www.ecobio.co.kr

Bio 황 Sulfa®

World's first and largest production

Environmentally friendly

BioSulfur

ECOBIO HOLDINGS CO.,LTD.

REF. 180906

World No.1 PREMIUM

Agriculture, Livestock, Aquaculture

Company Overview

www.ecobio.co.kr
www.biosulfa.co.kr

To transform ***the existing***
To create ***the nonexisting***
And forge ***sustainability!***

CEO	Hyo-Soon Song
Academic	Keimyung University, Environmentology
1989	Founding of EcoBio Holdings Co., Ltd.
2005	Chairman of Bio-division of New & Renewable Energy Association
2013	Received Presidential Prize for Renewable Energy Award
2015	Present Auditor of New Renewable Energy Association
2016	Current EcoBio Holdings CEO
2018	Korean Scoiety of Clean Technology Vice-Chairman

Company Name: EcoBio Holdings Co., Ltd. (KOSDAQ 038870)

Corporate Registration Number : 122-88-01030

Headquarters : 5, Seoun-ro 26-gil, Seocho-gu, Seoul

Factory : 61, Geowol-ro, Seo-gu, Incheon

Tel. : 02)3483-2900 **Fax** : 02)3483-2929

Email : biosulfa@ecobio.co.kr

Homepage : www.ecobio.co.kr

2016	EcoBio Holdings Co., Ltd.
2013	Presidential Award for Excellence
2012	Awarded the highest prize by a company specializing in the recycling of waste energy resources - Minister of Environment
2008	Goldman Sachs U.K attracts $ 28 million in foreign capital
2007	KOSDAQ Listed
2002	Joined Korea Renewable Energy Association
1989	Founding of EcoBio Holdings (previous TotalENS)

Benefits of Sulfur

Essential Nutrients	Important constituent of our bones, skin, and hair
Skincare	Plays an important role in skin cells and tissues
Constipation	Can help to improve constipation through diuretic action
Constitution	Improves muscles and bones Prevents balding and promotes hair growth
Insulin and Hormones	Activates insulin hormones Effective in controlling diabetes
Detoxification	Detoxifies carcinogenic and disease-causing sources

Comparison between Biosulfur and chemical sulfur

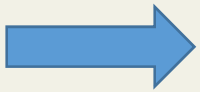
Certified Organic Material
(Post No. 1-6-014)
(Certification No. 1-6-002)

VS

Category	Bio Sulfur (suspended concentrate)	Petrochemical Sulfur (solid)
Definition	Bio sulfur produced from microbial metabolism	Chemical sulfur derived from chemical reactions
pH	Slightly Alkaline (pH 8.5) suspension	Not soluble in water
Sulfur Conc.	40% ± 3% (suspension)	100% solid powder
Density	1.35 g/cm^3	1.95 ~ 2.26 g/cm^3
Particle Size	1~10 ㎛ particles (high fungicidal effect)	400~600㎛ (low fungicidal effect)
Hydrophilicity	Pharmacological cocktail effect (Hydrophilic-like, can be mixed with other substances)	Not compatible with other chemicals (Highly hydrophobic, can not be mixed with other substances))
Characteristics	Naturally suspended state, easily suspended in water User in organic fertilizers, pesticides, cosmetics and pharmaceuticals Harmless to insects	Not soluble in water, needs caustic soda and surfactant for suspension Used in chemical fertilizer Can cause metal corrosion, generates toxic gas and can reduce the lifespan of plastic materials

Effects of Sulfur on People

20th century – the age of "Vitamins"



21st century – the age of "BioSulfa"

On average, the human body has 0.2% sulfur in its weight and should be maintained at all times.
Taking 0.5 to 1mg of sulfur per kilogram of body weight is the key to good health.

Sulfur deficiency

Sulfur deficiency is a major cause of baldness, keratinization of nails, toenails, as well as skin aging
Due to sulfur's detoxification ability, it is also called the antidote of the 21st century.

Beauty Mineral

Sulfur is a main component of amino acids that make up enzymes that affect collagen, a molecule that maintains the elasticity of the skin.
It is effective enough to be called beauty minerals

Sulfur
Effects on the human body

Detoxification

Detoxification ability of heavy metals, chemicals , various pesticides, yellow-dust, etc.
Helps in releasing heavy metals such as yellow-dust, car fumes, seasonings, pesticides etc. from the body

Other qualities

Suppresses increase in blood cholesterol
Improves decomposition of platelets and improves sperm activity
Has anti-cancer and inhibitory effect
Anti-parasitic activity

Effects of sulfur animal feeds on livestock(1/2)

Meat Quality Improvement	**Tested on meat quality of cow , pigs, ducks, and chickens. High quality meat produced and approved** (Increase in sirloin cut size with 20% decrease in fat layer)
Collagen Proteins	Richer meat broth and improved meat texture through increase in collagen proteins
Cholesterol	Decrease in overall cholesterol and increase in unsaturated fatty acids
Endocrine-Disrupting hormones	Helps alleviate build-up of endocrine-disrupting hormones Decreased build-up of heavy metals in muscles
Livestock Disease Control	**Decreased livestock death due to increase in immunity, preventing disease outbreaks** (rate of gain increased by 5~67% in all livestock, increased effectiveness of feed by 3~5%)
Reduces need of antibiotic administration, excellent deodorizer	

Effects of sulfur animal feeds on livestock(2/2)

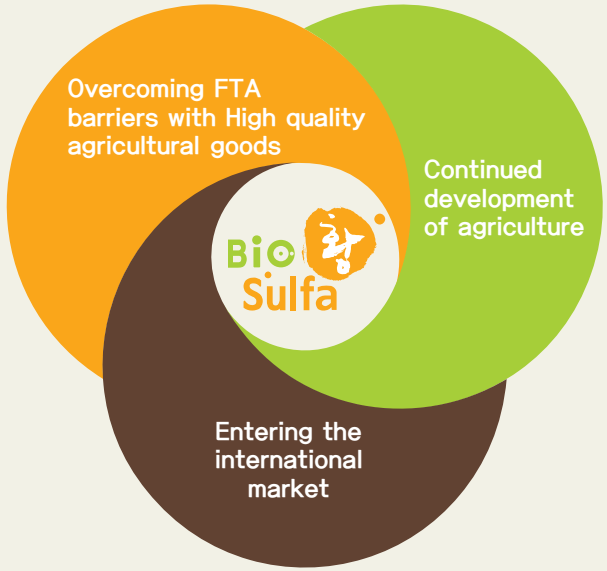
Odor Removal	When cooking, the fishy smell of meat is replaced by a savory scent
Oil solidification	Oil after cooking does not solidify and the taste of the meat does not change after cooling.
Meat Tenderness	The meat is becomes tender and dryness of breast meat is reduced.
Meat Quality	Animals that consume sulfur create a white broth when boiled for stock, creating a light and clean quality
Effective detoxification effect	Removes heavy metals, agrochemicals, and growth hormones

Effect of Sulfur on Crops

- Improves crop growth through sterilization and disinfection action
- Improves nourishment supply through soil sterilization
- Improves resistant to disease and pests for environmentally friendly farming

Environmentally friendly farming = Increases income of farm, balanced development of industry

→ Healthy public



Vision

Although sulfur has been used in agriculture since centuries ago, the toxicity of sulfur has prevented it from extensive use However, Biosulfa produced by microbial metabolism is expected to attract worldwide attention as eco-friendly new agriculture. Biosulfa, which helps soil sterilization and crop growth as well as being highly efficient, is expected to accelerate the expansion of the eco-friendly agriculture.

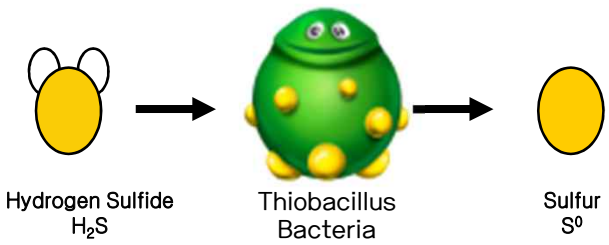
What is BioSulfa?

Biologically produced!

BioSulfa

- Solves the toxicity problem of chemically produced sulfur.
- Biologically produced by microbial digestion (eco-friendly)
- Combines the benefits of sulfur and microorganisms
- Can use in agriculture, livestock, and aquaculture

※Biosulfur production process within the Bioreactor



Thiobacillus breakdown of hydrogen sulfide by bacterial metabolism

Applications of BioSulfa

Agriculture
Soil improvement, winter control, foliar spray

Livestock
Development of animal feed

Aquaculture
Good replacement of currently used antibiotics

And much more!
Medicine, cosmetics, deodorizer, etc

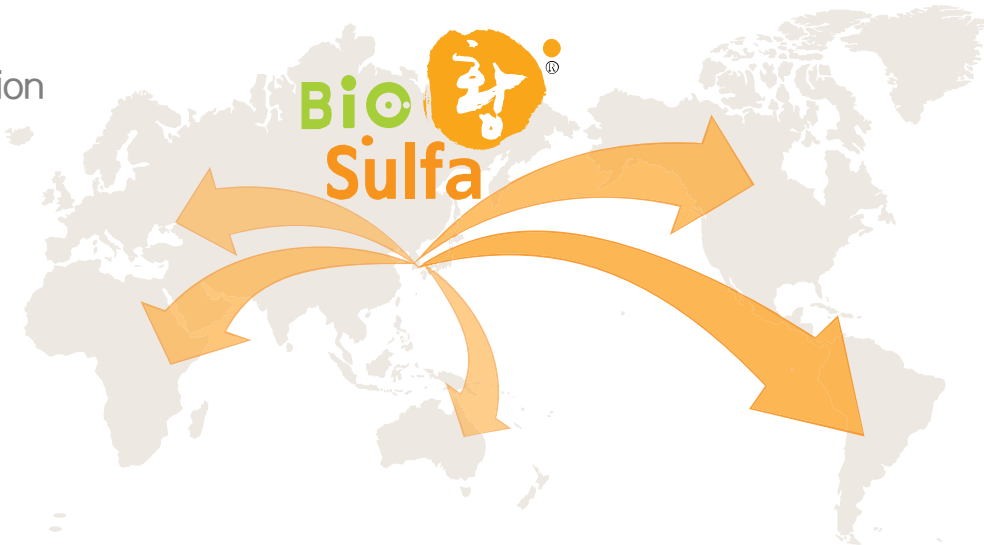
Market Value of BioSulfa

Of the entire **Sulfur** production in the world

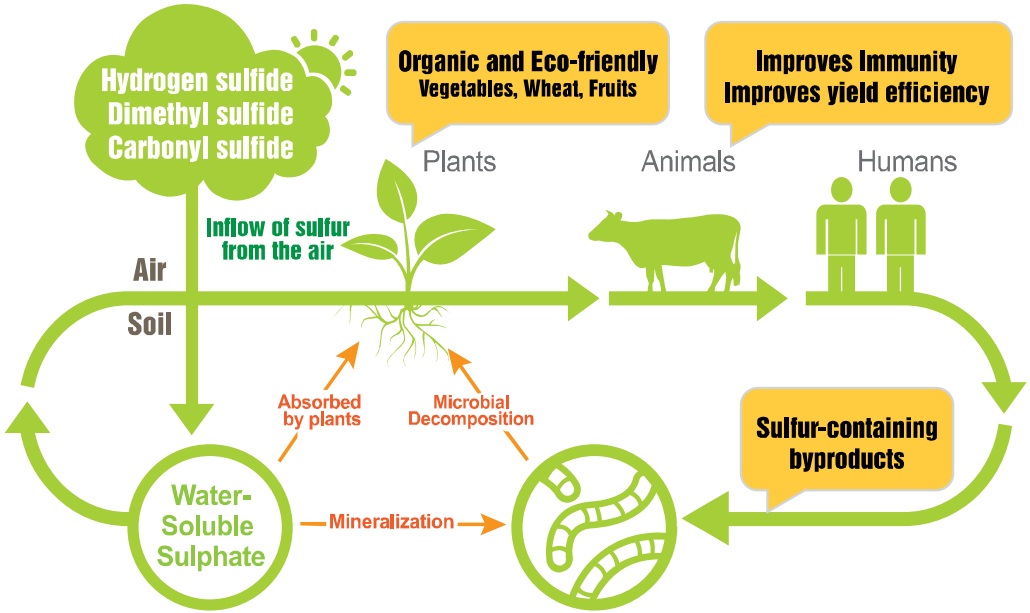
Only 0.04% of it is biosulfa!

High in scarcity value

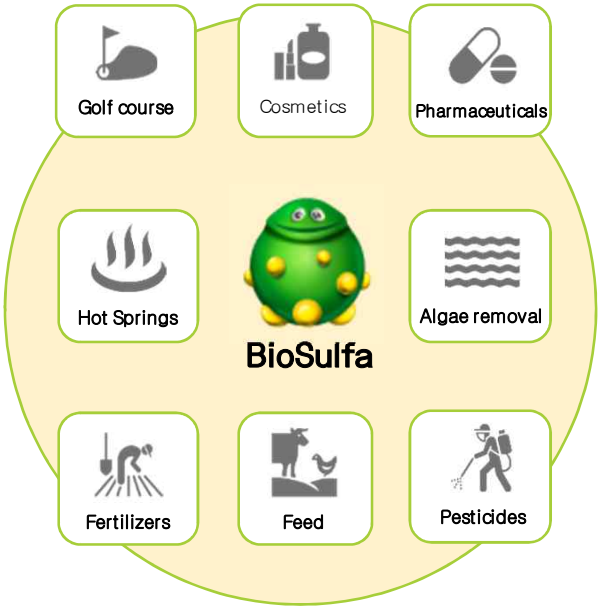
- World's largest biosulfa production facility
- First domestic biosulfa production and commercialization
- The only domestic technology for production biosulfa



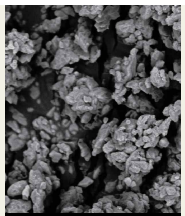
BioSulfa Cycle



Agricultural BioSulfa (fungicide) → raw material for daily supplies→ raw material for cosmetics → raw material for medicine



Used for Various Purposes


SEM of BioSulfa

BioSulfa?

BioSulfa combines the benefits of microbial digestion and sulfur to create an eco-friendly product of the highest quality.
Over 30,000 farmers have experienced its advantages

Vision of Biosulfa in Agriculture, Livestock and Aquaculture

Global Market for Environment Friendly Fertilizer/Fodder

Zero Chemicals

Organic

Biosulfa

Environment friendly	Production expansion	Strengthen competitiveness
ZERO Pesticide	Specialized farming techniques	Stable returning to farming
Preserve land and secure safe food by implementing pesticide-free	Competitive fertilizer and livestock industry	Contribute to economic revitalization of agricultural and fishery by stable cultivation

Feasibility of entering BioSulfa fertilizer market (market environment) (1/2)

Problems of using existing chemical fertilizer

- Between 1960 and 2000, the use of chemical fertilizers increased about 800% globally.
- The use of chemical fertilizers is continuously increasing due to the success of chemical fertilizers such as nitrogen and phosphoric acid.
- Excessive acidification of soil due to the effect of acid rain by overspray and industrialization.
- The acidification of soil brought acidification of the plants, so that humans body is also affected Most pathogens breed well in acid, so that pests outbreak on acidic soil and .
- Excessive nitrogen in chemical fertilizers generates large amounts of greenhouse gases, accelerating climate change. ("About 1/4 of total nitrous oxide emission, one of global warming material, is known as "results of agricultural activities using chemical fertilizers.")

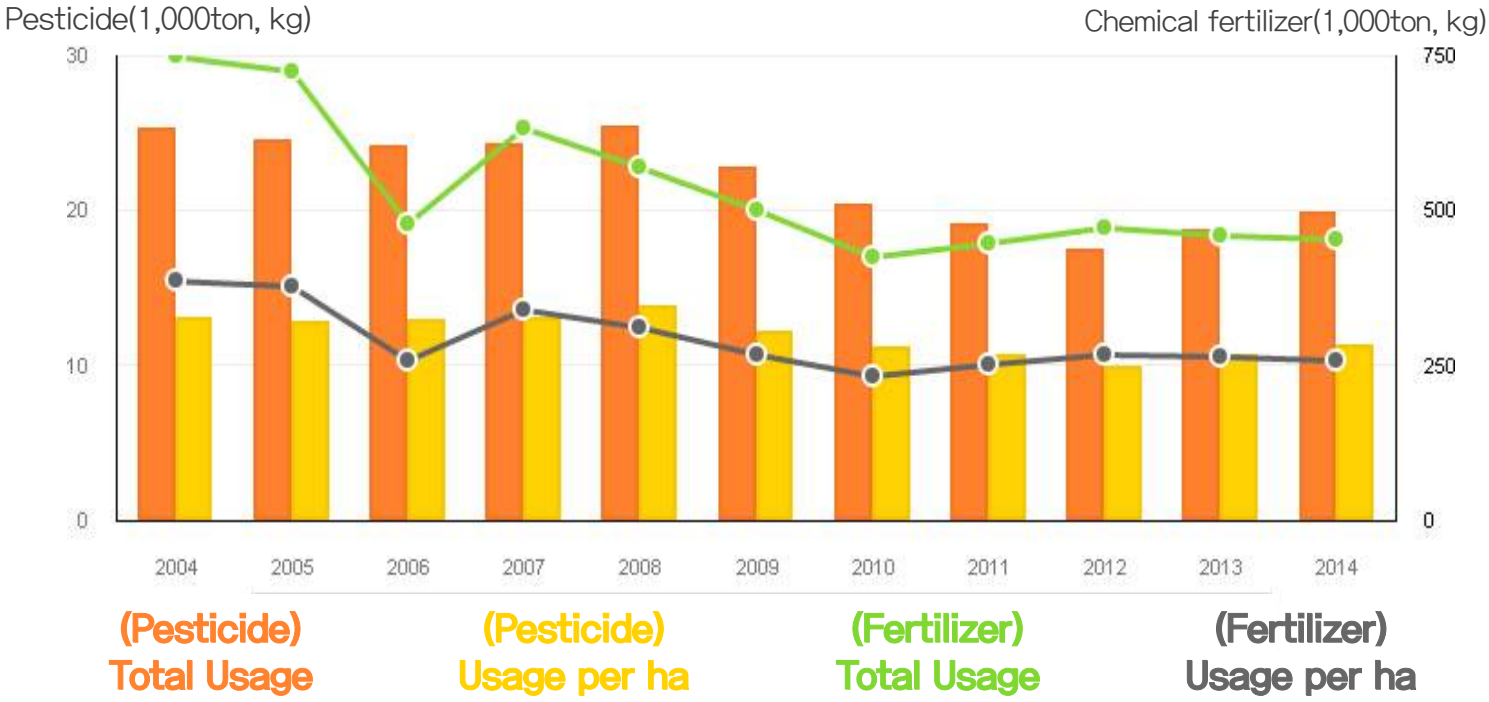
Feasibility of entering BioSulfa fertilizer market (market environment) (2/2)

The crisis of existing agriculture

Acidification of soil	• Soil becomes strongly acidic (pH 5.0 ~ 5.5) by excessive use of chemical fertilizer, pesticides, heavy metals in the dust. • Organic and nutrient content is low. (Soil organic content : 2.4% in Korea) • Zero chemical agriculture, organic farming, were tried, however productivity and wide availability are low. → **It is not a fundamental way to solve the problem.**
The aging of the agricultural population	• Aging of agriculture population is serious due to concentration of population and low birth rate. • Agricultural population decreased continuously.
FTA	• The crisis of agriculture industry due to the liberalization of export and import of various agricultural products. • Need to change into organic and qualified product.

Agricultural and chemical fertilizer usage (Korea)

‹ Usage of pesticides and chemicals ›



▶ Serious soil acidification due to excessive fertilizer/pesticide usage.

▶ Need to find a way to solve soil acidification problem.

* Source: Ministry of Agriculture, Forestry and Livestock Foods
* Note: Chemical fertilizer usage is based on agricultural standards (excluding industrial use and export use)
* Usage of fertilizer and pesticide is classified by nationwide only.

Effect & Necessary of BioSulfa

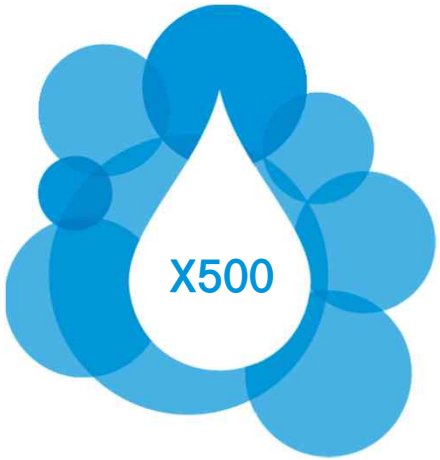
Consumer
- Safe food
- Delicious food
- Fresh food
- Residual pesticide-free food
- Domestic agricultural products

Farmers
- Increase product quantity
- Continuous cultivation
- Increase income
- Production of high quality agricultural products
- Consumer satisfaction

Distributor
- Securing qualified agricultural products
- Extension of expiration date
- Safe product supply
- Increase profitability

Government
- Development of competitive agricultural technology
- Protection of Primary Industry from FTA
- Environmental protection
- Export of agricultural technology

How to use BioSulfa



On growing crops
Ratio (500-fold dilution)
Foliar treatment

* Material for organic products
* Hydrophilicity ensures safe use and mixing convenience
* Provide essential ingredients for plants growth
* Small particle size allows spray

※ Shake it sufficiently before use. Adjust spraying interval and concentration depending on soil, crop conditions and environment situation.

BioSulfa

Effects, Applications, and certification

Biosulfur has different properties to chemical sulfur,
making biosulfur unique to widely available sulfur.

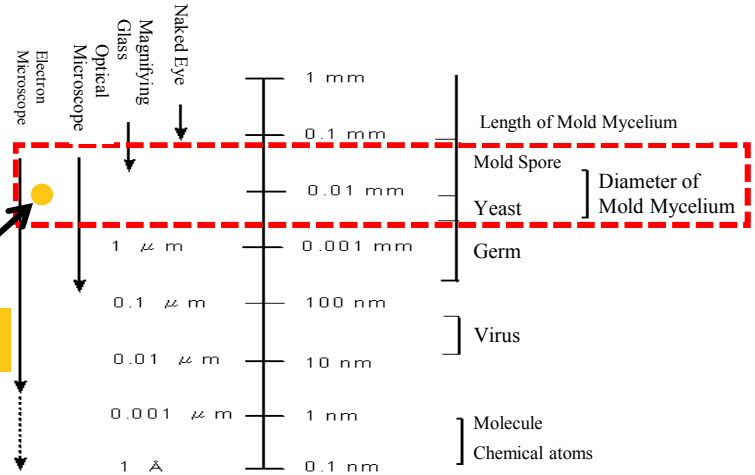
Fungicidal effects of BioSulfa

Why So Effective?

1) Optimal Particle Size : 1~10 ㎛
2) Particle Size Optimal for Sterilizing Mold Spores
3) Germs and viruses are smaller than **BioSulfa** particles

Conditions for Optimizing BioSulfa effects

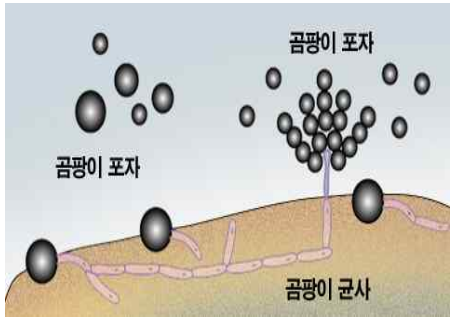
1~10 ㎛

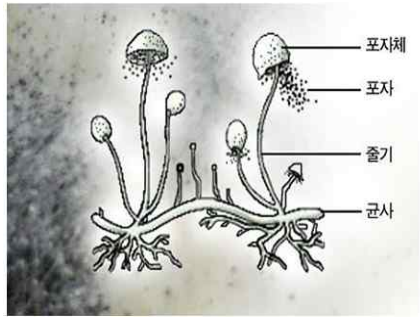


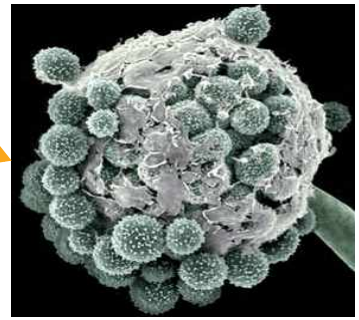
BioSulfa's fungicidal effect

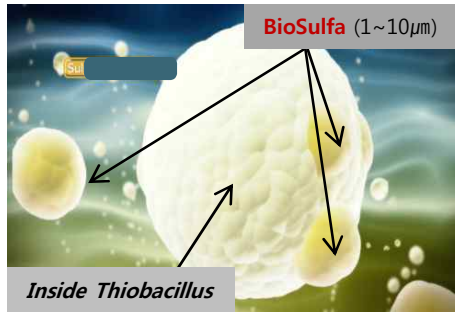
1) Fungi reproduce through spores ➔ can maintain spores through unfavorable conditions
2) Regular sulfur has larger particle size than fungi ➔ can't reprevent reproduction

Existing pesticides ➔ Increase pesticide resistance
BioSulfa ➔ highly effective ➔ no build-up of resistance









Effects of BioSulfa

PEOPLE

- Detoxify heavy metals
- Helps maintain skin elasticity
- Helps lower cholesterol and degrade platelets.
- Helps bones grow stronger
- Removes inflammation and kills germs
- Used to help treat diabetes
- Helps to alleviate constipation

LIVESTOCK

- Meat becomes tender
- Removal of unique odor
- High content of unsaturated fatty acids
- Slow oil solidification for fat
- Nutritious animal feed
- Good for digestion (helps stamina)

CROPS

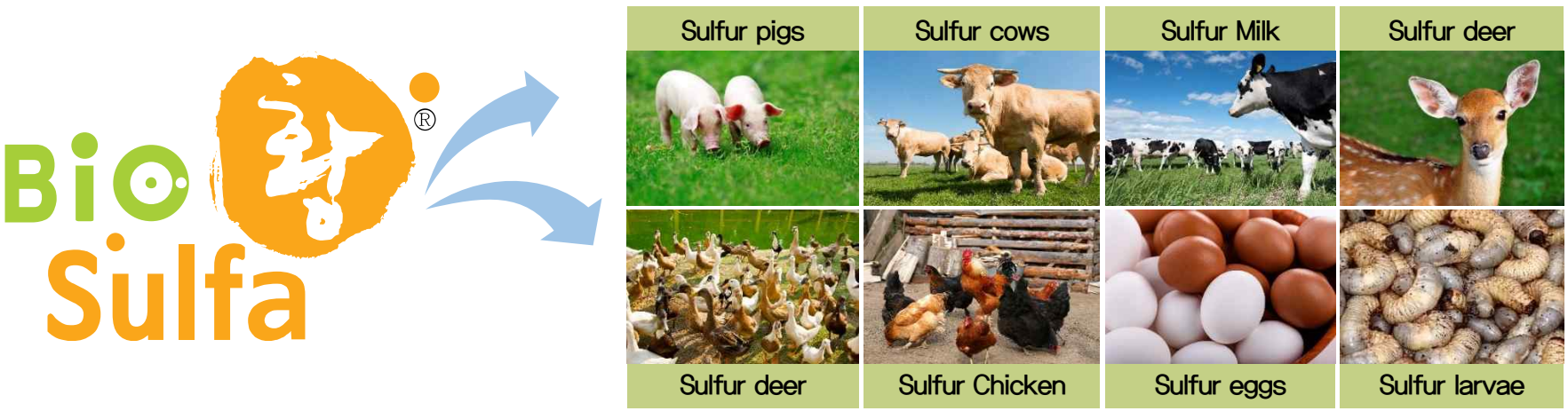
- Improves crop growth through sterilization and disinfection action
- Improves nourishment supply through soil sterilization
- Improves resistant to disease and pests for environmentally friendly farming
- Contributes significantly in increasing farm income
- Winter control, soil sterilization, foliar spray etc.
- Improves color, scent, and taste of fruits

Use of Biosulfa

Safe to use in agriculture, livestock, and aquaculture

Sulfur pig, sulfur cows, sulfur ducks, sulfur chickens, sulfur eggs, sulfur deer, sulfur larvae and sulfur mudfish, etc.

The possibility of non-antibiotics in agriculture, livestock, and aquaculture begins with **BioSulfa!**



Comparison of Safety of BioSulfa and processed Sulfur

"processed" Sulfur < BioSulfa "superior safety standards"

(units : ppm)

Category	Permissible Standard	BioSulfa Taken from Korea Testing & Research Institute 2016.10.10 results	Processed Sulfur Taken from Konkuk University, College of Animal Bioscience & Technology
S(Sulfur)	-	50.8%	98.34%
Pb(Lead)	3.0	Undetected	1.32
Cd(Cadmium)	3.0	Undetected	0.06
As(Arsenic)	3.0	Undetected	Undetected
F(Fluorine)	3.0	-	0.09
Hg(Mercury)	3.0	Undetected	Undetected
Cr(Chromium)	3.0	Undetected	0.06
Se(Selenium)	3.0	50.8%	0.05

BioSulfa(powder) antibacterial test (Staphylococcus aureus)

한국분석시험연구원 KATR Korea Analysis Test Researcher

서대문구 연희로 261-28, 2층(홍은동)
T : 1670-9936 F : 02-6016-9711
Homepage : http://katr.re.kr

시험성적서

접 수 번 호	: KATR180702-001	접 수 일 자	: 2018. 07. 02
성적서 번호	: KAAA180715-006	발 급 일 자	: 2018. 07. 15
신 청 회 사	: 에코바이오홀딩스 주식회사	용 도	: 품질관리
주 소	: 서울특별시 서초구 서운로26길 5(서초동, 토탈에코빌딩)		
담 당 자	: 한무호		
제 출 처	:		
시 료 명	: 바이오황 #		

시험항목		시험결과							
		Control	#1	#2	#3	#4	#5	#6	#7
ASTM E 2149-13a									
Staphylococcus aureus ATCC 6538	생균수(CFU/mL)	$2.8X10^5$	ND	ND	ND	$2.5X10^5$	$1.7X10^4$	$1.0X10^4$	$1.1X10^4$
	균감소율(%)		99.9	99.9	99.9	10.7	93.9	96.4	96.1

접종균액의 농도 : 2.5 X 10^5 CFU/mL

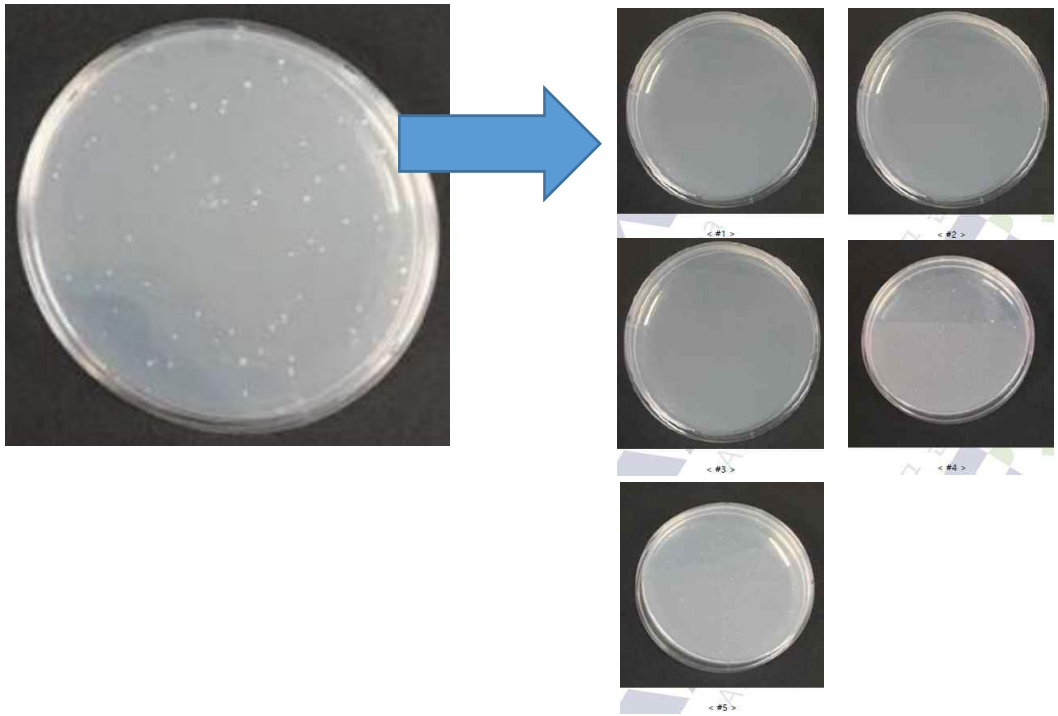
※ 시료 종류 : 분말
※ 시료량 : 1.0 g
※ 시료 반응 시간 : 1시간
※ 균감소율(%) = {(control 균수)-(시료 균수)}/(control 균수)X100

한국분석시험연구원

비고 1. 이 성적서는 신청인이 제시한 시료 및 시료명으로 시험한 결과로서 전체 제품에 대한 품질을 보증하지 않습니다.
2. 이 성적서는 KATR의 동의 없이 홍보, 선전, 광고 및 소송용으로 사용될 수 없으며, 용도 이외의 사용을 금합니다.

99.9% antibacterial effect on *Staphylococcus Aureus*

[2018.07.15] * Analysis: KATR (Korea Institute of Analysis and Testing)



바이오황 닭 진드기 약제방제 효과시험

시 험 성 적 서

시험책임자	양 병 근
시험담당자	이 재 선

접수일자	2018. 08. 29.	접수번호	01-18-008
시 료 명	T0	시험대상	*Dermanyssus gallinae*
제조일자		시험구분	*D. gallinae* 사멸율 실험
의 뢰 자	에코바이오홀딩스	소 재 지	서울특별시 서초구 서운로 26길 5
의뢰내용	"T0" 시료의 *D. gallinae* 사멸율 확인		

귀하께서 우리 팜씨큐 연구개발센터에 의뢰한 시료에 대한 시험결과는 다음과 같습니다.

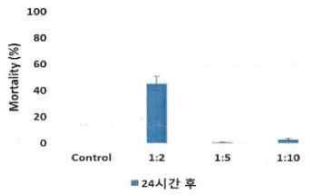
시험방법 및 결과

시험방법

① 약제노출 후 사멸율 (mortality, %) 측정
② *D. gallinae* 성충 100마리, 알 20개 접종, 3회 반복 실험 수행
③ 실험농도 : 1:2, 1:5, 1:10
④ 약제 농도별 *D. gallinae* 사멸율 (mean±SE, %) 측정

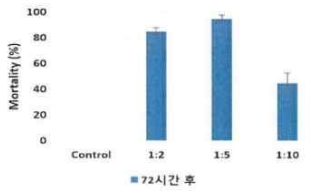
결 과

① T0 성충 농도별 사멸율(Mortality, %) 측정 결과



성충 결과 (*In vitro*)	처리 후 결과 (Mortality ± SE)
T0	24시간 후
1:2	45.6 ± 5.4
1:5	0.8 ± 0.4
1:10	3.1 ± 0.8
Control	0.0 ± 0.0

② T0 알 농도별 사멸율(Mortality, %) 측정 결과



알 결과 (*In vitro*)	처리 후 결과 (Mortality ± SE)
T0	72시간 후
1:2	85.0 ± 2.9
1:5	95.0 ± 2.9
1:10	45.0 ± 7.6
Control	0.0 ± 0.0

③ 실험 결과 분석
- 의뢰받은 T0 시료에 대한 성충 실험결과, 24시간 후에 1:2 희석배율에서 45.6% 의 사멸율을 보였고, 1:10에서는 3.1% 의 사멸율을 보였다. 1:2 희석액을 살포하면 물보다는 약간 점도가 있었으며, 뿌린 뒤 말랐을 때 갇혀죽은 개체가 많았다. 실험자의 의견으로 1:2의 경우 화학적 기작이 아닌 물리적 기작으로 *D. gallinae*를 죽였을 가능성이 높다.
- 알 실험 결과, 1:2배 희석배율에서 85.0%의 사멸율을 보였고, 1:10에서는 45.0%의 사멸율을 보였다. 1:2보다는 1:5에서 더 효과가 좋았다.

비고 : 상기 시험성적은 의뢰자가 제공한 시료에 대한 결과이며, 시료명은 의뢰자가 제시한 것입니다. 본 성적서는 시험의뢰 목적이외의 광고, 선전 등 상업적인 용도나 법적인 해결의 용도로 사용할 수 없고 임의로 시험성적서를 변형할 수 없습니다.

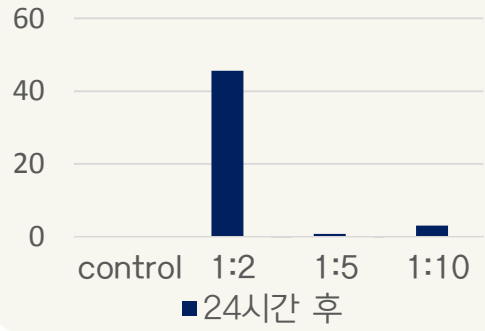
2018년 09월 04일

주식회사 비오지노키 팜씨큐 연구개발센터

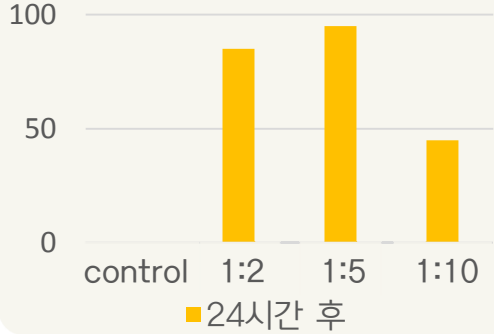
닭 진드기 성충 45.6% 사멸(T0 1:물 2), 알 95.0% 사멸(T0 1:물 5)

[2018.08.29] ㈜비오지노키 팜씨큐 연구개발센터

성충 농도별 사멸률 측정 결과



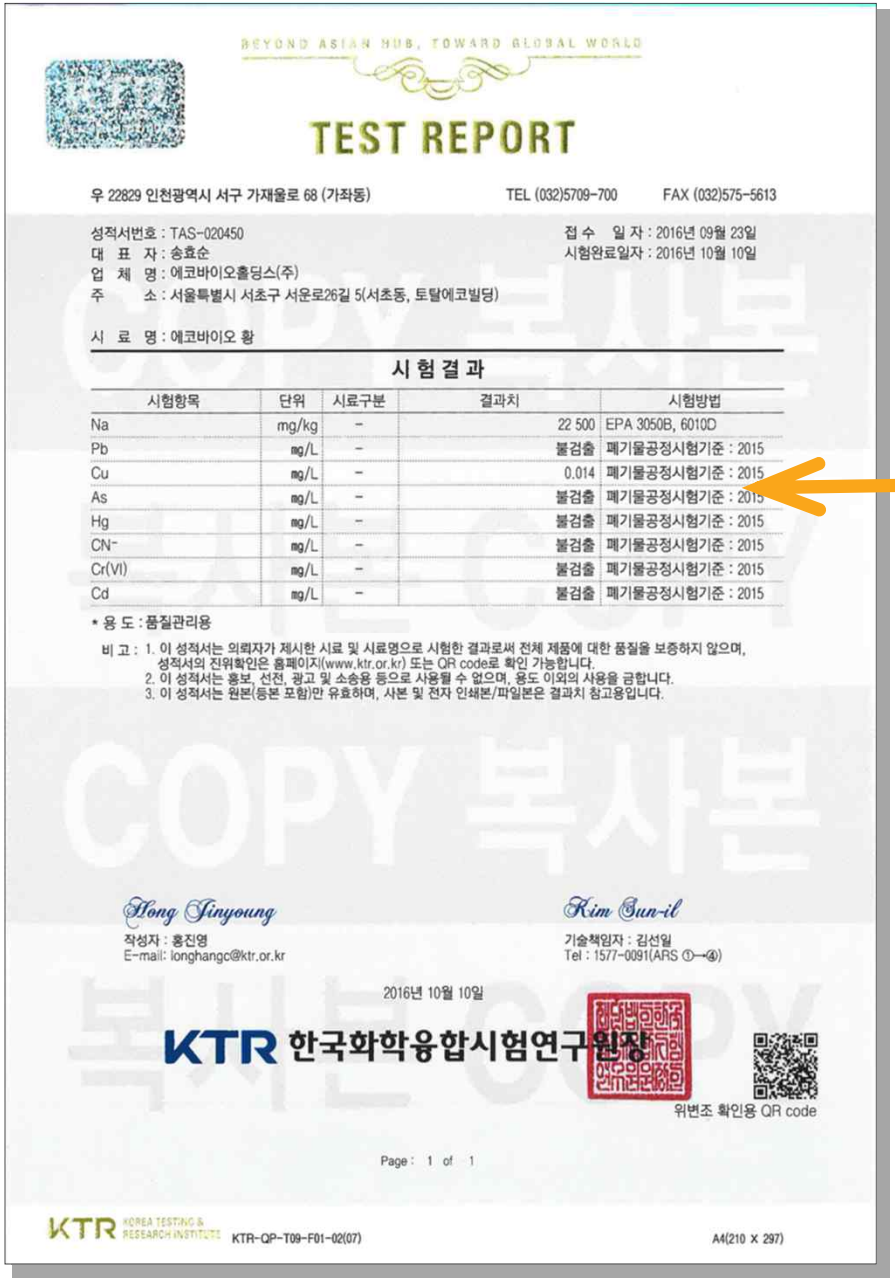
알 농도별 사멸률 측정 결과



성충 결과	처리 후 결과 (Mortality ± SE) (24시간 후)
1:2	45.6 ± 5.4
1:5	0.8 ± 0.4
1:10	3.1 ± 0.8
Control	0.0 ± 0.0

알 결과	처리 후 결과 (Mortality ± SE) (72시간 후)
1:2	85.0 ± 2.9
1:5	95.0 ± 2.9
1:10	45.0 ± 7.6
Control	0.0 ± 0.0

Harmful heavy metals analysis



BEYOND ASIAN HUB, TOWARD GLOBAL WORLD

TEST REPORT

우 22829 인천광역시 서구 가재울로 68 (가좌동) TEL (032)5709-700 FAX (032)575-5613

성적서번호 : TAS-020450
대 표 자 : 송효순
업 체 명 : 에코바이오홀딩스(주)
주 소 : 서울특별시 서초구 서운로26길 5(서초동, 토탈에코빌딩)

접 수 일 자 : 2016년 09월 23일
시험완료일자 : 2016년 10월 10일

시 료 명 : 에코바이오 황

시 험 결 과

시험항목	단위	시료구분	결과치	시험방법
Na	mg/kg	-	22 500	EPA 3050B, 6010D
Pb	mg/L	-	불검출	폐기물공정시험기준 : 2015
Cu	mg/L	-	0.014	폐기물공정시험기준 : 2015
As	mg/L	-	불검출	폐기물공정시험기준 : 2015
Hg	mg/L	-	불검출	폐기물공정시험기준 : 2015
CN^-	mg/L	-	불검출	폐기물공정시험기준 : 2015
Cr(VI)	mg/L	-	불검출	폐기물공정시험기준 : 2015
Cd	mg/L	-	불검출	폐기물공정시험기준 : 2015

* 용 도 : 품질관리용

비 고 : 1. 이 성적서는 의뢰자가 제시한 시료 및 시료명으로 시험한 결과로써 전체 제품에 대한 품질을 보증하지 않으며, 성적서의 진위확인은 홈페이지(www.ktr.or.kr) 또는 QR code로 확인 가능합니다.
2. 이 성적서는 홍보, 선전, 광고 및 소송용 등으로 사용할 수 없으며, 용도 이외의 사용을 금합니다.
3. 이 성적서는 원본(등본 포함)만 유효하며, 사본 및 전자 인쇄본/파일본은 결과치 참고용입니다.

Hong Sinyoung
작성자 : 홍진영
E-mail: longhangc@ktr.or.kr

Kim Sun-il
기술책임자 : 김선일
Tel : 1577-0091(ARS ①→④)

2016년 10월 10일

KTR 한국화학융합시험연구원장

위변조 확인용 QR code

Page : 1 of 1

KTR KOREA TESTING & RESEARCH INSTITUTE KTR-QP-T09-F01-02(07) A4(210 X 297)

Harmful heavy metals not detected

시 료 명 : 에코바이오 황

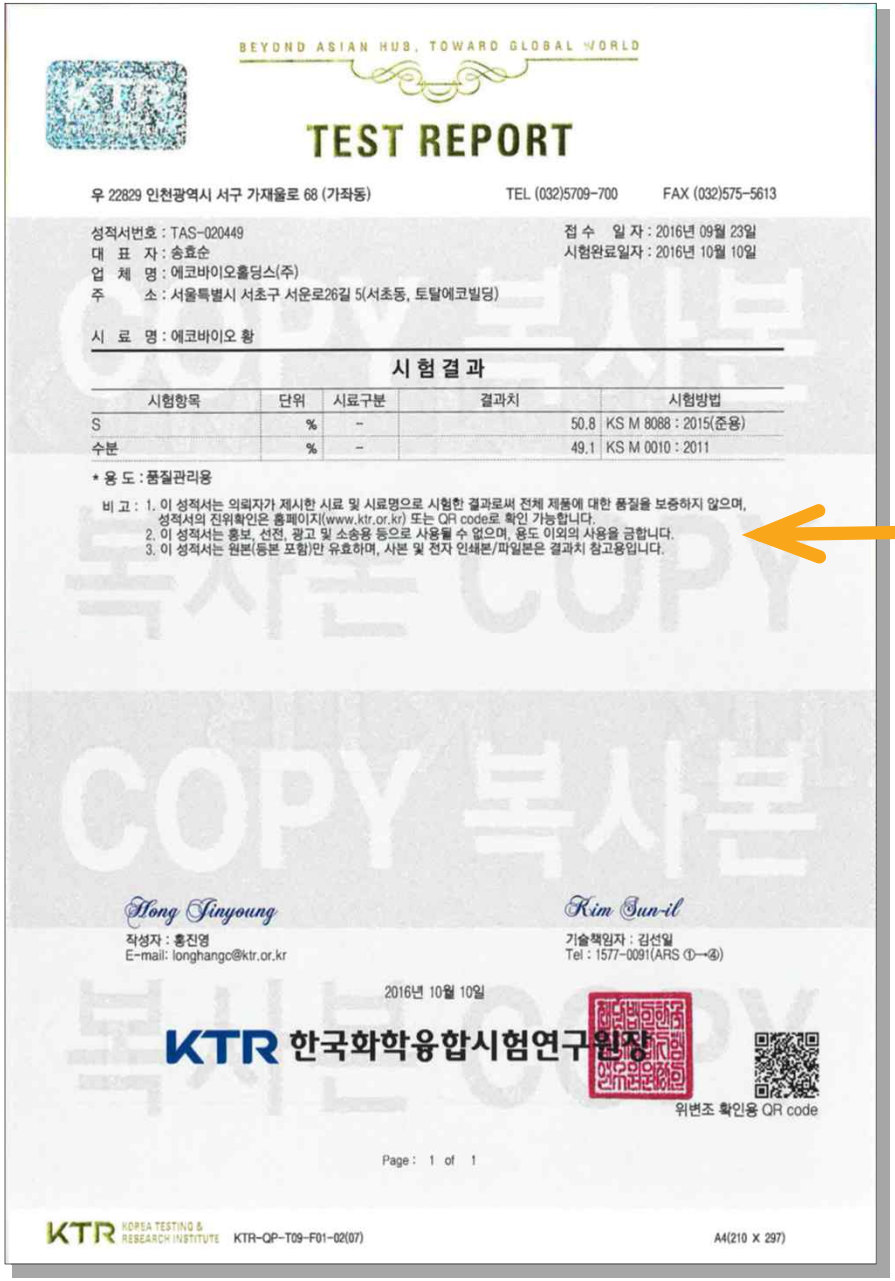
시 험 결 과

시험항목	단위	시료구분	결과치	시험방법
Na	mg/kg	-	22 500	EPA 3050B, 6010D
Pb	mg/L	-	불검출	폐기물공정시험기준 : 2015
Cu	mg/L	-	0.014	폐기물공정시험기준 : 2015
As	mg/L	-	불검출	폐기물공정시험기준 : 2015
Hg	mg/L	-	불검출	폐기물공정시험기준 : 2015
CN^-	mg/L	-	불검출	폐기물공정시험기준 : 2015
Cr(VI)	mg/L	-	불검출	폐기물공정시험기준 : 2015
Cd	mg/L	-	불검출	폐기물공정시험기준 : 2015

* 용 도 : 품질관리용

[2016.10.10] * Analysis : KTR (Korea Testing & Research Institute)

BioSulfa content analysis



BEYOND ASIAN HUB, TOWARD GLOBAL WORLD

TEST REPORT

우 22829 인천광역시 서구 가재울로 68 (가좌동) TEL (032)5709-700 FAX (032)575-5613

성적서번호 : TAS-020449
대 표 자 : 송효순
업 체 명 : 에코바이오홀딩스(주)
주 소 : 서울특별시 서초구 서운로26길 5(서초동, 토탈에코빌딩)

접 수 일 자 : 2016년 09월 23일
시험완료일자 : 2016년 10월 10일

시 료 명 : 에코바이오 황

시 험 결 과

시험항목	단위	시료구분	결과치	시험방법
S	%	-	50.8	KS M 8088 : 2015(준용)
수분	%	-	49.1	KS M 0010 : 2011

* 용 도 : 품질관리용

비 고 : 1. 이 성적서는 의뢰자가 제시한 시료 및 시료명으로 시험한 결과로써 전체 제품에 대한 품질을 보증하지 않으며, 성적서의 진위확인은 홈페이지(www.ktr.or.kr) 또는 QR code로 확인 가능합니다.
2. 이 성적서는 홍보, 선전, 광고 및 소송용 등으로 사용될 수 없으며, 용도 이외의 사용을 금합니다.
3. 이 성적서는 원본(등본 포함)만 유효하며, 사본 및 전자 인쇄본/파일본은 결과치 참고용입니다.

Hong Sinyoung
작성자 : 홍진영
E-mail: longhangc@ktr.or.kr

Kim Sun-il
기술책임자 : 김선일
Tel : 1577-0091(ARS ①→④)

2016년 10월 10일

KTR 한국화학융합시험연구원장

위변조 확인용 QR code

Page : 1 of 1

KTR KOREA TESTING & RESEARCH INSTITUTE KTR-QP-T09-F01-02(07) A4(210 X 297)

well-controlled sulfur content

시 료 명 : 에코바이오 황

시 험 결 과

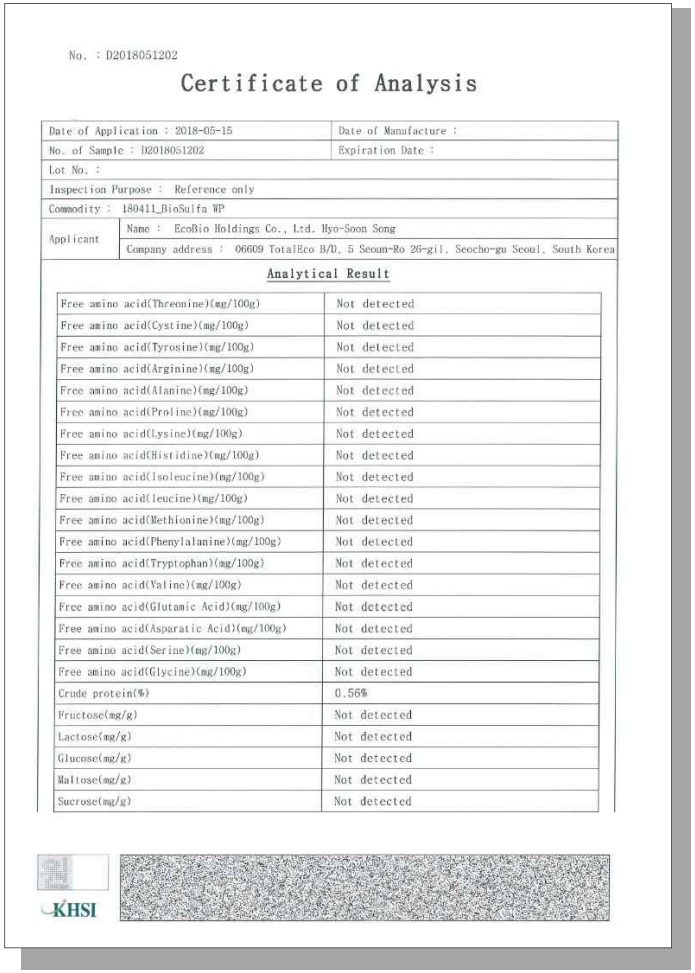
시험항목	단위	시료구분	결과치	시험방법
S	%	-	50.8	KS M 8088 : 2015(준용)
수분	%	-	49.1	KS M 0010 : 2011

* 용 도 : 품질관리용

[2016.10.10] * Analysis: KTR (Korea Testing & Research Institute)

Component Analysis

Crude Proteins (0.56 %), Oleic acid (0.04g/100g) detected



No. : D2018051202

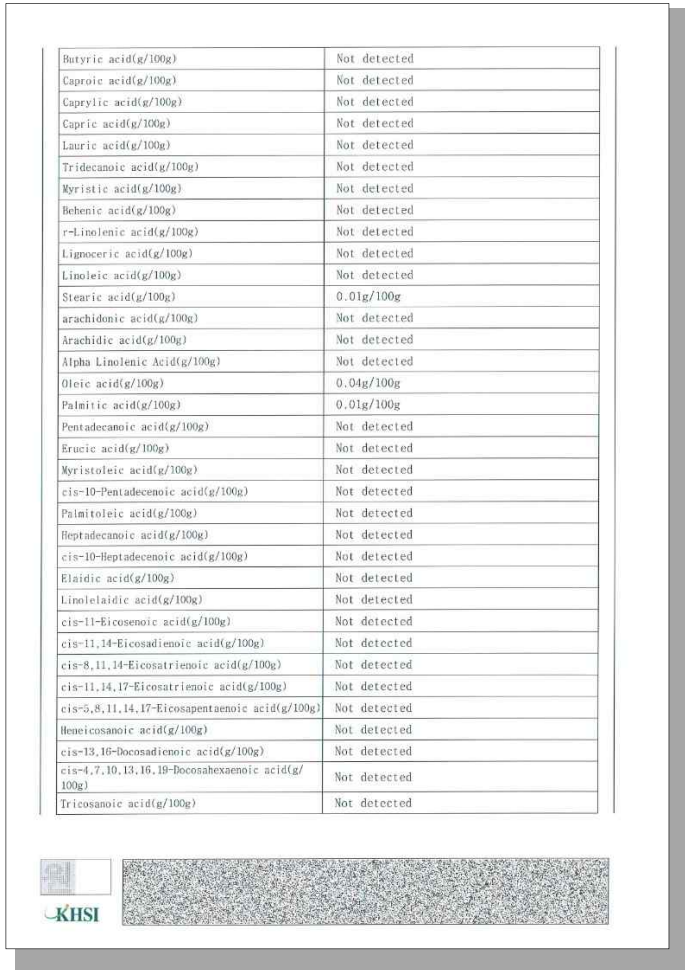
Certificate of Analysis

Date of Application : 2018-05-15	Date of Manufacture :
No. of Sample : D2018051202	Expiration Date :
Lot No. :	
Inspection Purpose : Reference only	
Commodity : 180411_BioSulfa WP	
Applicant — Name : EcoBio Holdings Co., Ltd. Hyo-Soon Song	
Applicant — Company address : 06609 TotalEco B/D, 5 Seoun-Ro 26-gil, Seocho-gu Seoul, South Korea	

Analytical Result

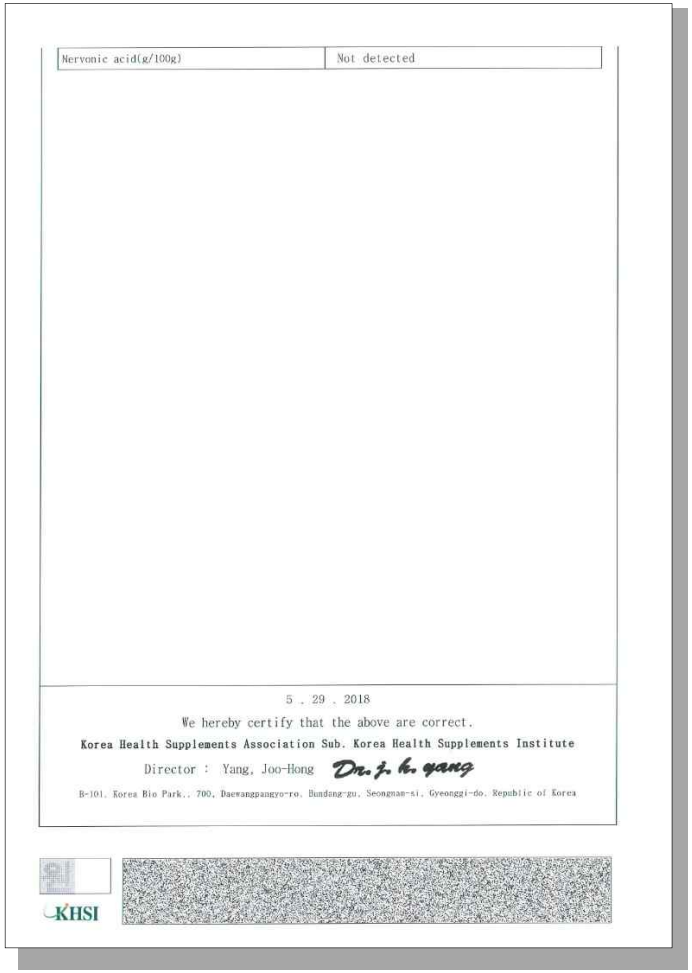
Free amino acid(Threonine)(mg/100g)	Not detected
Free amino acid(Cystine)(mg/100g)	Not detected
Free amino acid(Tyrosine)(mg/100g)	Not detected
Free amino acid(Arginine)(mg/100g)	Not detected
Free amino acid(Alanine)(mg/100g)	Not detected
Free amino acid(Proline)(mg/100g)	Not detected
Free amino acid(Lysine)(mg/100g)	Not detected
Free amino acid(Histidine)(mg/100g)	Not detected
Free amino acid(Isoleucine)(mg/100g)	Not detected
Free amino acid(leucine)(mg/100g)	Not detected
Free amino acid(Methionine)(mg/100g)	Not detected
Free amino acid(Phenylalanine)(mg/100g)	Not detected
Free amino acid(Tryptophan)(mg/100g)	Not detected
Free amino acid(Valine)(mg/100g)	Not detected
Free amino acid(Glutamic Acid)(mg/100g)	Not detected
Free amino acid(Asparatic Acid)(mg/100g)	Not detected
Free amino acid(Serine)(mg/100g)	Not detected
Free amino acid(Glycine)(mg/100g)	Not detected
Crude protein(%)	0.56%
Fructose(mg/g)	Not detected
Lactose(mg/g)	Not detected
Glucose(mg/g)	Not detected
Maltose(mg/g)	Not detected
Sucrose(mg/g)	Not detected

KHSI



Butyric acid(g/100g)	Not detected
Caproic acid(g/100g)	Not detected
Caprylic acid(g/100g)	Not detected
Capric acid(g/100g)	Not detected
Lauric acid(g/100g)	Not detected
Tridecanoic acid(g/100g)	Not detected
Myristic acid(g/100g)	Not detected
Behenic acid(g/100g)	Not detected
r-Linolenic acid(g/100g)	Not detected
Lignoceric acid(g/100g)	Not detected
Linoleic acid(g/100g)	Not detected
Stearic acid(g/100g)	0.01g/100g
arachidonic acid(g/100g)	Not detected
Arachidic acid(g/100g)	Not detected
Alpha Linolenic Acid(g/100g)	Not detected
Oleic acid(g/100g)	0.04g/100g
Palmitic acid(g/100g)	0.01g/100g
Pentadecanoic acid(g/100g)	Not detected
Erucic acid(g/100g)	Not detected
Myristoleic acid(g/100g)	Not detected
cis-10-Pentadecenoic acid(g/100g)	Not detected
Palmitoleic acid(g/100g)	Not detected
Heptadecanoic acid(g/100g)	Not detected
cis-10-Heptadecenoic acid(g/100g)	Not detected
Elaidic acid(g/100g)	Not detected
Linolelaidic acid(g/100g)	Not detected
cis-11-Eicosenoic acid(g/100g)	Not detected
cis-11,14-Eicosadienoic acid(g/100g)	Not detected
cis-8,11,14-Eicosatrienoic acid(g/100g)	Not detected
cis-11,14,17-Eicosatrienoic acid(g/100g)	Not detected
cis-5,8,11,14,17-Eicosapentaenoic acid(g/100g)	Not detected
Heneicosanoic acid(g/100g)	Not detected
cis-13,16-Docosadienoic acid(g/100g)	Not detected
cis-4,7,10,13,16,19-Docosahexaenoic acid(g/100g)	Not detected
Tricosanoic acid(g/100g)	Not detected

KHSI



Nervonic acid(g/100g)	Not detected

5 . 29 . 2018

We hereby certify that the above are correct.

Korea Health Supplements Association Sub. Korea Health Supplements Institute

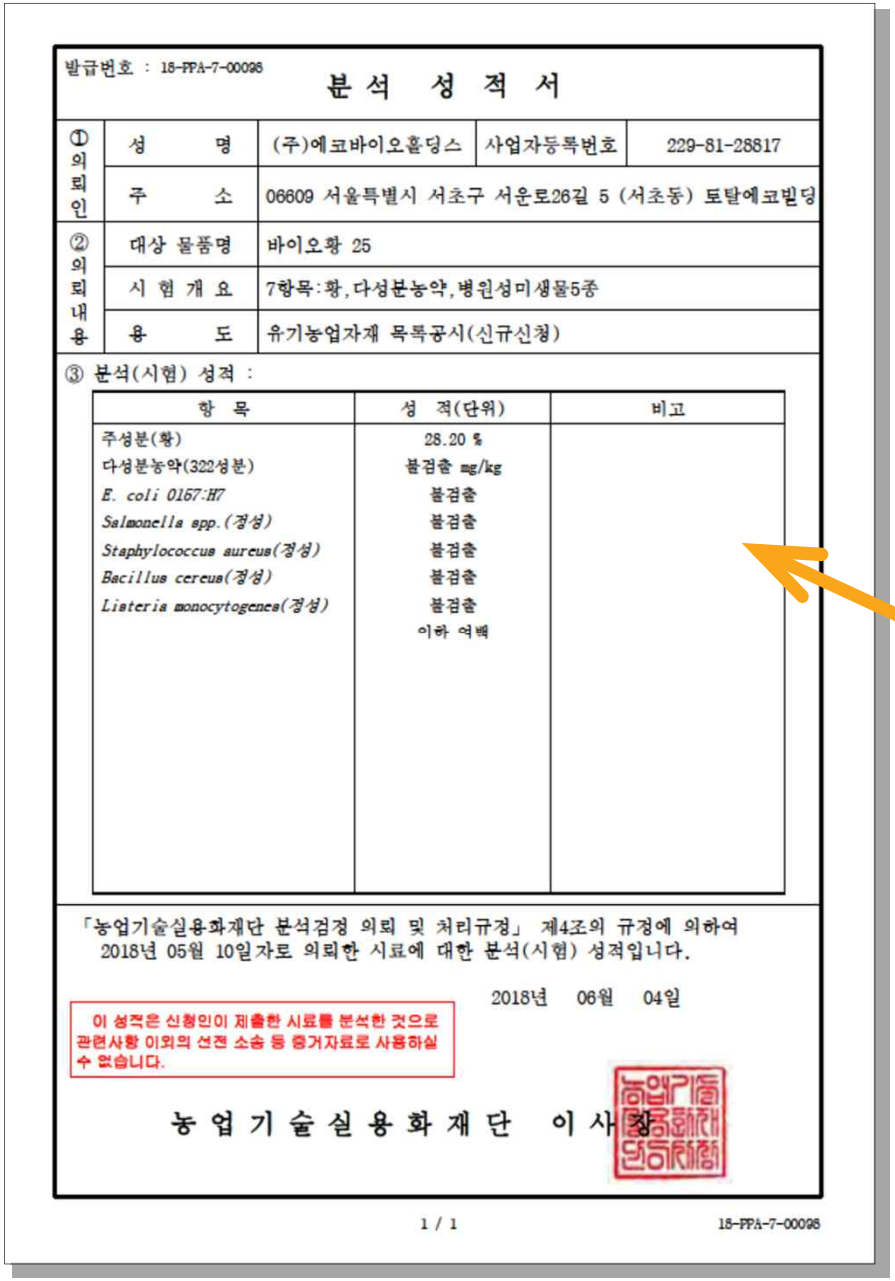
Director : Yang, Joo-Hong Dr. J. H. yang

B-101, Korea Bio Park., 700, Daewangpangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea

KHSI

Component Analysis / [2018.05.15] * Analysis : KHSI (Korea Health Supplement Institute)

Pesticide residue and Pathogenic Microorganisms analysis



발급번호 : 18-FPA-7-00098

분 석 성 적 서

① 의뢰인	성 명	(주)에코바이오홀딩스	사업자등록번호	229-81-28817
	주 소	06609 서울특별시 서초구 서운로26길 5 (서초동) 토탈에코빌딩		
② 의뢰내용	대상 물품명	바이오황 25		
	시 험 개 요	7항목:황,다성분농약,병원성미생물5종		
	용 도	유기농업자재 목록공시(신규신청)		

③ 분석(시험) 성적 :

항 목	성 적(단위)	비고
주성분(황)	28.20 %	
다성분농약(322성분)	불검출 mg/kg	
E. coli 0157:H7	불검출	
Salmonella spp.(정성)	불검출	
Staphylococcus aureus(정성)	불검출	
Bacillus cereus(정성)	불검출	
Listeria monocytogenes(정성)	불검출	
	이하 여백	

「농업기술실용화재단 분석검정 의뢰 및 처리규정」 제4조의 규정에 의하여 2018년 05월 10일자로 의뢰한 시료에 대한 분석(시험) 성적입니다.

2018년 06월 04일

이 성적은 신청인이 제출한 시료를 분석한 것으로 관련사항 이외의 선전 소송 등 증거자료로 사용하실 수 없습니다.

농 업 기 술 실 용 화 재 단 이 사 장

1 / 1 18-FPA-7-00098

Pesticide residue and pathogenic microorganisms not detected

시 험 개 요	7항목:황,다성분농약,병원성미생물5종
용 도	유기농업자재 목록공시(신규신청)

분석(시험) 성적 :

항 목	성 적(단위)	비고
주성분(황)	28.20 %	
다성분농약(322성분)	불검출 mg/kg	
E. coli 0157:H7	불검출	
Salmonella spp.(정성)	불검출	
Staphylococcus aureus(정성)	불검출	
Bacillus cereus(정성)	불검출	
Listeria monocytogenes(정성)	불검출	
	이하 여백	

[2018.06.04] * Analysis : Foundation of Agri. Tech Commercialization AND Transfer

BioSulfa25 efficacy test of Powdery mildew control on Oriental melon (*Cucumis melo L. var. makuq*)

T.N: GET1806-15

Trial of organic agricultural materials against Powdery mildew on Oriental melon

KBSI (Korea Bio Safety Institute)

[2018.07.23] Chungbuk Eumseong-gun, Saenggeuk-myeon
82.7% control effect of powdery mildew on Korean melons observed

KBSI (주) 한국생물안전성연구소

KBSI KOREA BIO-SAFET

1. Objectives

This test is intended to serve as an organic agricultural materials quality certification registration materials for Powdery mildew on Cucumber.

2. Materials and Methods

a. Methods of the phytotoxicity and efficacy testing shall be follow to the notification of RDA(Rural Development Administration)

b. Target diseases : Powdery mildew(*Sphaerotheaca fusca*)

c. Host(race) : Oriental melon(chammaseuncheonchamoe)

d. Incidence of target diseases : 20.2% disease severity of average in untreated control was sufficient to review the efficacy.

e. Treatment of chemicals

Chemicals	Content (%)	Efficacy		Phytotoxicity		Sponsor
		Dilution/Dosage	Method	Standard	Double dosage	
Ecobiosulfur25	Sulfur 55.6	1,000	When the initial of diseases occur, to spray 3 times at interval of 10 days (6/12, 6/22, 7/2)	1,000 (6/12)	500 (6/12)	Ecobio holdings
Untreated control	-	-	-	-		-

f. Cultural practices : Cultivation under structure. Semiforcing culture. 200×45 interval transplant at 15th February 2018. vinyl mulching. During the test, it was used 'Ecobiosulfur25' chemical except another fungicides.

3. Method of assessment

Division	investigating items	Time of investigation	Date of investigation	Method of investigation
Efficacy	Disease severity	1	7/12	Investigate the disease leaf area on over 100 leaves at 10days after final treatment
Phytotoxicity	Seemingly phytotoxicity existence	3	6/15, 6/17, 6/19	Observe the phytotoxicity at 3, 5, 7days after treatment

4. Results

a. Efficacy

○ Trial of efficacy against powdery mildew on Oriental melon (10days after final treatment)

Chemicals	Disease severity(%)				Significant difference (DMRT)	Control value (%)
	I	II	III	Average		
Ecobiosulfur25	4.3	2.8	3.5	3.5	b	82.7
Untreated control	18.8	21.3	20.5	20.2	a	-

C.V.(%) ---------- (12.0)

5. Summary

a. Efficacy

○ Ecobiosulfur25 exhibited a superior control effect over 82.7% compared to untreated control.

b. Phytotoxicity

○ Ecobiosulfur25 were not phytotoxicity in standard and double dosage.

6. Discussion

○ The result of this study indicates the Ecobiosulfur25 is available at an organic farming material since there was no phytotoxicity and exhibited a superior control effect over 82.7% compared to untreated control in Oriental melon. So, this is considered to be practical against powdery mildew.

BioSulfa25 efficacy test of red spider mite control on apples

T.N: GET1806-18

Trial of organic agricultural materials against red spider mite in apple orchard

KBSI KOREA BIO-S

KBSI (Korea Bio Safety Institute)

[2018.07.23] Gyeongsangbuk-do Yecheon-gun Yecheon-eup
52.1% control rate of red spider mites on apples observed

KBSI (주) 한국생물안전성연구소

1. Objectives

This is intended to serve as an organic agricultural materials quality certification registration materials for red spider mite in apple orchard.

2. Materials and Methods

a. Methods of the phytotoxicity and efficacy testing shall be follow the procedure given in RDA(Rural Development Administration)
b. Target insects: Red spider mite(*Panonychus ulmi*)
c. Host(race): Apple(Fuji)
e. Incidence of target insects: The 140.0 of target insects in untreated control at before treatment was sufficient to review the efficacy.
f. Treatment of chemicals

Chemicals	Content (%)	Efficacy		Sponsor
		Dilution/Dosage	Method	
Biosulfur25	Sulfur 55.6	1,000	When initial occurrence, to spray 1 time (6/20)	Ecobio Co., Ltd.
Untreated control	-	-	-	-

g. Cultural practices: Cultivation of bare ground. Slender spindle bush form(type). eleven-years. 4×1.5m interval trees. During the test, it was used only 'Biosulfur 25' chemical that except another pesticides.

h. Plot design: Completely randomized design with 3 replication

Division	Treats	Replicates	Total area	Number of tree	Number of trees to use	The total number of trees to use
Efficacy	2	3	6	1	6	6

3. Method of assessment

Division	Investigating items	Time of investigation	Date of investigation	Method of investigation
Efficacy	Survival rate	3	6/12, 6/19, 6/26	Investigate the mites on 30 leaves before treatment and at 7, 14days after treatment

4. Results

a. Efficacy

○ Trial of efficacy against red spider mite in apple orchard(7days after treatment)

Chemicals	Density of before treatment	Survival rate(%)				Significant difference (DMRT)	Control value (%)
		I	II	III	Average		
Biosulfur25	130.0	67.8	44.4	51.1	54.4	b	52.1
Untreated control	140.0	112.5	106.0	122.4	113.6	a	-

C.V.(%) ---------- (12.3)

○ Trial of efficacy against red spider mite in apple orchard(14days after treatment)

Chemicals	Density of before treatment	Survival rate(%)				Significant difference (DMRT)	Control value (%)
		I	II	III	Average		
Biosulfur25	130.0	64.4	43.0	48.2	51.9	b	57.8
Untreated control	140.0	119.5	117.4	132.2	123.0	a	-

C.V.(%) ---------- (11.1)

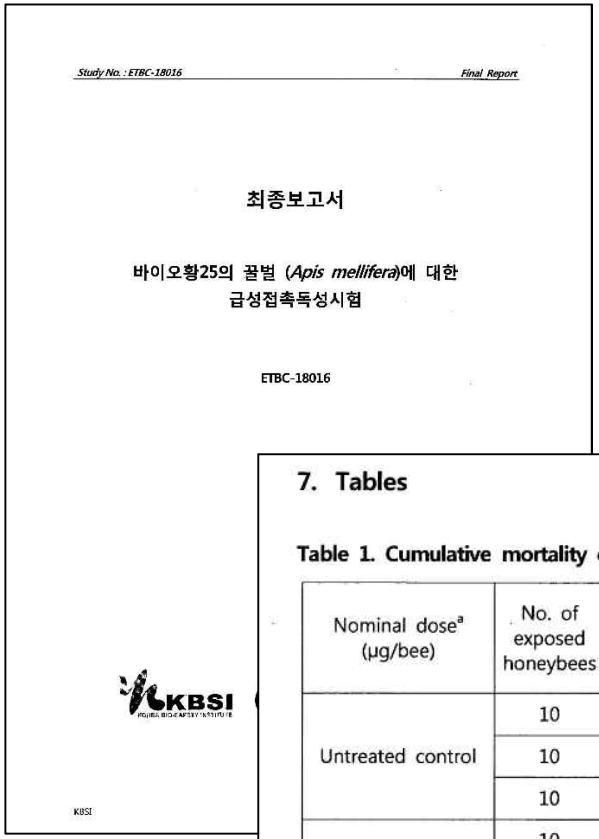
5. Summary

○ Biosulfur25 exhibited a superior control effect over 52.1% compared to untreated control.

6. Discussion

○ The result of this study indicates the Biosulfur25 is available at an organic farming material. So, this is considered to be practical against red spider mite.

BioSulfa 25 Acute contact toxicity test for honeybees


Study No. : ETBC-18016 Final Report

최종보고서

바이오황25의 꿀벌 (*Apis mellifera*)에 대한
급성접촉독성시험

ETBC-18016

KBSI

KBSI (Korea Bio Safety Institute)

[2018.06.12] Contact toxicity on honeybee is not detected

KBSI (주) 한국생물안전성연구소

7. Tables

Table 1. Cumulative mortality of honeybees

Nominal dose[a] (μg/bee)	No. of exposed honeybees	Cumulative mortality			Mortality (Death / Total)	
		4 hr	24 hr	48 hr	24 hr	48 hr
Untreated control	10	0	0	0	0% (0 / 30)	0% (0 / 30)
	10	0	0	0		
	10	0	0	0		
Negative control[b]	10	0	0	0	0% (0 / 30)	0% (0 / 30)
	10	0	0	0		
	10	0	0	0		
100.000	10	0	0	0	0% (0 / 30)	0% (0 / 30)
	10	0	0	0		
	10	0	0	0		

a: Based on main ingredient input ratio
b: Distilled water+Acetone (8:2), 1 μL/bee

Study No. : ETBC-18016 Final Report

Table 2. Behavioral abnormalities of honeybees

Nominal dose[a] (μg/bee)	No. of exposed honeybees	Abnormal response		
		4 hr	24 hr	48 hr
Untreated control	10	N(10[b])	N(10)	N(10)
	10	N(10)	N(10)	N(10)
	10	N(10)	N(10)	N(10)
Negative control[c]	10	N(10)	N(10)	N(10)
	10	N(10)	N(10)	N(10)
	10	N(10)	N(10)	N(10)
100.000	10	N(10)	N(10)	N(10)
	10	N(10)	N(10)	N(10)
	10	N(10)	N(10)	N(10)

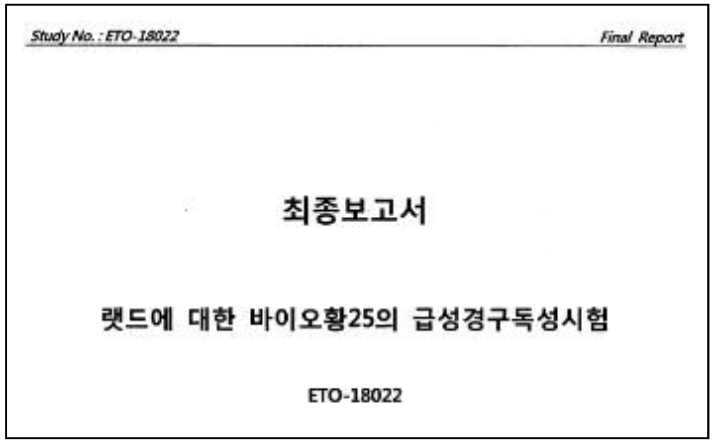
a: Based on main ingredient input ratio
b: Number of honeybees
c: Distilled water+Acetone (8:2), 1 μL/bee

※ Observation key
N: Normal
A: Hyperactivity
B: Mobile but not working or flying normally
C: Alive but unable to walk or fly
NA: Not applicable, not observed because of 100% mortality

BioSulfa 25 Acute oral toxicity test for rat

KBSI (Korea Bio Safety Institute)

[2018.06.12] Oral toxicity on rat is not detected



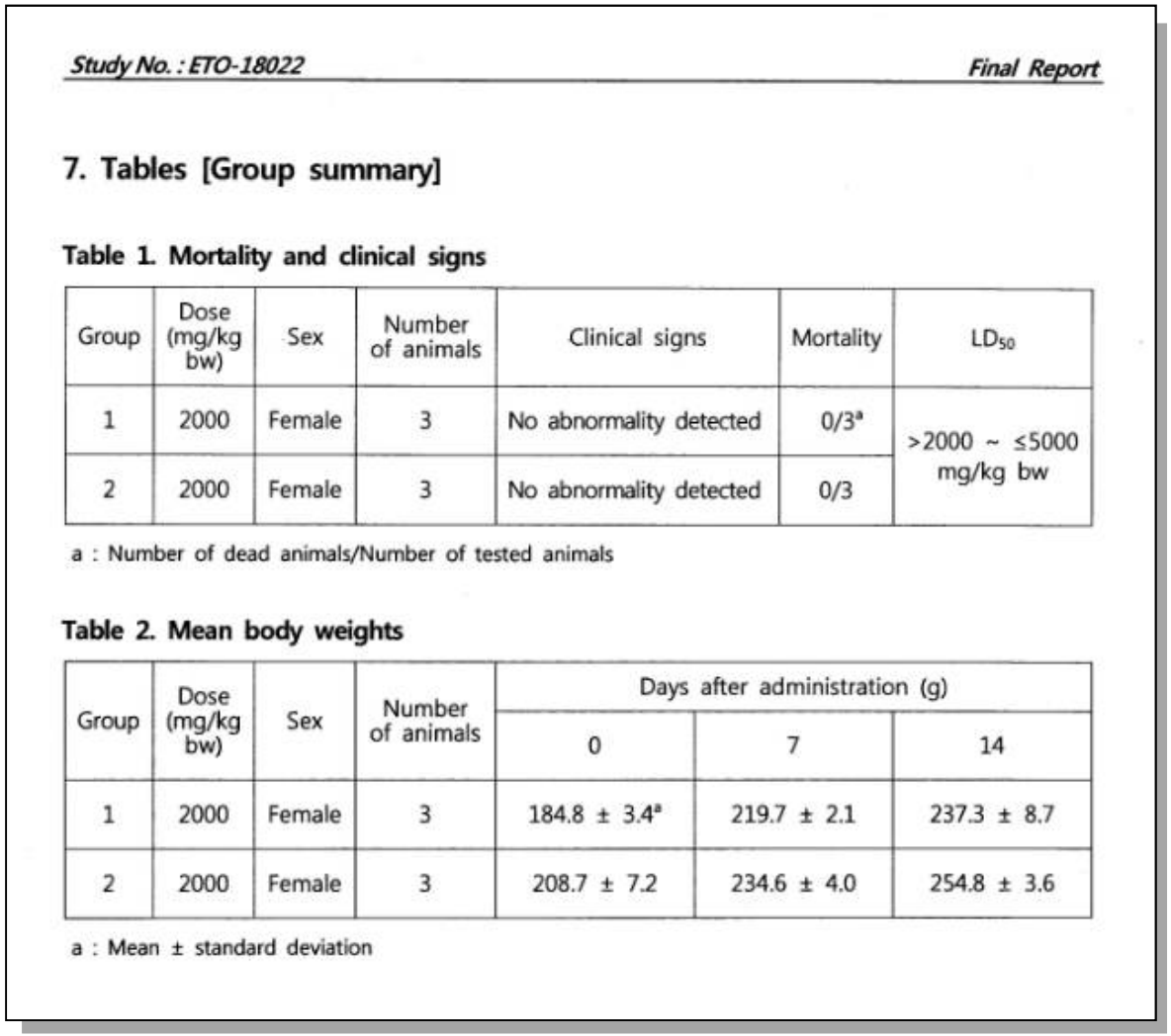
Study No. : ETO-18022 Final Report

최종보고서

랫드에 대한 바이오황25의 급성경구독성시험

ETO-18022

KBSI (주) 한국생물안전성연구소



Study No. : ETO-18022 Final Report

7. Tables [Group summary]

Table 1. Mortality and clinical signs

Group	Dose (mg/kg bw)	Sex	Number of animals	Clinical signs	Mortality	LD_{50}
1	2000	Female	3	No abnormality detected	0/3[a]	>2000 ~ ≤5000 mg/kg bw
2	2000	Female	3	No abnormality detected	0/3	

a : Number of dead animals/Number of tested animals

Table 2. Mean body weights

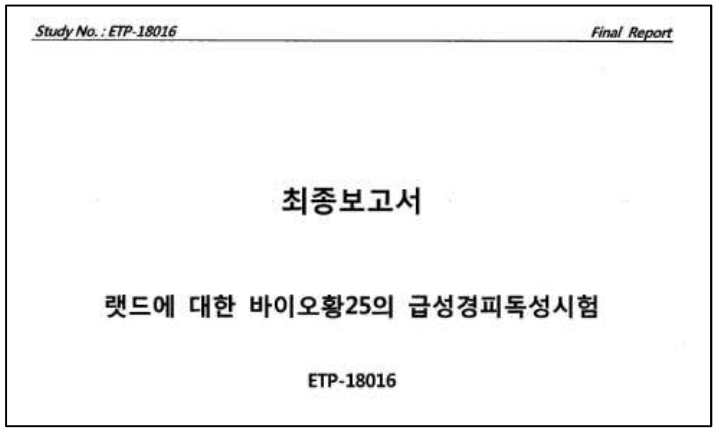
Group	Dose (mg/kg bw)	Sex	Number of animals	Days after administration (g)		
				0	7	14
1	2000	Female	3	184.8 ± 3.4[a]	219.7 ± 2.1	237.3 ± 8.7
2	2000	Female	3	208.7 ± 7.2	234.6 ± 4.0	254.8 ± 3.6

a : Mean ± standard deviation

BioSulfa 25 Acute dermal toxicity test on rat

KBSI (Korea Bio Safety Institute)

[2018.06.12] Dermal toxicity on rats is not detected



Study No. : ETP-18016 Final Report

최종보고서

랫드에 대한 바이오황25의 급성경피독성시험

ETP-18016

KBSI (주) 한국생물안전성연구소

Study No. : ETP-18016 Final Report

7. Tables [Group summary]

Table 1. Mortality and clinical signs

Group	Dose (mg/kg bw)	Sex	Number of animals	Clinical signs	Mortality (dead / total)	LD_{50}
1	4000	Male	5	No abnormality detected	0% (0 / 5[a])	> 4000 mg/kg bw
2	4000	Female	5	No abnormality detected	40% (2 / 5)	

a : Number of Death animals / Number of tested animals

Table 2. Mean body weights

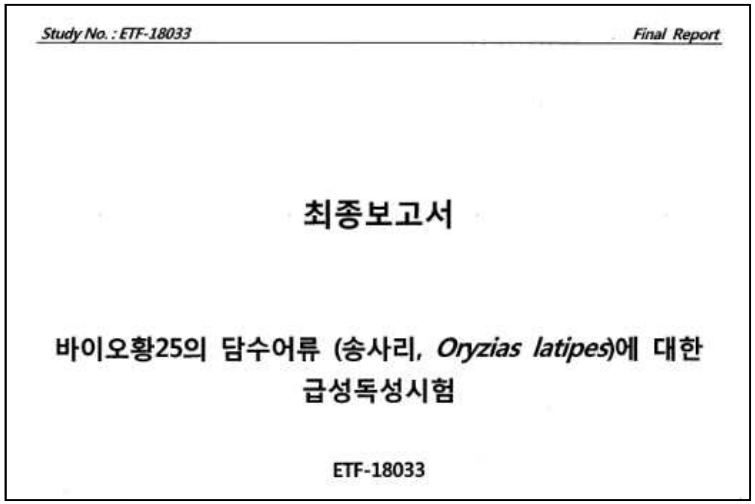
Group	Dose (mg/kg bw)	Sex	Number of animals	Days after administration (g)		
				0	7	14
1	4000	Male	5	260.9 ± 11.5[a]	304.6 ± 14.4	363.6 ± 13.1
2	4000	Female	5	196.6 ± 9.8	211.0 ± 9.7	230.4 ± 8.8

a : Mean ± standard deviation

BioSulfa 25 Acute toxicity test for freshwater fish

KBSI (Korea Bio Safety Institute)

[2018.06.12] Toxicity on freshwater fish is not detected



Study No. : ETF-18033 Final Report

최종보고서

바이오황25의 담수어류 (송사리, *Oryzias latipes*)에 대한 급성독성시험

ETF-18033

KBSI (주) 한국생물안전성연구소

7. Tables

Table 1. Cumulative mortality of *Oryzias latipes*

Nominal concentration[a] (mg/L)	Number of fish	Cumulative mortality				
		0 hr	24 hr	48 hr	72 hr	96 hr
Control	10	0	0	0	0	0
10.0	10	0	0	0	0	0

a: Based on nominal concentration of main ingredient input ratio

Table 2. Abnormal response of *Oryzias latipes*

Nominal concentration[a] (mg/L)	Number of fish	Abnormal response			
		24 hr	48 hr	72 hr	96 hr
Control	10	NOR(10[b])	NOR(10)	NOR(10)	NOR(10)
10.0	10	NOR(10)	NOR(10)	NOR(10)	NOR(10)

a: Based on nominal concentration of main ingredient input ratio

b: Number of fish

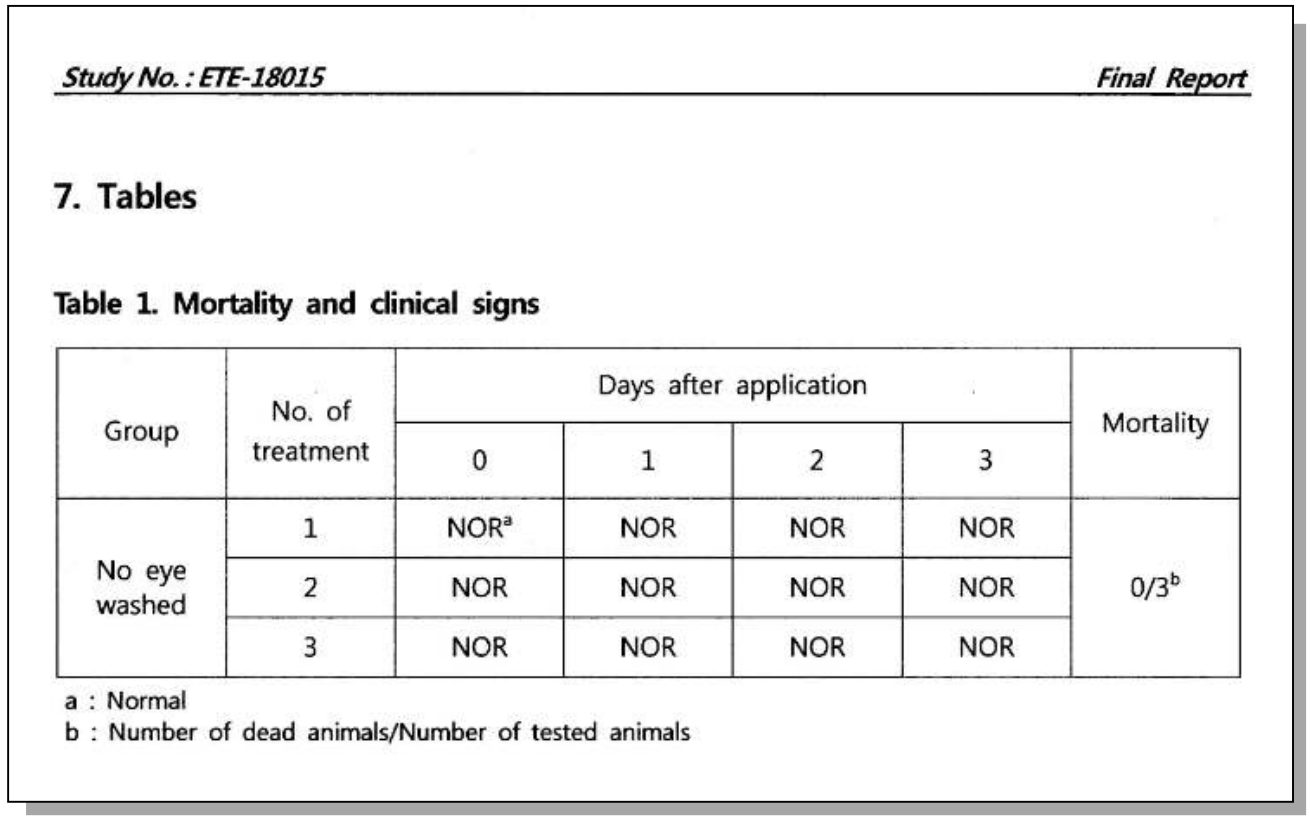
※ Observation key

LOE : Loss of equilibrium
SUR : Fish mainly at the surface
HEM : Hemorrhage
VDE : Vertebral deformation
BOT : Fish mainly at the bottom
NOR : Normal
NA : Not applicable, not observed because of 100% mortality

BioSulfa 25 Mucos membrane irritation test for New Zealand white rabbits

KBSI (Korea Bio Safety Institute)

[2018.06.12] Muscos membrane irritation on rabbit eye is not detected



Study No. : ETE-18015 *Final Report*

7. Tables

Table 1. Mortality and clinical signs

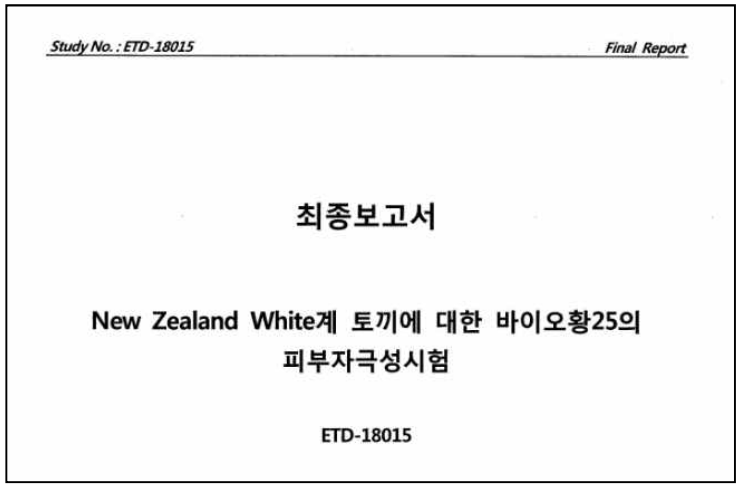
Group	No. of treatment	Days after application				Mortality
		0	1	2	3	
No eye washed	1	NOR[a]	NOR	NOR	NOR	0/3[b]
	2	NOR	NOR	NOR	NOR	
	3	NOR	NOR	NOR	NOR	

a : Normal
b : Number of dead animals/Number of tested animals

BioSulfa 25 Skin irritation test for New Zealand white rabbits

KBSI (Korea Bio Safety Institute)

[2018.06.12] Skin irritation on rabbit is not detected


Study No. : ETD-18015 Final Report

최종보고서

New Zealand White계 토끼에 대한 바이오황25의
피부자극성시험

ETD-18015

KBSI (주) 한국생물안전성연구소

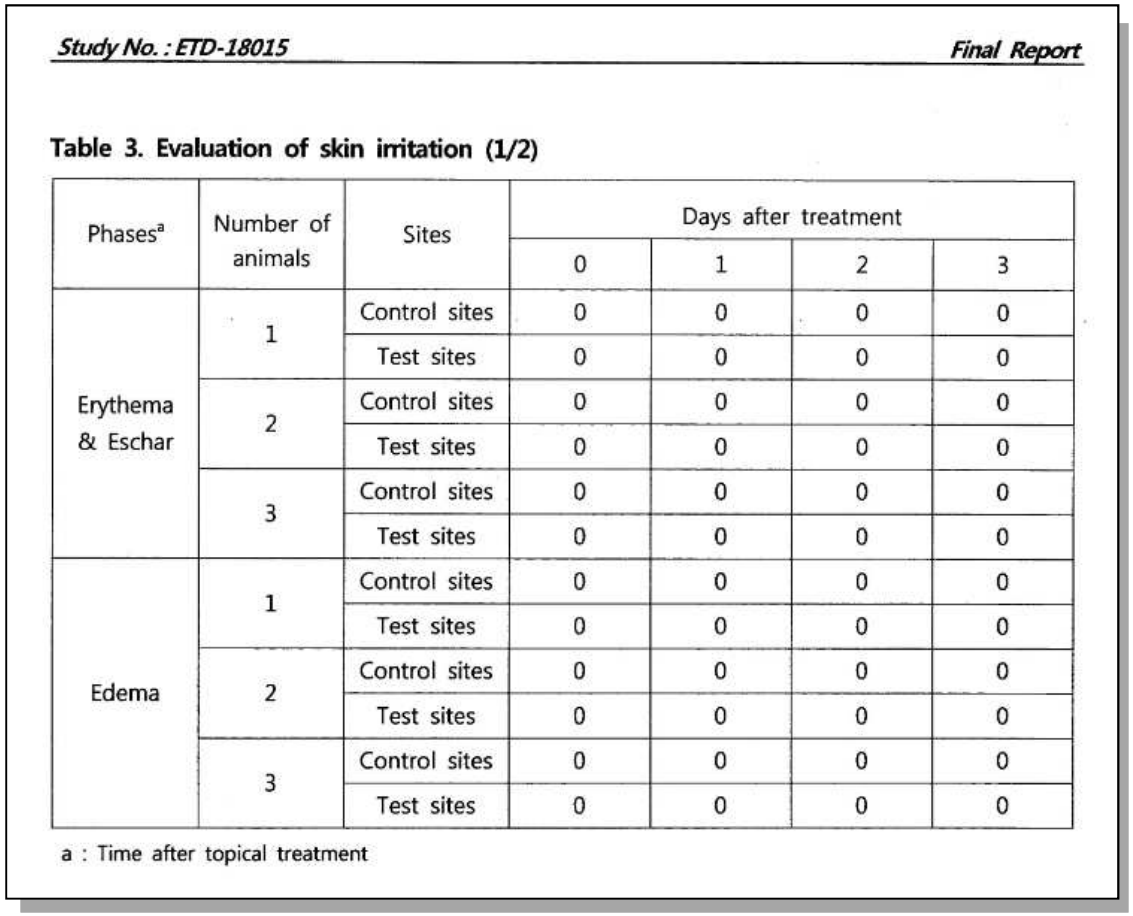

Study No. : ETD-18015 Final Report

Table 3. Evaluation of skin irritation (1/2)

Phases[a]	Number of animals	Sites	Days after treatment			
			0	1	2	3
Erythema & Eschar	1	Control sites	0	0	0	0
		Test sites	0	0	0	0
	2	Control sites	0	0	0	0
		Test sites	0	0	0	0
	3	Control sites	0	0	0	0
		Test sites	0	0	0	0
Edema	1	Control sites	0	0	0	0
		Test sites	0	0	0	0
	2	Control sites	0	0	0	0
		Test sites	0	0	0	0
	3	Control sites	0	0	0	0
		Test sites	0	0	0	0

a : Time after topical treatment

BioSulfa 50% Organic Materials Certification

Quality Certified by the Korean government !

에코바이오황

Listed Number :1-6-014
Certification Number : 1-6-002

공시번호 : 제 공시-1-6-014호

유기농업자재 공시서

1. 업체명 : 에코바이오
3. 주소(사업장) : 서울
4. 자재의 명칭 : 황
5. 자재의 구분 : 병해충
6. 상표명 : 에코바이오
7. 주성분(원료)의 종류
   - 주성분 : 황
   - 원료의 종류 및 함
8. 유효기간 : 2018.10.
9. 제조장주소 : 인천광
10. 최초 공고일 : 2015
11. 최초 공시기관 : 농

「친환경농어업 육성 및
제2항 및 「농림축산식품
·지원에 관한 법률 시행
자재 공시임을 증명합니다

농업기

Issue number : 16-16

Environment-friendly Agricultural & Organic Inputs Product	공시서 (National Notice)		
Notice Number	National Notice-1-6-014		
Company Name	EcoBio Holding Co., Ltd	Chief Executive Officer	Hyo-soon Song
Company Address	5, Seoun-ro 26-gil, Seocho-gu, Seoul, Rep. of KOREA		
Factory Location	61, Gelwol-ro, Seo-gu, Incheon, Rep. of KOREA		
Organic Inputs Type	An organic agricultural material to control diseases and pests.		
Brand name	Eco Bio Sulfur		
Applied Crop	Red pepper, Lettuce, Chinese cabbage, Soybean, Cucumber, Strawberry		
Applied Pest	-		
Expiration Date	Oct. 10. 2015. ~ Oct. 09. 2018.		

In accordance with Article 37 of 「ENVIRONMENT-FRIENDLY AGRICULTURE PROMOTION ACT」, I hereby certify that the product above is listed on the National Notice List of Environment-friendly Agricultural & Organic Inputs in the Republic of Korea.

Date of Issue : Oct. 28. 2016.

농 업 기 술 실 용 화 재 단 이 사 장

Foundation of Agri. Tech. Commercialization & Transfer

공시(품질인증)번호 : 제 품질인증-1-6-002호

유기농업자재 [ ] 공시서 [○] 품질인증서

1. 업체명 : ㈜에코
3. 주소(사업장) :
4. 자재의 명칭 :
5. 자재의 구분 :
6. 상표명 : 에코바
7. 주성분(원료)의
   - 주성분 : 황(S
   - 원료의 함량(
8. 유효기간 : 201
9. 제조장 주소 또는 수입
10. 최초 공고일 :
11. 최초 공시등기

「친환경농어업 육
제2항 및 「농림축
리·지원에 관한 법
업자재 공시(품질인

Issue number : 16-15

Environment-friendly Agricultural & Organic Inputs Product	품질인증서 (Quality Certification)		
Notice Number	Quality Certification-1-6-002		
Company Name	EcoBio Holding Co., Ltd	Chief Executive Officer	Hyo-soon Song
Company Address	5, Seoun-ro 26-gil, Seocho-gu, Seoul, Rep. of KOREA		
Factory Location	61, Gelwol-ro, Seo-gu, Incheon, Rep. of KOREA		
Organic Inputs Type	An organic agricultural material to control diseases and pests.		
Brand name	Eco Bio Sulfur		
Applied Crop	Red pepper, Lettuce, Chinese cabbage, Soybean, Cucumber, Strawberry		
Applied Pest	Powdery mildew(Cucumber), Two Spotted spider mite(Strawberry)		
Expiration Date	Jun. 30. 2016. ~ Jun. 29. 2019.		

In accordance with Article 37 of 「ENVIRONMENT-FRIENDLY AGRICULTURE PROMOTION ACT」, I hereby certify that the product above is listed on the National Notice List of Environment-friendly Agricultural & Organic Inputs in the Republic of Korea.

Date of Issue : Oct. 28. 2016.

농 업 기 술 실 용 화 재 단 이 사 장

Foundation of Agri. Tech. Commercialization & Transfer

BioSulfa 25% Organic Materials Certification

Quality Certified by the Korean government !

에코바이오황 Listed Number :1-6-030

공시번호 : 제 공시-1-6-030호

유기농업자재 공시서

1. 업체명 : 에코바이오홀딩스(주)　　2. 대표자 성명 : 송효순

3. 주소(사업장) : 서울특별시 서초구 서운로 26길 5

4. 자재의 명칭 : 황

5. 자재의 구분 : 병해충관리용

6. 상표명 : 바이오황25

7. 주성분(원료)의 종류 및 함량(%)
   - 주성분 : 황
   - 원료의 종류 및 함량 : 황 25, 보조제 75

8. 유효기간 : 2018.08.23.~2021.08.22.

9. 제조장주소 : 인천광역시 서구 백석동 58(수도권 매립지내)

10. 최초 공고일 : 2018.08.23.

11. 최초 공시기관 : 농업기술실용화재단

「친환경농어업 육성 및 유기식품 등의 관리·지원에 관한 법률」 제38조제2항 및 「농림축산식품부 소관 친환경농어업 육성 및 유기식품 등의 관리·지원에 관한 법률 시행규칙」 제49조제2항에 따라 위와 같이 유기농업자재 공시임을 증명합니다.

2018년 8월 23일

농업기술실용화재단 이사장

BioSulfa

Crop test results

Test results on various crops as well as observations notes.

Benefits of utilizing sulfur in agriculture

- Healthy crops due to immunity improvement
- Minimization of the reliance on protective agent
- Increase of yield (Increase of organic matter content)
- Universalization of eco-friendly agricultural techniques (Environment improvement)

High Value
"BioSulfa"

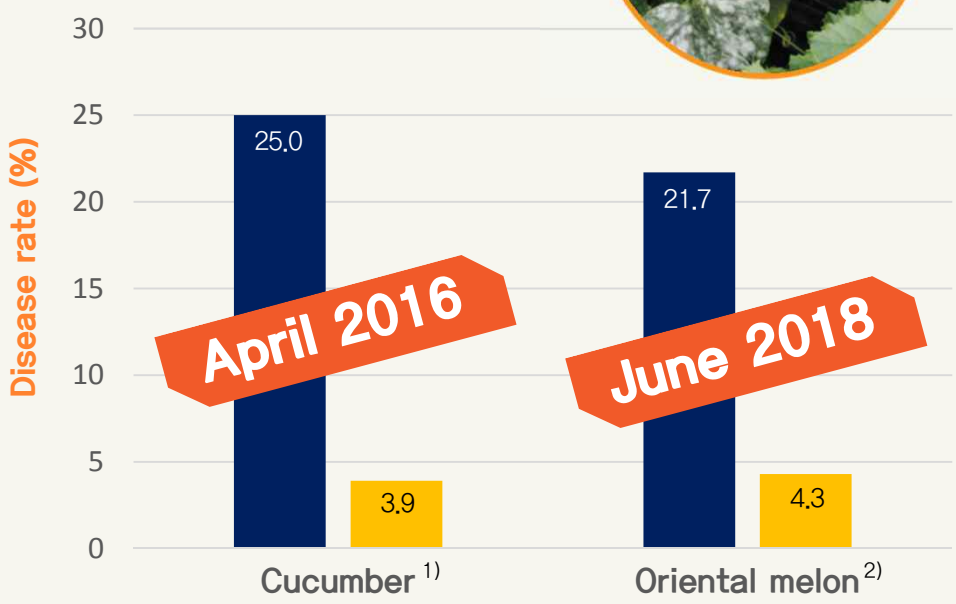




Summary of BioSulfa efficacy on Powdery Mildew and Mites

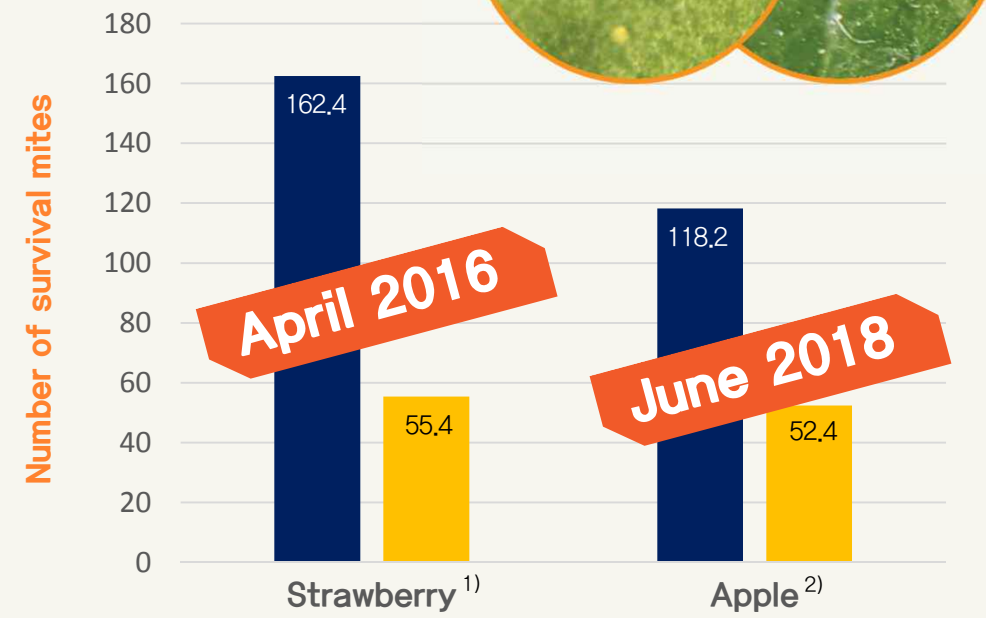
■ No treatment ■ Treatment

Powdery mildew



1) Cucumber (2016.04.08~2016.05.29) 2) Oriental melon (2018.06.12~2018.07.12)

Mites



1) Strawberry (2016.04.26~2016.05.10) 2) Apple (2018.06.12~2018.07.04)

KBSI (주) 한국생물안전성연구소 **Performed by the Korea Bio-Safety Institute**

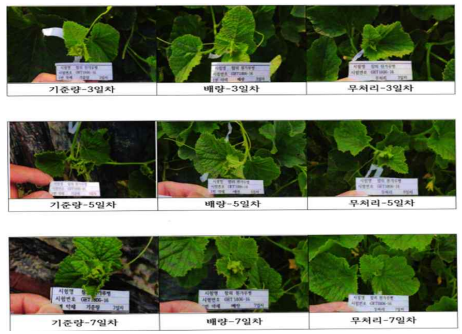
Certified Institute Test of BioSulfa on Powdery Mildew and Mites(1/4)

Performed by the Korea Bio-Safety Institute / Cucumber 2016.04.08~05.08 (Ipjang), 2016.04.29~05.29 (Namseon)

Crop	Targets	Results	Treatment Images
Cucumber	• Phytotoxicity • Powdery Mildew *(Sphaerotheaca fusca)*	• Standard dilution(x1,000) and double dosage dilution(x500) were applied • 3 times Foliar Spraying after breakout in every 10 days • **85% efficacy** on powdery mildew at Ipjang farm • **83.6% efficacy** on powdery mildew at Namseon farm • Greenhouse conditions • Test was carried out at 3 different region at same time during 30 days • **No phytotoxicity** in standard dose and double dosage.	 〈 test photo 1 〉  〈 Test photo 2 〉  〈 test photo 3 〉  〈 Phytotoxicity test result 〉 (3, 5, 7 days after treatment)

Certified Institute Test of BioSulfa on Powdery Mildew and Mites(2/4)

Performed by the Korea Bio-Safety Institute / 2018.06.12-2018.07.12 (Namseon, Saengguk)

Crop	Targets	Results	Treatment Images
Oriental melon	• Phytotoxicity • Powdery Mildew *(Sphaerotheaca fusca)*	• Standard dilution(x1,000) and double dosage dilution(x500) were applied • 3 times Foliar Spraying after breakout in every 10 days • **78.4% efficacy** on powdery mildew at Namseon farm • **82.7% efficacy** on powdery mildew at Saengguk farm • Greenhouse conditions • Test was carried out at 3 different region at same time during 30 days • **No phytotoxicity** in standard dose and double dosage.	 〈 test photo 1 〉  〈 Test photo 2 〉  〈 test photo 3 〉  〈 Phytotoxicity test result 〉 (3, 5, 7 days after treatment)

Certified Institute Test of BioSulfa on Powdery Mildew and Mites(3/4)

Performed by the Korea Bio-Safety Institute / 2016.04.26~2016.05.10 (Gamgok)

Crop	Targets	Results	Treatment Images
Strawberry	• Phytotoxicity • Mite *(Tetranychus urticae)*	• Standard dilution(x1,000) and double dosage dilution(x500) were applied • 1 time Foliar Spraying after breakout • **65.9% efficacy** on strawberry mite at Gamgok farm • Test was carried out at 3 different region at same time during 14 days • **No phytotoxicity** in standard dose and double dosage	〈 test photo 1 〉 〈 Test photo 2 〉 〈 test photo 3 〉 〈 Phytotoxicity test result 〉 (3, 5, 7 days after treatment)

Certified Institute Test of BioSulfa on Powdery Mildew and Mites(4/4)

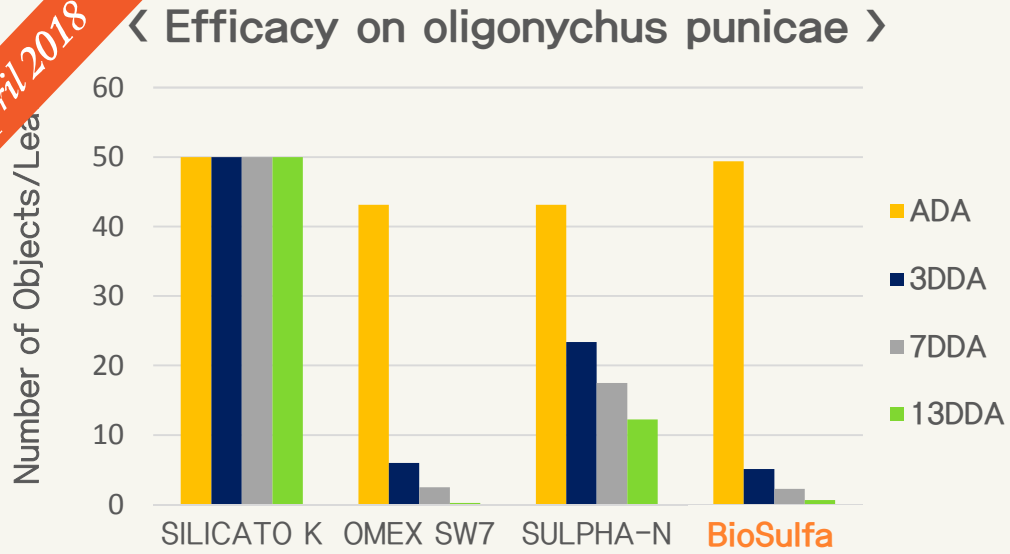
Performed by the Korea Bio-Safety Institute / 2018.06.12-2018.06.26 (Yecheon), 2018.06.20-2018.07.04 (Gamgok)

Crop	Targets	Results	Treatment Images
Apple	• Phytotoxicity • Mite *(Panonychus ulmi)*	• Standard dilution(x1,000) and double dosage dilution(x500) were applied • 1 time Foliar Spraying after breakout • **57.8% efficacy** on apple mite at Yecheon farm • **62.1% efficacy** on apple mite at Gamgok farm • Test was carried out at 3 different region at same time during 14 days • **No phytotoxicity** in standard dose and double dosage.	 〈 test photo 1 〉  〈 Test photo 2 〉  〈 test photo 3 〉  〈 Phytotoxicity test result 〉 (3, 5, 7 days after treatment)

Farm test of BioSulfa on oligonychus punicae for avocado (Peru)

Biosulfa test on oligonychus punicae control for avocado

April 2018



	ADA	3DDA	7DDA	13DDA
BioSulfa	49.38	5.13	2.25	0.65
SULPHA-N	43.13	23.38	17.50	12.25
OMEX SW7	43.13	6.00	2.50	0.25
SILICATO K	50.00	50.00	50.00	50.00

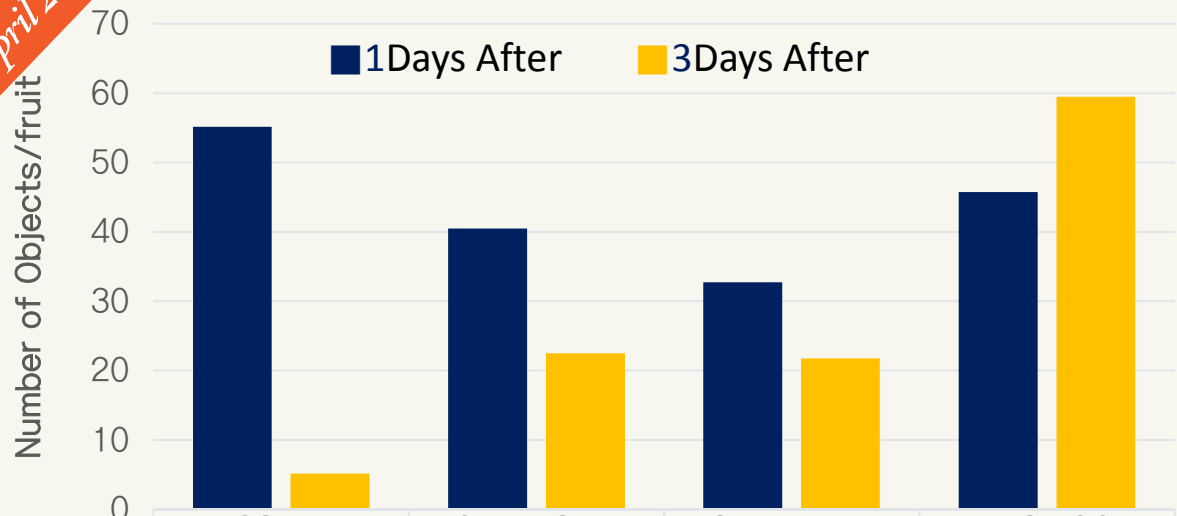
- Test performed with BioSulfa, SULFA-N, OMEX SW7, and SILICATO K
- BioSulfa presented significantly higher efficacy compared to other products

Farm test of BioSulfa on Phyllocoptruta oleivora for citrus (Peru) (1/2)

Biosulfa test on Phyllocoptruta oleivora control forcitrus

April 2018

〈 Efficacy on Phyllocoptruta oleivora〉



	BIOSULFA	OMEX SW7	SULPHA-N	TESTIGO
ADA	55.17	40.5	32.75	45.75
3 DDA	5.17	22.5	21.75	59.5

- Test performed with BioSulfa, SULFA-N, OMEX SW7, and SILICATO K
- **BioSulfa presented significantly higher efficacy compared to other products**

Farm test of BioSulfa on Phyllocoptruta oleivora for citrus (Peru) (2/2)

Biosulfa test for Phyllocoptruta oleivora control on citrus

PRODUCTOS	Nº PLANTAS	Nº FRUTOS	Nº ACAROS ADA	Nº ACAROS DDA
			27/04/2018	30/04/2018
BioSulfa	P1	F1	64	6
		F2	65	4
		F3	38	5
	P2	F4	64	8
		F5	28	4
		F6	72	4
OMEX SW7	P1	F1	48	32
		F2	37	15
		F3	26	12
	P2	F4	53	32
		F5	33	32
		F6	46	12

PRODUCTOS	Nº PLANTAS	Nº FRUTOS	Nº ACAROS ADA	Nº ACAROS DDA
			27/04/2018	30/04/2018
SULFA N	P1	F1	56	32
		F2	34	30
TESTIGO	P2	F3	16	00
		F4	25	25
	P1	F1	43	50
		F2	52	55
	P2	F3	47	71
		F4	41	62

- Test performed with BioSulfa, SULFA-N, OMEX SW7, and SILICATO K
- **BioSulfa presented significantly higher efficacy compared to other products**

BioSulfa Application Example(Soil disinfection)

Lee Chang Hee (Gwangju, Gyeonggi) 2014. 04. 02
- BioSulfa was added to soil
- No effect was observed on other microorganisms.

Yang Jae Hwa (Mungyeong, Gyeongbuk) May 26, 2016
- x500 dilution was applied for sterilization
- x2,000 dilution was applied after planting

Lee Seung Yeon (Damyang, Jeonnam)
- Secondary sterilization

Park Jung-il (Ulsan, Gyeongnam) Nov. 16, 2016
- Sterilization after Typhoon Chava

BioSulfa Application example(Winter control)


Kim Seon-mi (Gimcheon, Gyeongbuk)
- For winter control


Kim Hae-soon (Yeongcheon, Gyeongbuk) 2014. 04. 04
- x200 dilution was applied

Song In Sik (Youngdong, Chungbuk)
- x200 dilution for the first time.
- X2,000 dilution was applied in the frequency of 1 week
- Mite was invisible

Jung Moon-seok (Boeun, Chungbuk) 2014. 04. 09
- x500 dilution was applied

BioSulfa Application example(Foliar spray application)


Kim Jong-sam (Gohung, Jeonnam) 2016. 06.27
- x200 dilution was applied
- Mite was exterminated


Son Woo Hyun (Cheongsong, Gyeongbuk)
- x250 dilution was applied
- No other fertilizer and pesticide were used

Kim Hakkwon 2017.7.27
- x1,000 dilution was applied to the second year of Fuji,
- x500 dilution was applied to fruit and the 2nd year old, 10 years old trees
- x500 dilution was applied to the fruit and the 15th years old trees
- X125 dilution was applied to fruit and bud(3 years Hongro)

Ahn Chang-ho (Cheongsong, Gyeongbuk)
- x1,000 dilution was applied
- Spray 4 times to mulberry

BioSulfa Application Example(Vegetable leaf)

Shin Tae-soo (Gohan, Jeonnam) 2014. 04. 26
- x360 dilution was applied
- 2 times for garlic, 3 times for potato

Choi Sung-ryeol (Daejeon) 2016. 06. 12
- x500 dilution applied for ginseng

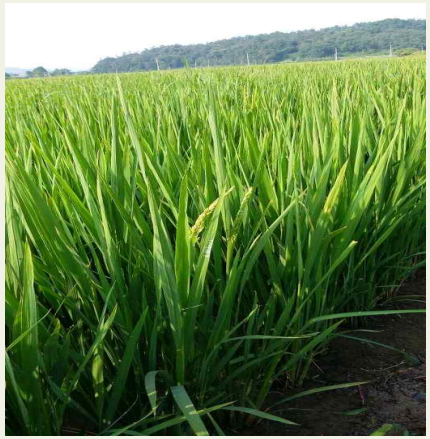
An Ki-cheol 2016. 05. 07
- x2,000 dilution was applied 5days frequency

Kim Young Soo (Gosung, Gyeongnam) 2016. 11. 28
- x2,500 was applied

Lee Young-seok (Haenam, Jeonnam) 2016. 10 16
- Mixture of BioSulfa + rooting agent + calcium + minor elements was applied 3 times

Yang, Joon-mo (Jangsu, Jeonbuk) 2017. 05. 10
- x200 dilution was applied

BioSulfa Application example(Sulfur containing rice)



Park Seok-joon (Hampyeong, Jeonnam) 2017. 07. 23
- x30 dilution was applied
- Foliar application

Choi Sun-joo (Gwangyang, Jeonnam) 2016. 08. 10
- x668 dilution was applied

Lee Chang-min (Yeongam, Jeonnam) 2016. 08. 14
- BioSulfa treatment

BioSulfa Application Example(Schizandra cultivation)

Gwang-Hyun Lee (Inje, Gangwon) 2016. 09. 14
- BioSulfa was applied 4 times
- No disease was found

Lee Sun Woo (Youngyang, Gyeongbuk) 2017. 06. 04
- Cultivation without disease after using BioSulfa

Kim, Gyeong-rye (Chungju, Chungbuk) 2017. 09. 07
- Increase yield and harvest without disease

Young-gu, Shim(Youngdong, Chungbuk) 2016. 09. 19
- Mitigation of powdery mildew

Youngyang Omija (Youngyang, Gyeongbuk 2016.9.17
- Cultivated without powdery mildew

Kwon Hyuk-beom (Pyeongchang, Gangwon) 2017.8.31
- Cultivated without powdery mildew

BioSulfa Application example(Walnut tree, banana disaster)

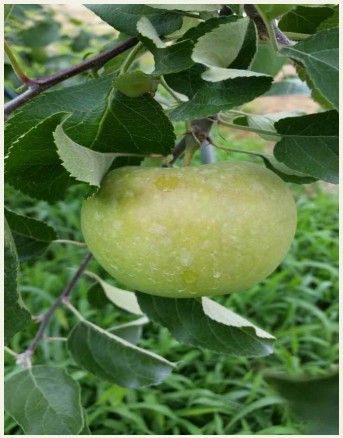


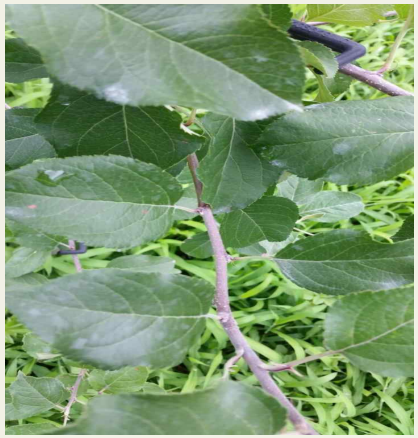
Kang Byung-taek (Youngdong, Chungbuk) May 11, 2015
- Winter sterilization for walnut farm



Kwon-Bae (Jeju) 2017.9.14
- Prevention of banana disease
- BioSulfa was applied on banana every few days

BioSulfa Application example(Apple, Tangerine)






Kim Hakkwon 2015. 07. 27 / 2016. 08. 20
- x1,000 dilution was applied
- x500 dilution was applied fruit
- x250 dilution was applied to 15 years old tree



Go Dong-hee (Jeju) Aug. 20, 2015
- x2,000 dilution was applied to Karahyang
- Spraying every 5 days

BioSulfa Application example(Powdery mildew)


Jeong Yong-yong (Jinju, Gyeongnam) Dec. 12, 2017
- x2,000 dilution was applied

Photo after treatment

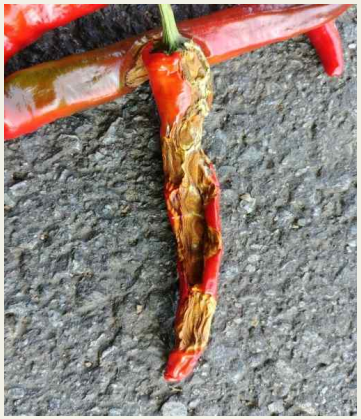
Son Byung-gwan (Iksan, Jeonbuk) 2015. 07. 21
- x2,000 dilution was applied and good effect was found

Photo after 10 days

BioSulfa application case(Anthrax)


Yang Dong-pil (Suncheon, Chonnam) 2018. 07. 25

Park Hee-jung (Jeongeup Jeonbuk) 2016. 12. 26



Mo Chung Yong (Muan, Jeonnam) 2017. 09. 16

Lee Young Suk (Haenam, Jeonnam)
- x200 dilution was applied

BioSulfa Application Example(Mite)


Mo Cheong-yong (Muan, Jeonnam)
- Spotted mites in cucumber
- x10 dilution was applied
- No mite was observed after treatment

Lee Jae-ryong 2016.4.5
- Using biosulfa


Song In-sik (Youngdong, Chungbuk) 2016. 06. 27
- x2,000 dilution was applied in every week

Jeong Woo-cheol (Gongju, Chungnam) 2017. 06. 19
- Using biosulfa to treat mites

Thank You !!

www.ecobio.co.kr

ECOBIO HOLDINGS CO.,LTD.

Total Eco Bldg. 5, Seoun-ro 26-gil, Seocho-gu, Seoul, Republic of Korea
Phone : +82)2-3483-2900 Fax : +82)2-3483-2929
Email : biosulfa@ecobio.co.kr homepage : www.ecobio.co.kr