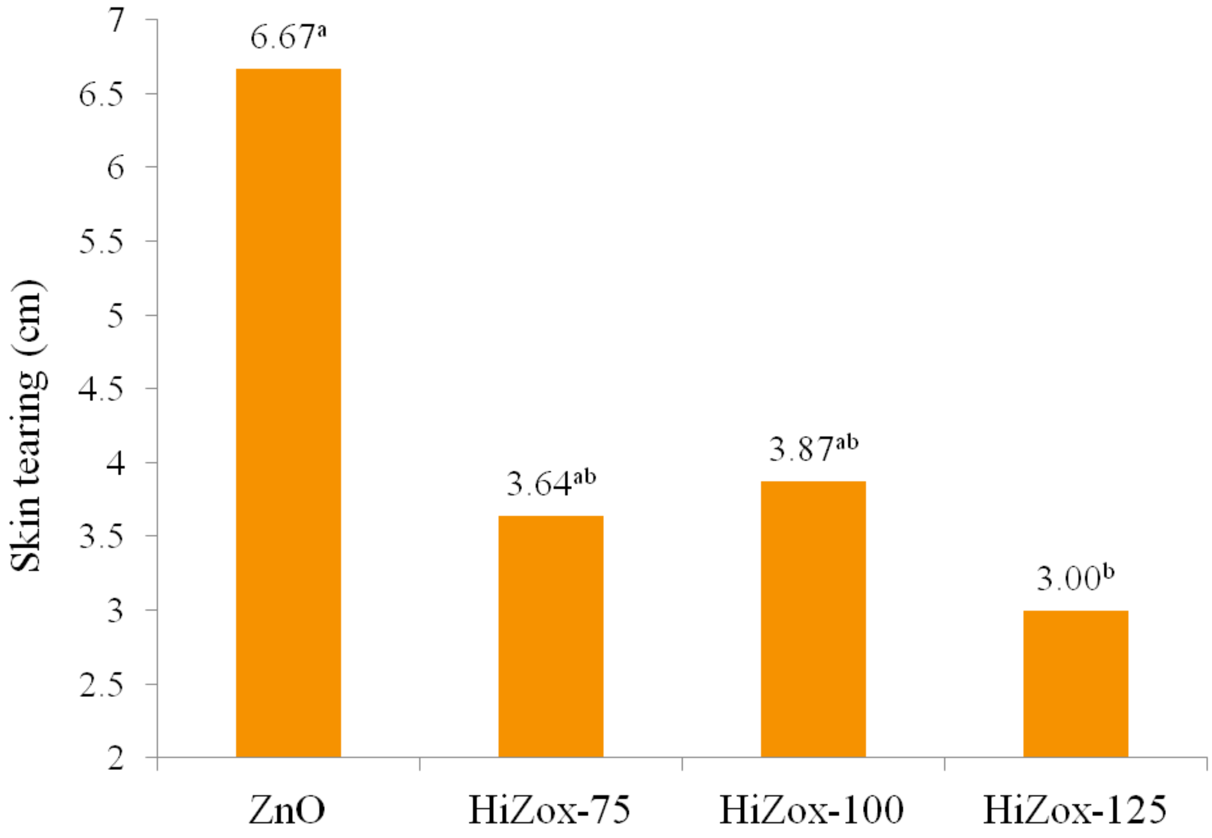
[abc] Means in a column with different superscripts differ significantly ($P < 0.05$).

Roberson and Edwards, 1994

Stress → liver Zn↑ → plasma zinc↓ → a marginal Zn deficiency

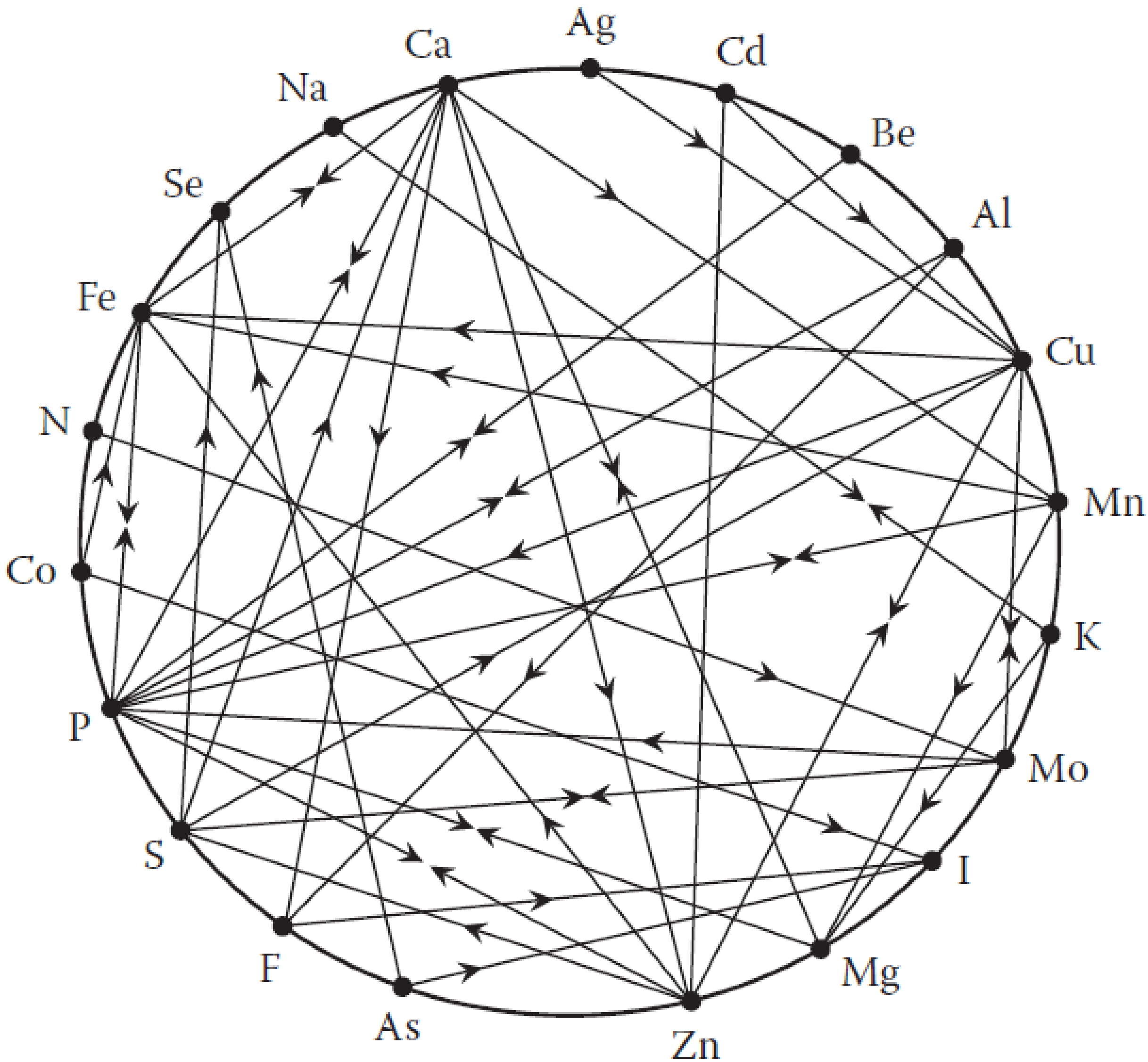


Effect of experimental diets on mortality rate of heat stressed male broiler chicken during 1 to 42 days ($P<0.06$, SE 0.06).

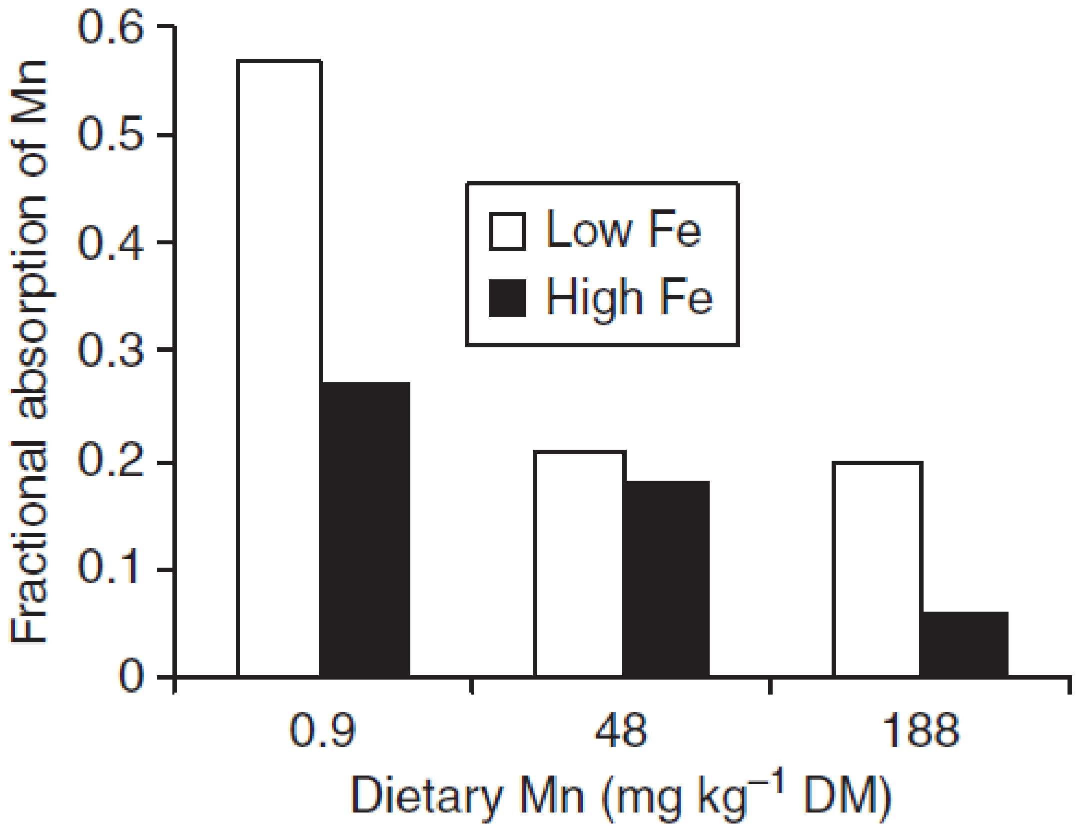


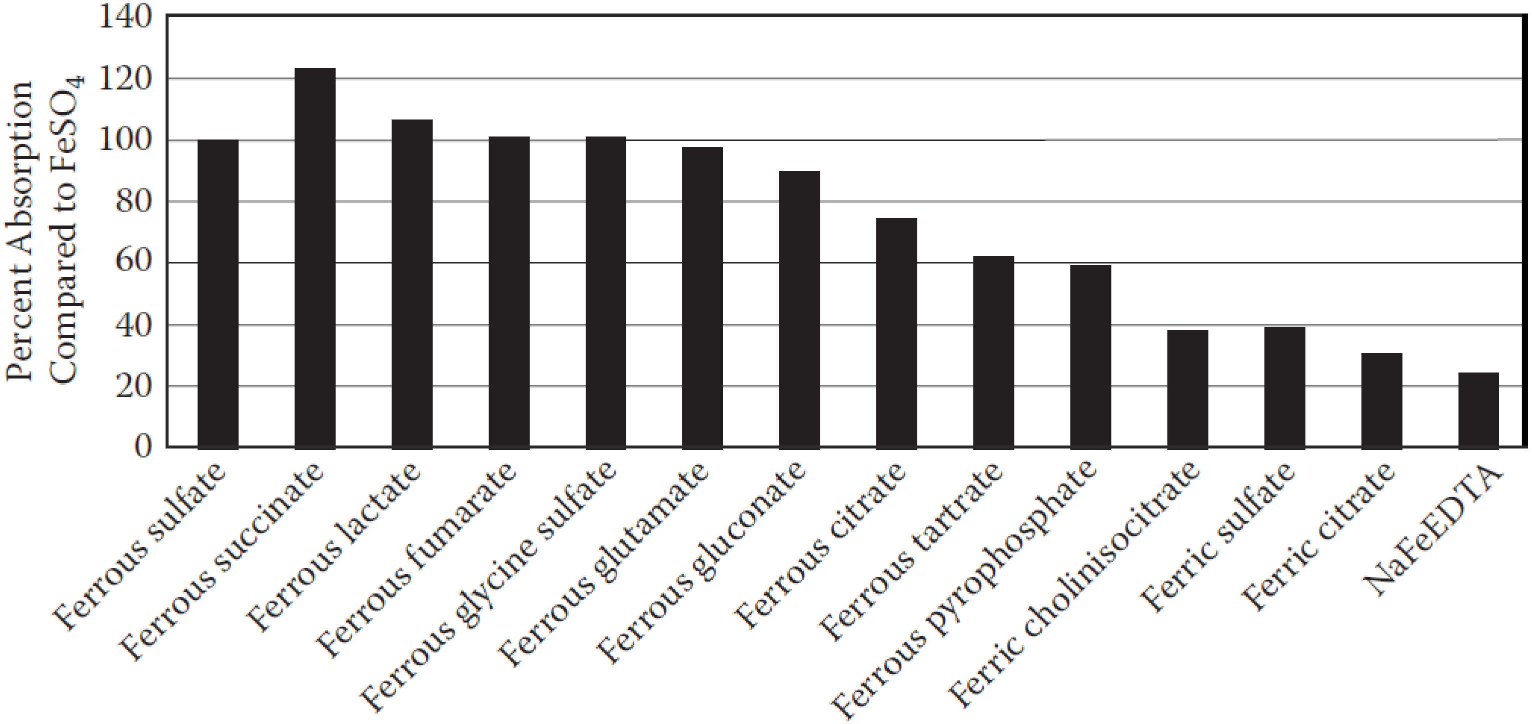
Effect of experimental diets on skin resistance test of heat stressed male broiler chicken at 42 day ($P<0.07$, SE 1.01).


اثرات متقابل



Ag
Cd
Ca
Na
Be
Se
Al
Fe
Cu
N
Mn
Co
K
P
Mo
S
I
F
Mg
As
Zn


0.6
0.5
0.4
0.3
0.2
0.1
0
Fractional absorption of Mn
Low Fe
High Fe
0.9
48
188
Dietary Mn (mg kg−1 DM)



Percent Absorption Compared to $FeSO_4$
140
120
100
80
60
40
20
0
Ferrous sulfate
Ferrous succinate
Ferrous lactate
Ferrous fumarate
Ferrous glycine sulfate
Ferrous glutamate
Ferrous gluconate
Ferrous citrate
Ferrous tartrate
Ferrous pyrophosphate
Ferric cholinisocitrate
Ferric sulfate
Ferric citrate
NaFeEDTA

Min Supplement Formulation

Formula Code: Min00004

Date: 03/09/2018

Formula Name: MINA TOYOOR

Birds Type: Broiler breeder

Stage: Laying

Strain: Ross 308

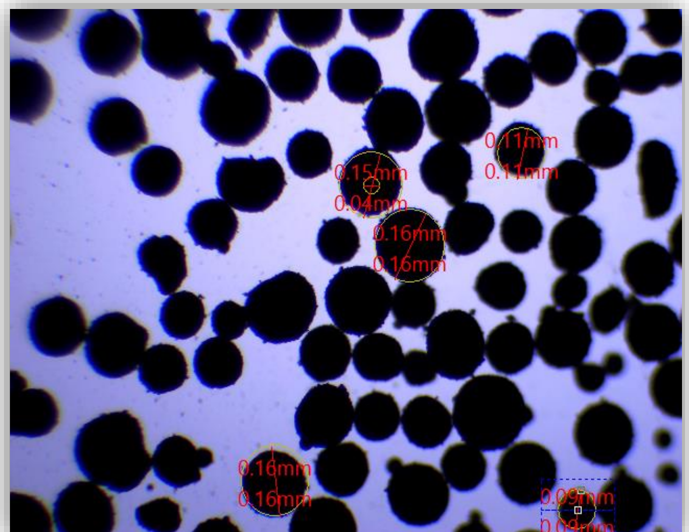
Ingredients	Description	Requirement	Unit	Concentration	Unit	Purity	Bioavalibility	Days PPD**	Density (g/cm3)	Price (Rial/kg)
Ferro	FeSO4,4H2O	50	(mg/Kg)	22.4	(%)	1	1	1	0.8	16000
Manganes	MnO2	120	(mg/Kg)	63.2	(%)	0.537	0.3	1	0.8	5500
Zinc	ZnO	110	(mg/Kg)	80.3	(%)	0.946	1	1	0.8	180000
Copper	CuSO4,5H2O	10	(mg/Kg)	24	(%)	0.9527	1	1	0.8	105000
Seleniume	Sodium Selenite	0.3	(mg/kg)	1	(%)	1	1	1	0.8	52000
Iodine	Ca(IO3)2,H2	2	(mg/kg)	61	(mg/kg)	1	0.95	1	0.8	1700000
Cobalt	COSO4,7H2O	0	(mg/Kg)	30	(%)	1	1	1	0.8	100000
Choline	Choline Cholorid	400	(mg/Kg)	60	(%)	0.86	1	0	0.5	90000
AntiOxid			(g/1000 Kg)			Filler & Carrier			0.5	150000
MinOysShell	10000		(g/1000 Kg)						0.5	2000
Active Peptid	20000		(g/1000 Kg)						0.8	2000
Corn Cob									0.4	2000

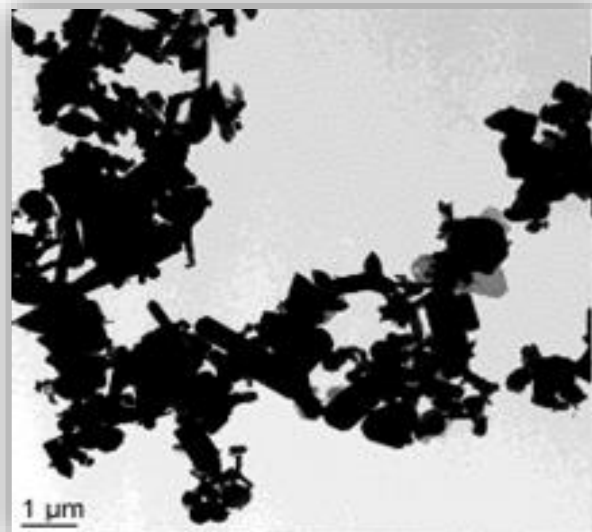
** Days Past from Production Date

Save Data | Close | Save Values | Show


شکل فیزیکی

مقایسه خصوصیات فیزیکی انواع اکسید روی										
منبع اکسید روی	اندازه ذرات (µm)	شکل	زاویه ریزش (درجه)	قابلیت میکس شدن	رنگ	نسبت سطح به وزن ($m2/g$)	آلودگی به عناصر سنگین			
							آرسنیک (ppm)	کادمیوم (ppm)	سرب (ppm)	دی اکسین (ng)
اکسید روی فعال شده	کمتر از ۱۰۰	صفحه‌ای	۲۸	خوب	کرم	۴۲	۵	۲	۲۰	۱/۵
اکسید روی معمولی	۱۰۰ تا ۱۰۰۰	میله‌ای	۳۵	ضعیف	سفید	۴/۲	۱۰	۱۱	۸۰	۱/۵



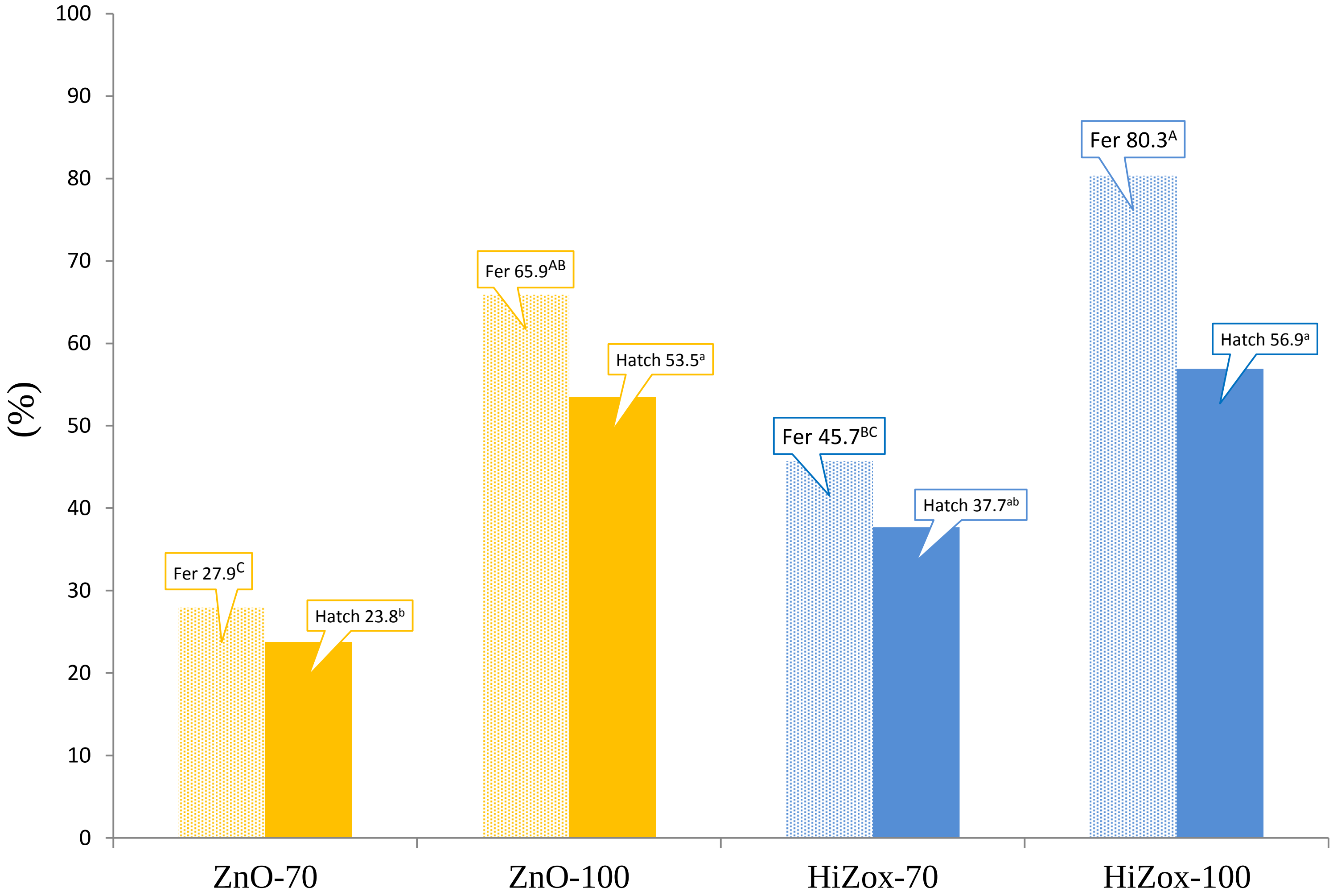


- Crystallite size: X-Ray diffraction

- Aggregate/agglomerate sizes: low-angle laser light scattering.

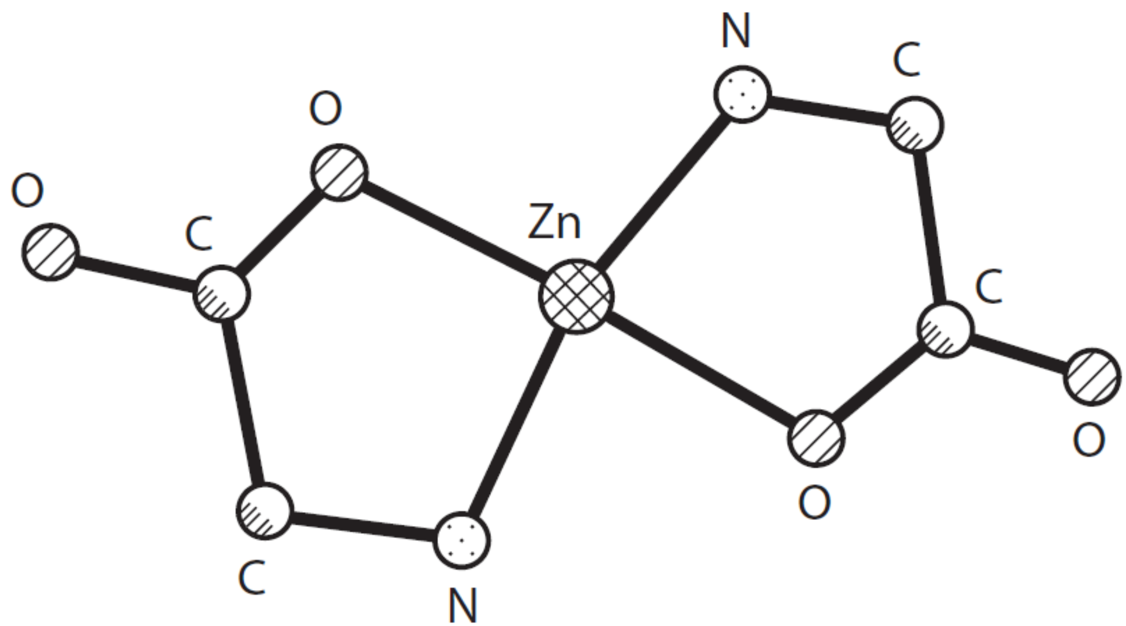
- Primary particle size and shape: transmission electron microscopy (TEM) and scan electron microscopy (SEM).

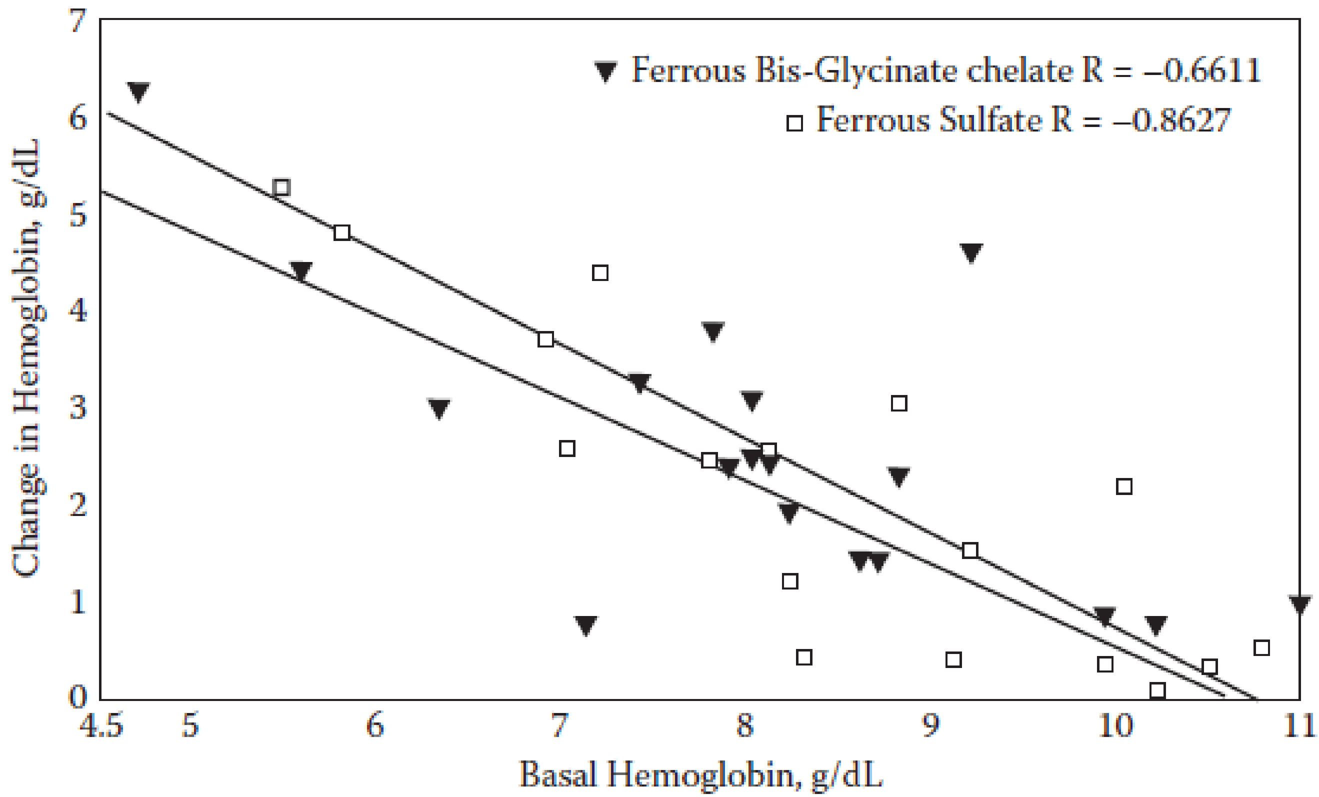
- Specific surface area and porosity: nitrogen adsorption applied to BET theory.


100
90
80
70
60
50
40
30
20
10
0
(%)
Fer 27.9C
Hatch 23.8b
Fer 65.9AB
Hatch 53.5a
Fer 45.7BC
Hatch 37.7ab
Fer 80.3A
Hatch 56.9a
ZnO-70
ZnO-100
HiZox-70
HiZox-100

ساختار ترکیب

Chelated mineral products?





Ferrous Bis-Glycinate chelate R = –0.6611
Ferrous Sulfate R = –0.8627
Change in Hemoglobin, g/dL
Basal Hemoglobin, g/dL
0
1
2
3
4
5
6
7
4.5
5
6
7
8
9
10
11

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