


Report

Products:
Penergetic-t and Penergetic-g

User:
Different farms in South Korea

Consultant:
Ok-Seong Korea Co. Ltd.
Penergetic Korea

Time Period:
2006 - 2011

Penergetic-t and Penergetic-g Case Studies in South Korea

Case 1. Pig Slurry

Test Site: Hanul Farm

- Pig-fattening farm with over 3,000 pigs
- Run by Young-tae Kim for over 20 years
- Located in Ham-An in Korea (about 380km south of Seoul)

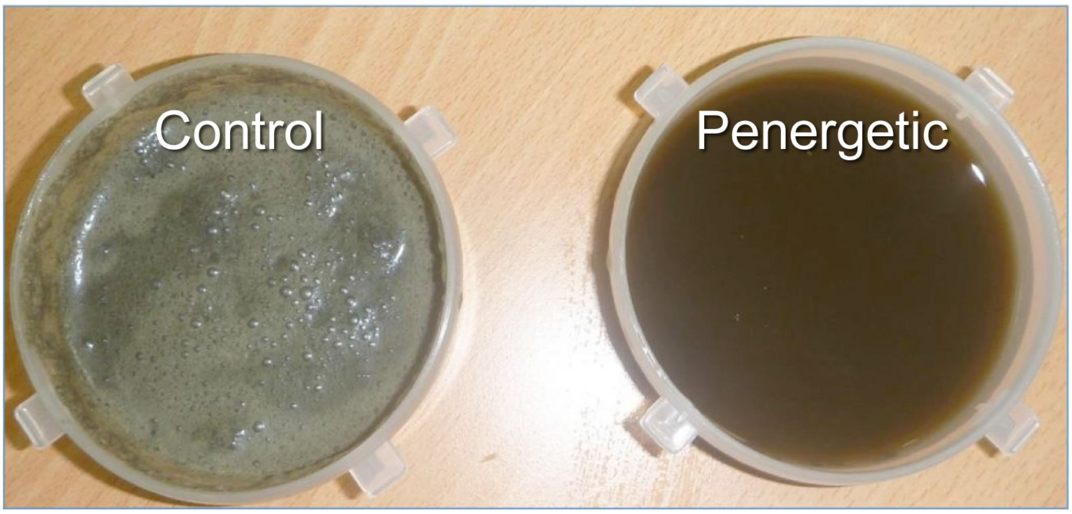
Test Overview

- Period: Oct. 22, 2011 – Feb. 15, 2012 (4 months)
- Control/Test group: 500 pigs each with an average weight of ca. 18 kgs
- All barns are above a slurry cistern/tank (slurry pig pen)

Test Products

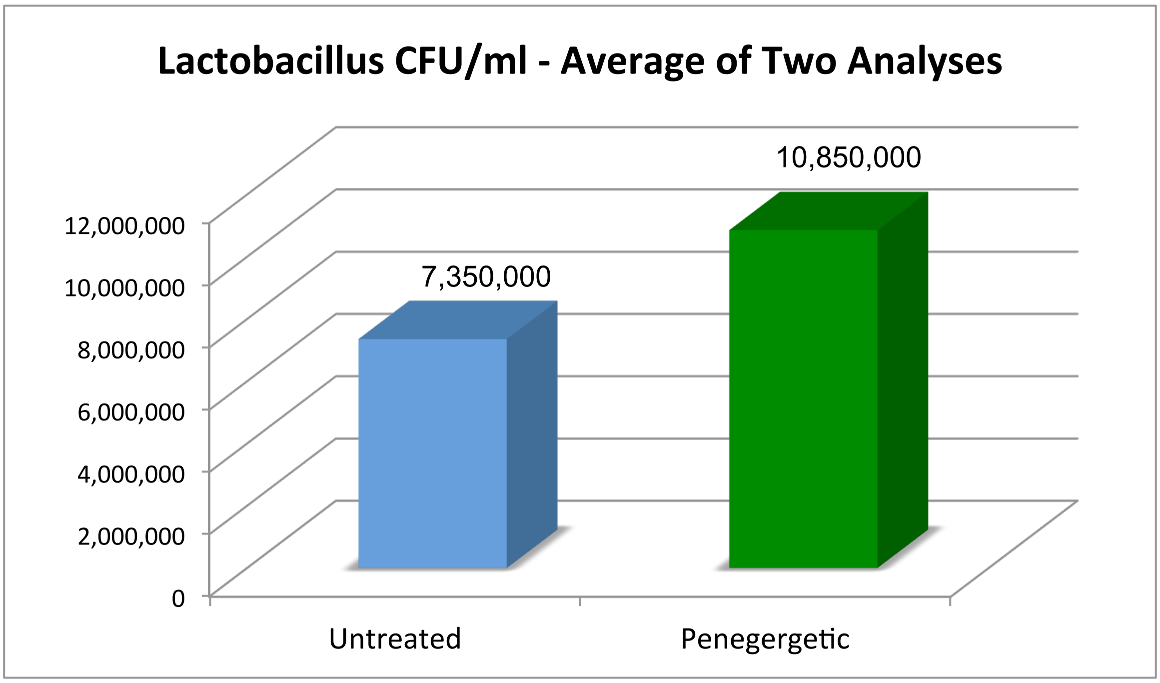
- Penergetic-t: fed with fodder (60g/ton)
- Penergetic-g: applied into slurry cistern/tank (once a week, 2 g per pig)

Results



- Free-flowing slurry, no sediments,
- Floating layers of slurry dissolved, more homogeneous
- Increased microbial activity (page 5)
- Improved living conditions of pigs:
  Much less cough and hyperemia (page 6-7)
  Hyperemia (red eye): control group (80%-90%), test group (10%-20%)
- Reduced unpleasant odors by 80%
- Better meat quality (page 8-11)
- Decreased pig mortality
- Improved working conditions of farmers

More beneficial microorganism (Lactobacillus) in pigs' intestine:



No pathogenic microorganisms detected in any of the analyses.

Less Nitrate, Phosphate and Potassium excreted due to improved feed conversion:

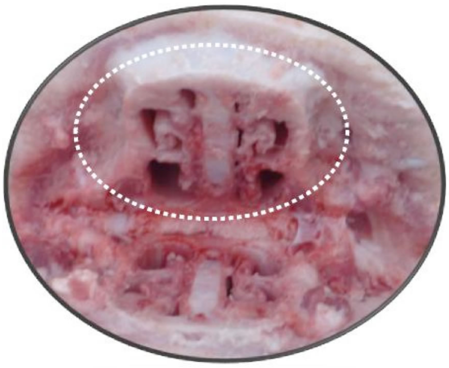
Parameter	Reduction in Percent
Nitrogen	**12.4%**
Phosphate	**45.0%**
Potassium	**72.0%**

All analyses by FACT, The Foundation of Agricultural Technology Commercialization and Transfer.

Nasal Cavity

Control

Penergetic

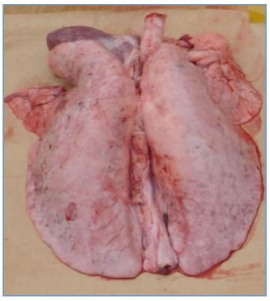


More closed and blocked

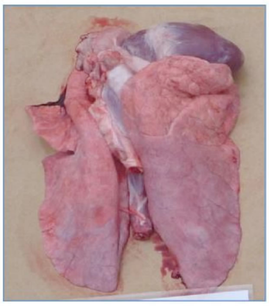
Clear and normal

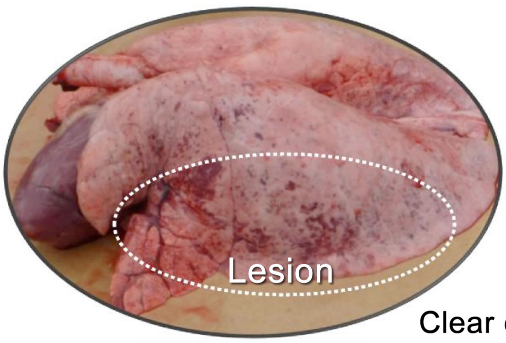
Condition of Lungs

Control

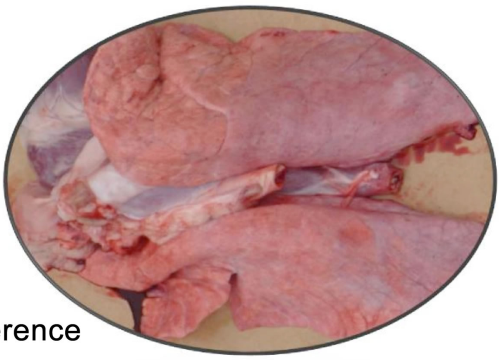


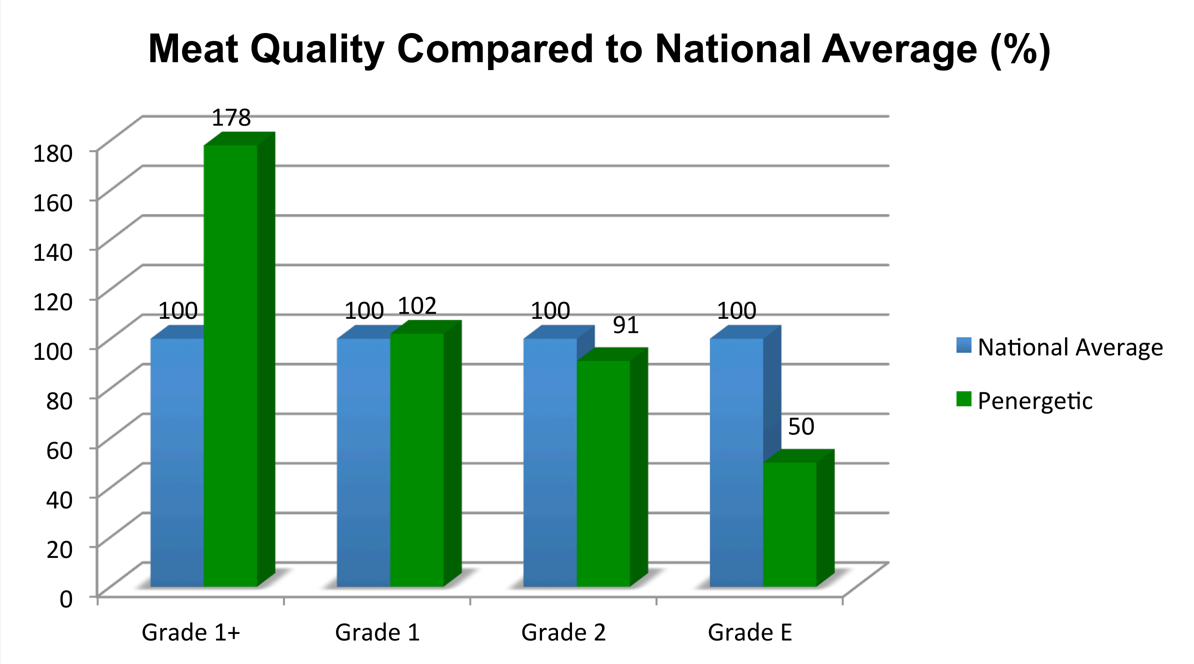
Penergetic





Clear difference





National Average based on 950,018 pigs. Penergetic farm 360 pigs.

	Grade 1+	Grade 1	Grade 2	Grade E	Total
National Avg. (A)	4.6%	61.3% [65.9%]	29.3%	4.8%	100%
Test Farm (B)	8.1%	62.8% [70.9%]	26.7%	2.4%	100%
Comparison B/A %	**176%** (3.5%↑)	**102%** (0.5% [5.0%]↑)	**91%** (2.6% ↓)	**2.4%** 50% (2.4%↓)	

[ ] : Premium quality = % of Grade 1+ & Grade 1

Thickness of Intestines (health of internal organs)

Control

Penergetic Farm

More than twice as thick

Condition of Hind Leg (Overall Health)

Control

Penergetic Farm

The meat is firmer and grayish pink in Penergetic group

Analyses Hind Leg

	Protein	Saturated Fat	Unsaturated Fat	Potassium
Control (A)	14.73%	37.92%	62.08%	$2,344^{16}$ mg/kg
Penergetic (B)	18.18%	35.57%	64.43%	$2,795^{60}$ mg/kg
Comparison (B/A %)	123.4% (3.45%↑)	94% (2.35%↓)	103.8% (2.35%↑)	119.2% (451^{44} mg/kg↑)

Case 2. Applications of Liquid Fertilizer from Pig Slurry

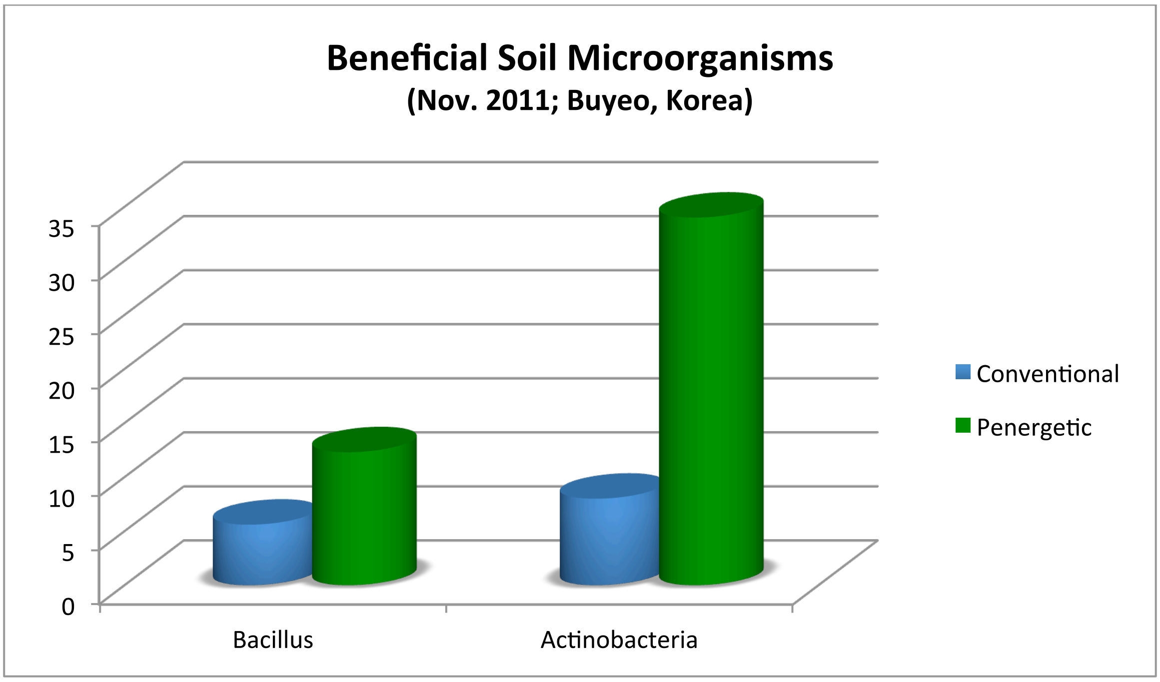
Liquid fertilizer from pig slurry using Penergetic products.

Product	Usage	Dosage
Penergetic-t	Feed additive	6 kg per 100 tons of fodder
Penergetic-g	Slurry treatment	10 g per LSU per week
Penergetic-k	Compost and soil treatment	3 g per m² on the barn floor after mucking out. Repeat each time after bedding.

Best results are obtained by using the products in combination as feasible.

Benefits (with combined use of Penergetic products)

- Reduce unpleasant odors and the occurrence of harmful insects and their larvae
- Significantly lower mortality rate and reduction of respiratory diseases
- Economical; reduce or eliminate the use of chemical additives
- Minimize groundwater pollution



Bacillus promotes plant growth. Actinobacteria speeds up decomposition of organic matter.

Application Cases

(1) Rice Cultivation (Mar–Aug, 2006; Dangjin, Korea)

Cultivated by Min-Hyung Cho; 10 hectare (used 25ℓ of liquid fertilizer per 3.3㎡)

Number of Stems (Aug 22, 2006)

Traditional Cultivation

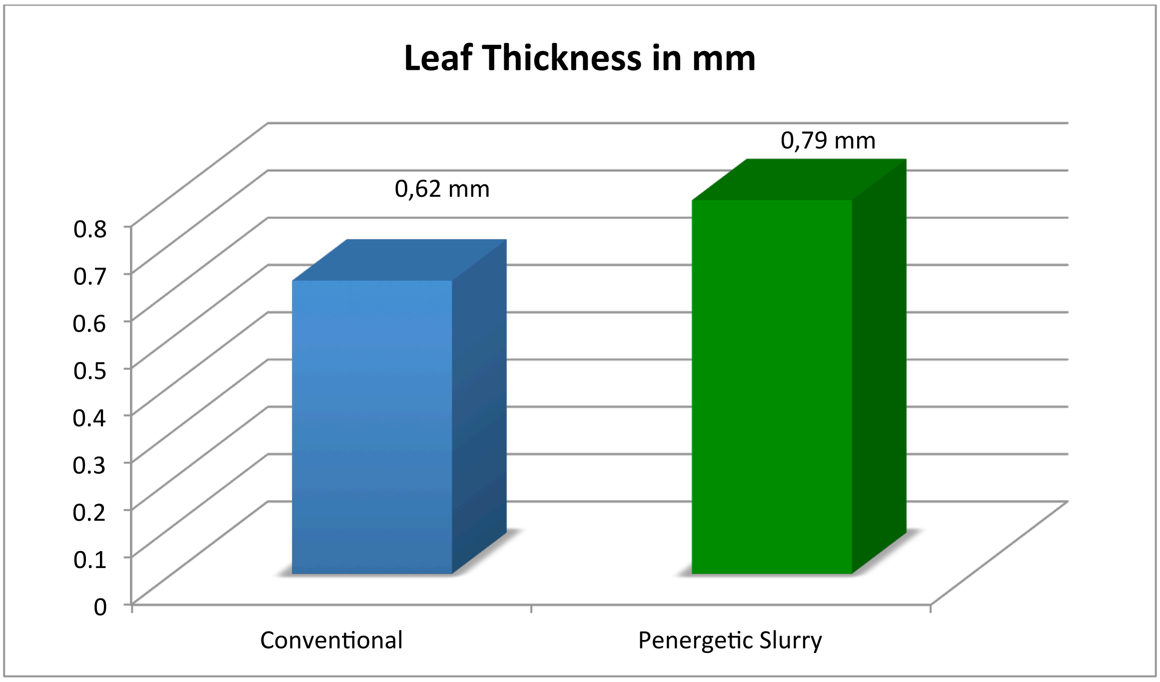
# of stems : 16.7

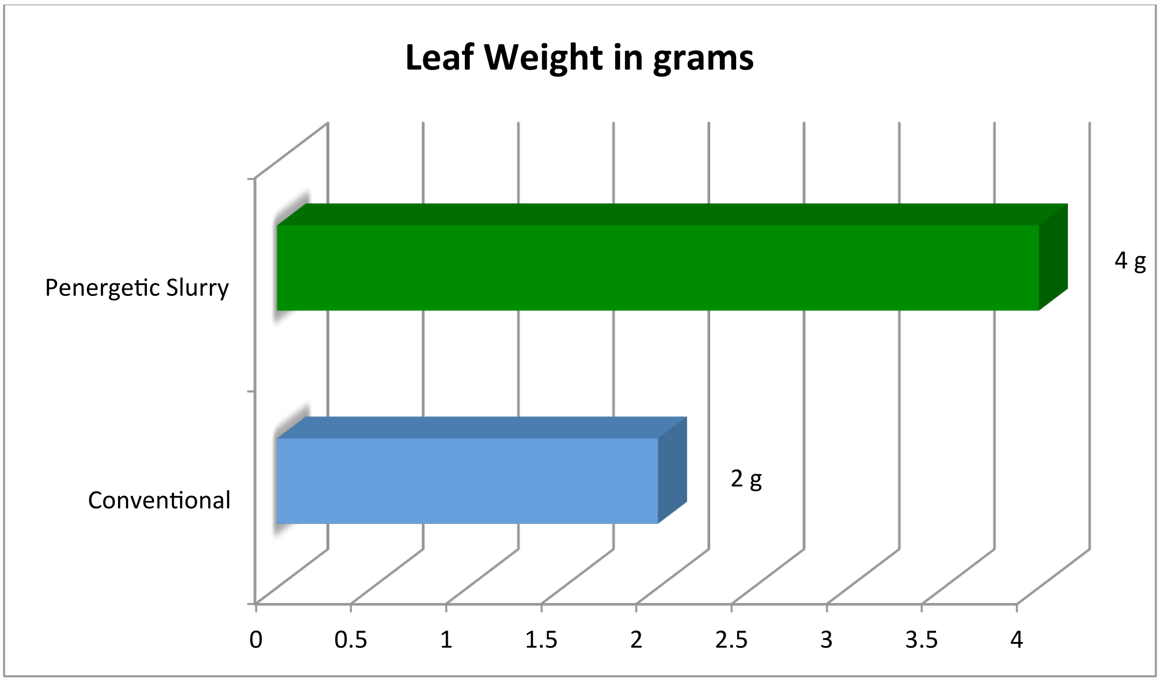
Penergetic Treated Slurry
(Replaced chemical fertilizer by 90%)

# of stems: 24.7 (+148%)

(2) Potato Cultivation (July 28, 2006; Chuncheon, Korea)

Cultivated by Jong-Sung Hong; 1 hectare (used 50ℓ of liquid fertilizer per 3.3 m^2)


Leaf Thickness in mm
0,62 mm
0,79 mm
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Conventional
Penergetic Slurry


Leaf Weight in grams
Penergetic Slurry
4 g
Conventional
2 g
0
0.5
1
1.5
2
2.5
3
3.5
4

Potato Crop (10 stems)

Conventional

Larger potatoes with Penergetic treated Slurry

Certificate of Results

돈분뇨 발효 미생물 액비 농법에 의한 감자재배 생산성 비교

○ 지　　번 : 강원도 춘천시 서면 신매 2리 32번지
○ 농 업 인 : 홍종성 외 1인
○ 총 면 적 : 3,000평
○ 품　　종 : 수미 (보급종)
○ 액비살포량 : 50리터/평
○ 재배 이력
　▷ 2006. 3. 7 액비 살포
　▷ 2006. 4. 3 정식
　▷ 2006. 6. 28 2차 평가

비교 평가 내역

(20포기씩 조사, 단위 : 개,kg)

구 분	대 조 구				액비 살포구				비 교	
	수량	점유	무게	점유	수량	점유	무게	점유	수량 %	중량 %
상품성	65	30%	14.88	73%	102	64%	21.22	88%	156.9%	142.6%
등외품	155	70%	5.50	27%	58	36%	2.86	12%		
합 계	220	100%	20.38	100%	160	100%	24.08	100%		

2006. 6. 28, 수

위의 내용을 입회 확인 평가함

서춘천 농협 영농지도사 김정운
춘천시 서면 재배농업인 홍종성
춘천농업기술센터 계장 송용규

Nutritional Values of the Potatoes

Parameter	Conventional (A)	Penergetic Slurry (B)	Comparison B/A %
Fiber	0,51%	0,77%	151.0%
Starch	16,55%	20,45%	123.6%
Vitamin C	96.3 ppm	125.3 ppm	130.1%

Tested by Gangwon-do Agricultural Research & Extensions Services

(3) Spinach Cultivation (Nov, 2010 ~ Mar 2011; Buyeo, Korea)

Fertilizers used in greenhouses:

A: Liquid / Chemical / Organic

B: Chemical / Organic / Liquid

C: Organic / Liquid / Chemical

Cultivated by Baek-Je Agricultural Association; used 40ℓ of liquid fertilizer per 3.3㎡

Weight of Spinach (based on 12 plants)

Penergetic
430g

Chemical Fertilizer
280g

Organic Fertilizer
320g

Certificate of Results

양돈분뇨활용 발효액비 농작물 재배 비교시험 확인서

1. TEST 내용

- 일 시 : 2010. 11. 24
- 장 소 : 부여군 상황리 본인 재배 비닐하우스
- 시비내용 : ① 화학비료 ② 유기질 퇴비 ③ 발효액비(백제양돈조합 생산)
- 재배작목 : 시금치 선정(동절기 감안), 3구 3반복 시험
- 입회 및 참석자 : 관외 – 농식품부, 농촌진흥청, 농업실용화재단 각 관계자

  관내 – 부여군농업기술센터 기술보급과장외 1명, 상황리 이장,

  부여백제양돈영농조합 대표 남성현

  기타 – 액비 관심 관계자

  * 총괄지도 : 옥성코리아 김금수

2. TEST 결과 종합소견(재배농민입장)

- **파종 2010. 12월 초 최종** 점검 : 2011. 3. 16
- 별지 자료와 같이 비교재배 시금치의 각 잔뿌리 및 수확량, 맛에서 1순위: 발효액비 시비구, 2순위 : 유기질퇴비구, 3순위 : 화학비료 시비구로 평가함.
- 백제양돈영농조합 액비는 "악취가 전혀 없고", "본인 외 1명이 소주 컵으로 각각 한잔씩 직접 마신(섭취) 결과 설사 등 인체에도 이상증상이 없었고", **"검증기관에서 병원성대장균 등의 검사결과 음성으로 판정되어" 안전성이 확보된 양질의 발효액비라는 것이 입증되어, 토양개량 및 농산물수확량 증대와 품질향상에 기여하는 것으로 확신함**
- 위기의 한국농촌 현실에서 농업과 축산이 공동 발전하는 길이 최선의 방법이라 생각함.

3. 기타 : 농민이 필요로 하는 검증된 양질의 발효액비가 공급되도록 관계당국의 적극적 지원과 협조를 요망합니다.

2011. 3. .

확인 및 소견자

재배농민 부여군 상황리 권경수 (서명)

휴대폰 번호 : 010-3405-7197

별지 : 각 시금치 뿌리 및 무게비교(2매)