OTERS®

Natural Calcium Source with Organic Acid

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INFORMATION

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- Product name OTERS®
  Natural calcium products coated with organic acid
- Application Finisher, Layer, Broiler
- Compositions Oyster shell($CaCO_3$)---------- 99%
  Citric acid---------- 0.2%
  Colorants----------trace
- Recommended dosage 2~4Kg per feed ton
- Performance
  - Strong skeleton formation
  - To reduce cage layer fatigue(CLF)
  - To improved feed efficiency
  - To extension of the lay cycle
  - To protect the broken & soft egg shells
- Packing 20 kg bag (Inside P.E.)
- Storage Cool and dry place

ANALYSIS

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Ca	36.0%
P	Max. 0.01%
Si	1.0%
Se	0.05mg/kg
Organic matters	1.07%
Fe	200ppm
Co	Max. 0.4ppm
Mg	0.37%
Zn	8ppm
Mn	259ppm
Cu	4ppm
Na	0.76%
K	32ppm
I	0.53ppm

There are many abundant trace minerals, mixed citric acid &colorants.

Ca & P Balance

- Ca & P balance---------- 10 : 1

  Calcium (3.6%) : Phosphorus (0.36%)

- Ca Supplementary amount when added Oters, 0.4% --0.144%

  $(0.4\% \times 36\% = 0.144\%)$

- Ca & P balance changed bu adding Oters, 0.4%---- 10.4 : 1

  $(3.6\% + 0.144\%) : 0.36\%$

Conclusion

No dramatic difference in the Ca & P balance by the OTERS supplement.

Shell powder
Lime stone powder

VS

OTERS®

Calcium Dissolution Rate (** Confer NO.1-1)

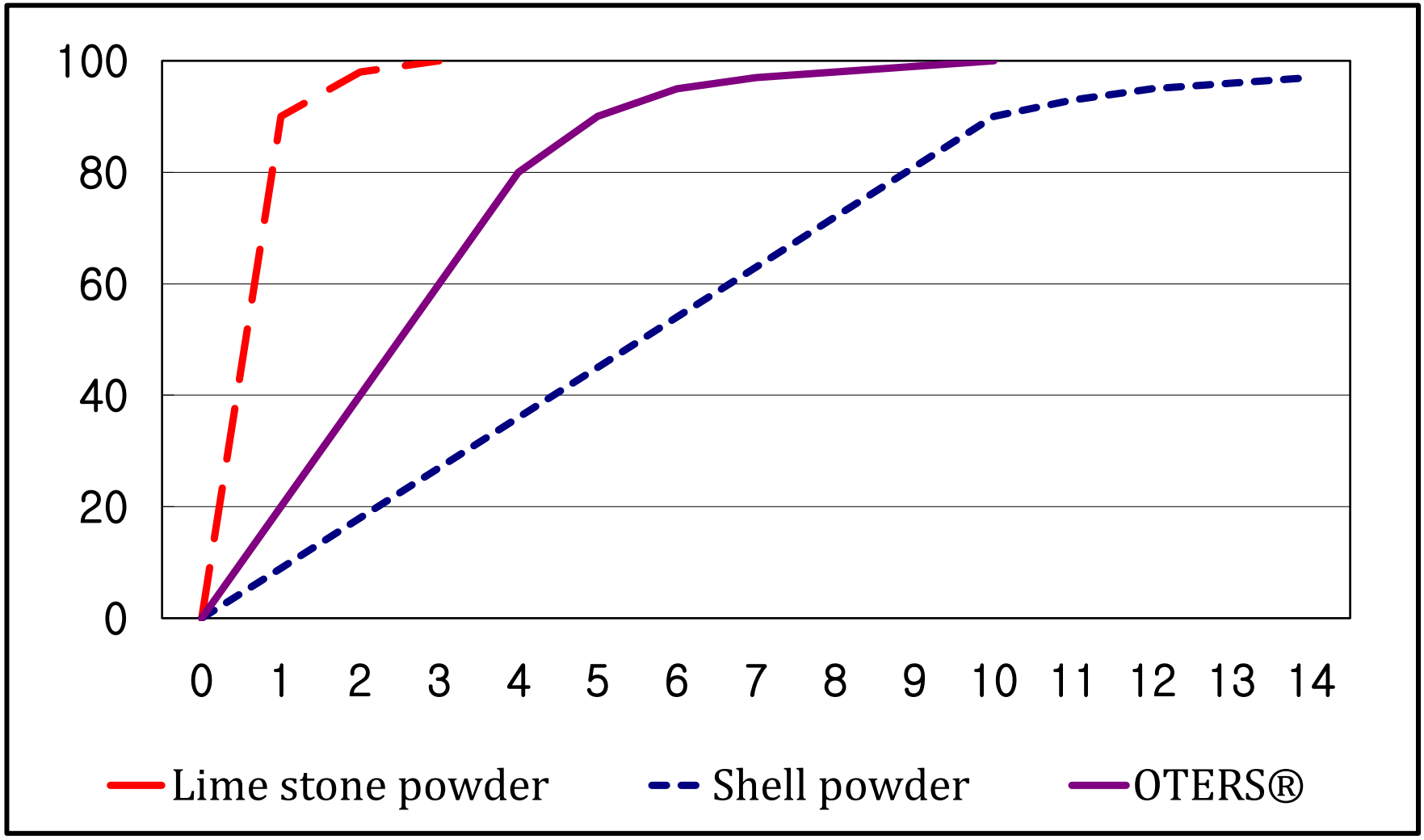
Limestone powder or Shell powder	OTERS ®
▪ Rapidly fast dissolution → Temporary oversupply of calcium ▪ Much of shell powder cannot be absorbed in intestinal tract due to slow dissolution	▪ Make up for the week point of Lime stone powder & Shell powder → Sustained and proper calcium supplier ▪ To improve digestibility

Shell powder
Lime stone powder

VS

OTERS®

NO.1-1 Calcium Dissolution Rate



Shell powder
Lime stone powder

VS

OTERS®

NO.1-1 Calcium Dissolution Rate

Classification	Dissolution Rate(%)			
	1	2	3	Average
Limestone (small particle)	48.9	50.6	49.8	49.8
Limestone (Big particle)	42.5	45.7	44.2	44.1
Shell powder	49.8	51.6	48.4	49.9
OTERS	77.5	76.8	77.3	77.2

Shell powder
Lime stone powder

VS

OTERS®

NO.1-3 Specific gravity

Classification	Weight/30cc g	Specific gravity g/cc
Limestone (Small particle)	28.2	0.94~1.06
Limestone (Big particle)	41.9	1.37~1.45
Shell powder	29.9	1.16~1.22
Corn particle	21.9	0.73~0.91
OTERS	25.8	0.86~0.95

Feed efficiency & Laying rate increase effect

Lime stone powder VS OTERS®

classification	Feeding quantity (%)	Laying rate (%)	Feed efficacy (kg fd/kg eggs)	Cracked & broken rate (%)
Lime (Ca-38%)	3.6	87.58	2.82	22.5
OTERS®	0.3	89.27	2.65	15.0

- Feeding OTERS ® increase in laying rate
- Feeding OTERS ® Improve feed efficiency
- To prevent feed intake in short of the calcium supply
- Use OTERS ® with Lime stone powder can get the maximum feed efficiency

Effect strengthen an eggshells

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Lime stone powder VS OTERS®

classification	Feeding quantity (%)	Eggshell rate (%)	Maximum Pressure (g)	Eggshell thickness (mm)	Eggshell Weight (g)
Limestone powder (Ca-38%)	3.6	8.96	2889	0.3480	5.38
OTERS®	0.3	9.58	3273	0.3724	5.98

- Adding OTERS® reduced cracked and broken rate
- Adding OTERS® increase in high quality eggs

Eggshell strength

Field Trial Data - 1

- Location : Junchonhu Farm
- Breeds : Hy-Line
- Ages : 85-week. (Start molting at 76 weeks)
- Henday laying rate : 76 %
- Cracked & broken rate : 1.45%
- Addition rate : 0.4%, to buck truck, from 35-week age
- Calcium level

Classification	Adding OTERS® ,%
Blood	(13.2,14.4,25) 17.53
Bone	15.65
Egg-York	0.32
Eggshell	29.95

*Analysis : The national livestock research institute

Eggshell strength

Field Trial Data - 1

Classification	Controls		OTERS®, 0.4%	
Eggshell-thick(mm)	0.315	Flat-side (0.312) Central point (0.315) Sharp side (0.319)	0.345	Flat-side (0.331) Central point (0.352) Sharp side (0.353)
Eggshell-strength	6.0		8.0	
Egg-York colors	7		8	

*measurement : Chungang University.

Shell defects

Field Trial Data - 2

- Location : Kangnam Farms
- Breeds : ISA971114 Layer
- Birds : 68,000 birds
- Addition rate : Add 0.2% of OTERS ®,
- Results

Weeks	Feed intake(g)	Laying rate(%)	Crack & broken eggs(%)	Low level(%)
Start, 24 weeks	110	81.6	1.5	6.4
25 weeks	110	85	0.98	5.28
26 weeks	110	87.2	1.01	5.05
27 weeks	110	85	0.99	4.82
28 weeks	110	88.4	1.08	3.38
39 weeks	110		0.79	1.80

* Conclusion

Producers improve the egg quality, while maintaining the lay cycle.

Egg weight

- Location : Kangnam Farms
- Breeds : ISA971114 Layer
- Birds : 68,000 birds
- Addition rate : Add 0.2% of OTERS®,

Weeks	Feed intake(g)	Average Egg-weight	Lay-rate	Reference
OTERS® feeding (63-week)	117.5	63.5	72.5	
After 1 week	116.3	64	72.8	Temperate 22°C
2 weeks	120.2	64.6	74.4	Stop OTERS® For 3 days
3 weeks	118.9	64.9	77	
4 weeks	118.6	65.1	73.4	disinfection
5 weeks	118.0	65.3	71.4	

Egg weight

Weeks	Super (min. 70g)	Big (60g)	Large (54g)	Middle (48g)	Small (42g)	Average
OTERS® Feeding (63-week)	11.6	57.1	22.2	3.4	0.1	64
After 1 week	12.1	56.4	19.4	2.8	0.1	64.6
2 weeks	13.1	57.5	20.7	3.1	0.1	64.9
3 weeks	13.9	56.4	17.4	2.4	0.1	65.1
4 weeks	13.4	57.3	18.0	2.2	0.1	65.3

* Conclusion

According to OTERS® intake, eggs become bigger ; Super size is increased by over 13%, middle size is decreased by over 23%.

Laying rate , Cracked & Broken rate

Field Trial Data - 4

- Location : Junchunhu Farm
- Breeds : Rodman (3-month after molting)
- Birds : 11,000 birds
- Laying rate : About 76~78%

Date	OTERS® addition Feed 5T/Bulk	Laying rate	Cracked & broken rate	Reference
		76%	4.30%	12packs(360)
7.12	15kg(0.3%)			
7.17	15kg(0.3%)			
7.20	10kg(0.2%)	77%	3.54%	10packs(300)
7.24	20kg(0.4%)			
7.26	20kg(0.4%)			
8.01	20kg(0.4%)	78%	2.84%	8packs(240)
8.08	20kg(0.4%)			
8.15	Finish	78%	1.52%	4.5packs(130)

* Conclusion

There is no decrease in laying rate.

However reduced cracked and broken rate to half by OTERS®.

Poultry breeders

Field Trial Data - 5

- Location : Yun Ju-woong Farm
- Breeds : Arbos Acres.
- Birds : 11,363 birds (♀-9,933, ♂-1,430)
- OTERS feeding : 26 weeks
- Addition rate : 0.25%, Automatic feed mixer.

Classification	Standard of A.A	OTERS, 0.25%	Conference
5% laying date	25 weeks	25 weeks(172days)	
First egg collecting date	26 weeks	26 weeks(177days)	
Henhouse index	191	174.5	91.4%
Average eggs(%)	94.8	96	1.3% over
Hen house index	181	167.4	93%
Hen-day peak laying date(%)	86	83.3	97%
Expiration date	68 weeks	67 weeks	99%

OTERS feeding & feed efficacy

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Classification	Layer	Old aged	Molting
Problem	Required calcium For the peak season need to plenty of calcium accumulation	*Week egg shells *Bad egg color *Cracked and broken shells	The chest and legs twisted because of the molting stress
Feeding time	From chick by periods	From 40 weeks	While molting
Feeding Method	From 2 weeks before start first delivery adding OTERS 4kg/MT In the feedstuff	Adding OTERS 4kg /MT and use vitamin by periods	After molting add some OTERS from 4 days before the first feeding
Feed efficacy	*Calcium accumulation *Muscular functions development *To improve digestibility	*Reduced the cracked and broken eggs *The eggs become bigger *Prolong the laying period	*Get the stronger eggshell *Prolong the laying period

Why hen needs more calcium?

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1. Summary : Major calcium source of the eggshell is the feed & the bone of the layer. But calcium supply has limitation from the feeds, required calcium will be increased by the grower. Therefore cracked & broken eggshell and cage layer fatigue will occur frequently.
2. Increased calcium requirement : Egg weight increased 56g→ 62g
   Egg shell weight increased 5.6g →6.2g
3. Daily calcium requirement : 2.3g
4. Calcium intake from seeds : 1.8g
5. Calcium needs : 0.5g (2.3-1.8)

Solutions : By adding OTERS – 0.3~0.4%, the necessary calcium is supplied. OTERS; its low specific gravity(0.83) than limestone(1.4) prevents segregations, its long solubility of 8 hours, longer than limestone(1hour) will produce Ca through the night time hours and its Vit. A/D3(400IU/kg) increases Ca absorption rate.

Poultry farmer's conclusion

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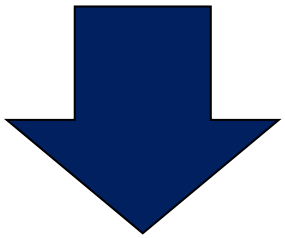
⇨ The lay-rate is maintained throughout the latter part of the lay cycle.

⇨ More effective for poultry breeding than yeast culture & nutriments.

⇨ There is increase in high quality eggs, cleaner and stronger.

⇨ High hatch-ability thanks to good egg quality.

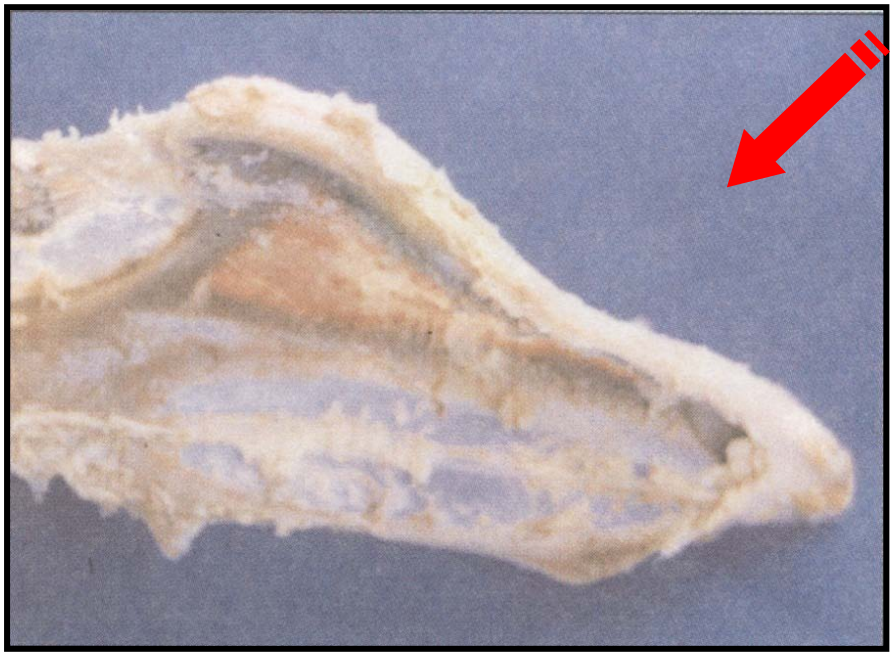


O K ~!!

The faster you use OTERS, the better your egg quality.

OTERS – Comparison of skeletal structure

Non adding OTERS



Adding OTERS

※ The chest part of 87 weeks layer

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Thank you !

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