



# 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

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## 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)

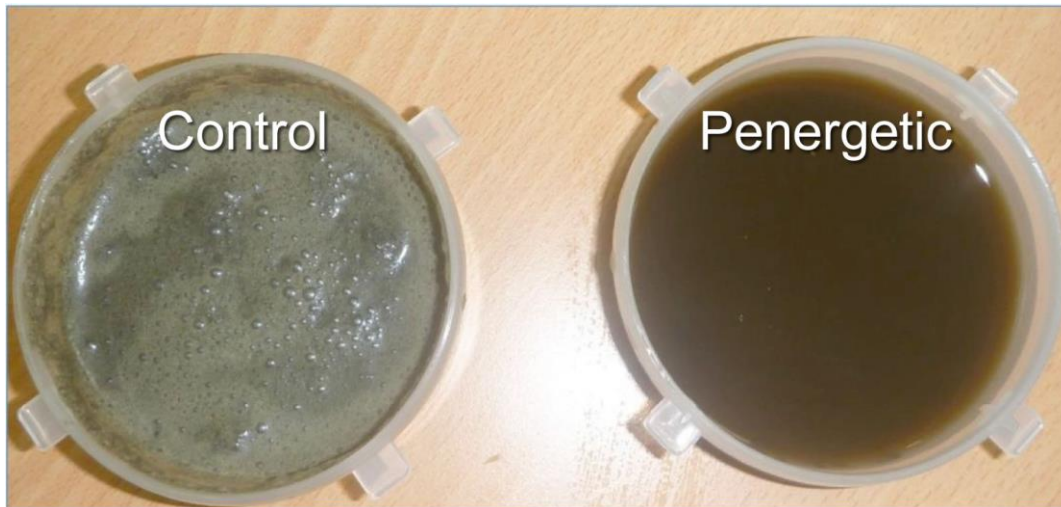
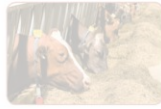
**Test Overview**

- 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**

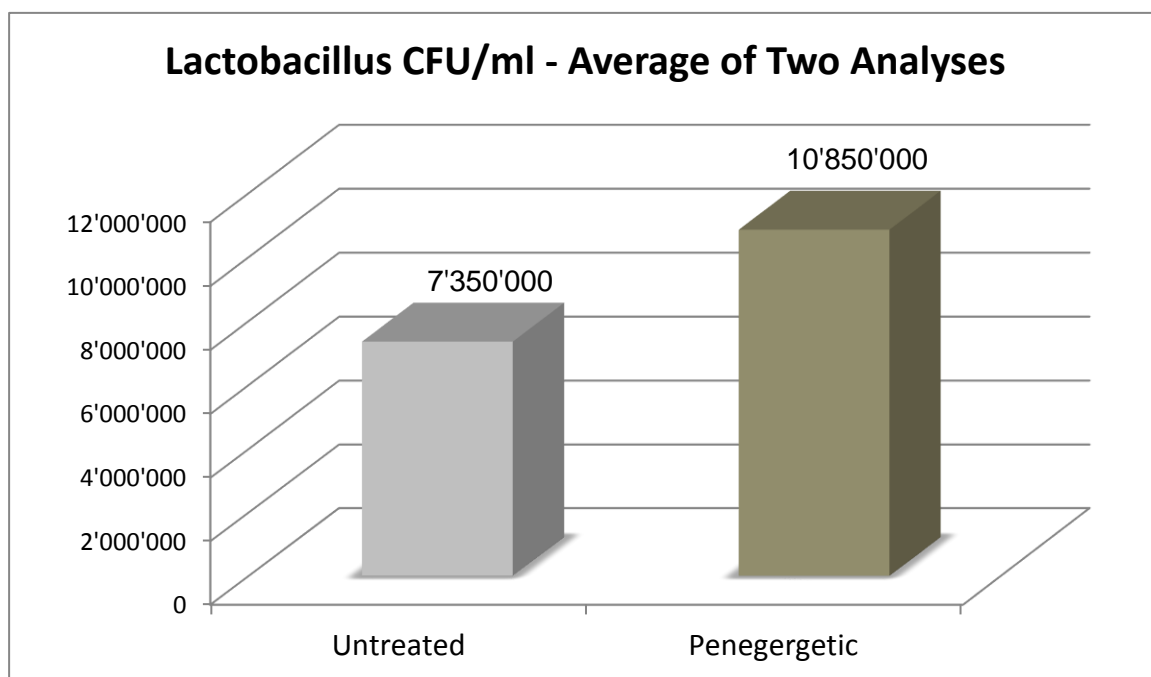
- Penergetic-t: fed with fodder (60g/ton)
- Penergetic-g: applied into slurry cistern/tank (once a week, 2 g per pig)

### Results

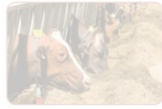


- Free-flowing slurry, no sediments,
- Floating layers of slurry dissolved, more homogeneous
- Increased microbial activity (page 5)
- Improved living conditions of pigs:  
 Much less cough and hyperemia (page 6-7)  
 Hyperemia (red eye): control group (80%-90%), test group (10%-20%)
- Reduced unpleasant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

More beneficial microorganism (Lactobacillus) in pigs' intestine:



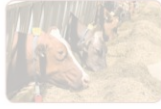
No pathogenic microorganisms detected in any of the analyses.



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

Parameter	Reduction in Percent
Nitrogen	<b>12.4%</b>
Phosphate	<b>45.0%</b>
Potassium	<b>72.0%</b>

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

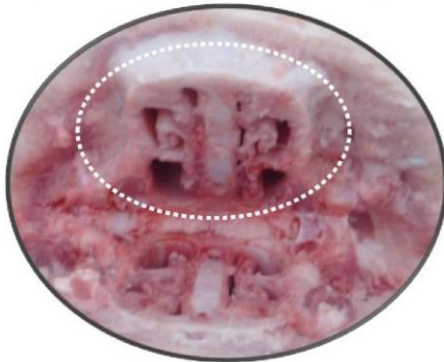


## Nasal Cavity

Control



Penergetic



More closed and blocked



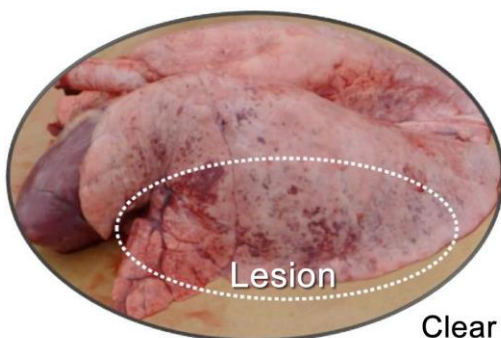
Clear and normal

## Condition of Lungs

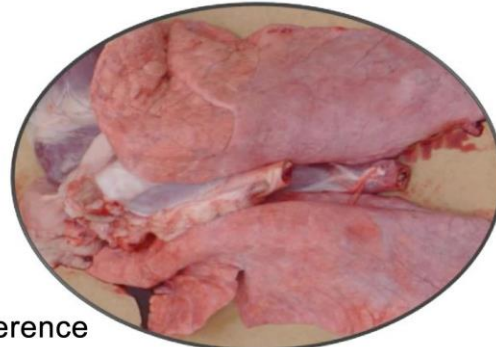
Control

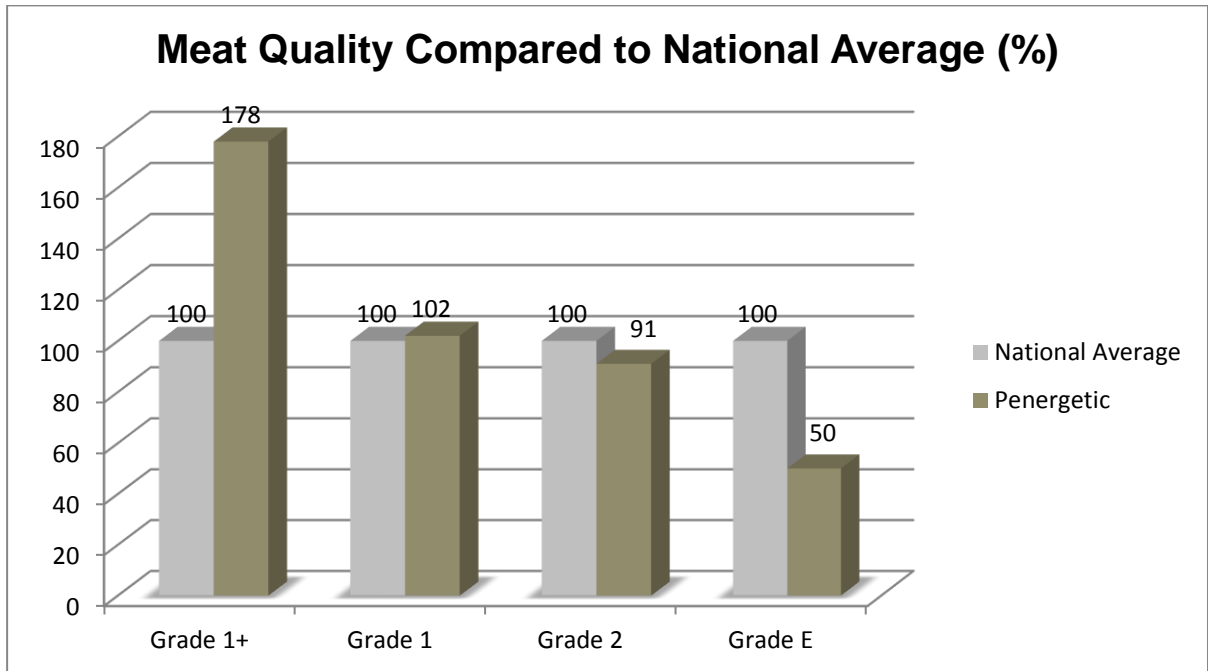
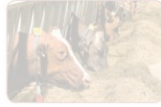


Penergetic



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 %	<b>176%</b> <b>(3.5%↑)</b>	<b>102%</b> <b>(0.5% [5.0%]↑)</b>	<b>91%</b> <b>(2.6% ↓)</b>	<b>2.4%</b> <b>50% (2.4%↓)</b>	

[ ] : 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
<b>Control (A)</b>	14.73%	37.92%	62.08%	2,344 <sup>16</sup> mg/kg
<b>Penergetic (B)</b>	18.18%	35.57%	64.43%	2,795 <sup>60</sup> mg/kg
<b>Comparison (B/A %)</b>	123.4% (3.45%↑)	94% (2.35%↓)	103.8% (2.35%↑)	119.2% (451 <sup>44</sup> mg/kg↑)

## Case 2. Applications of Liquid Fertilizer from Pig Slurry

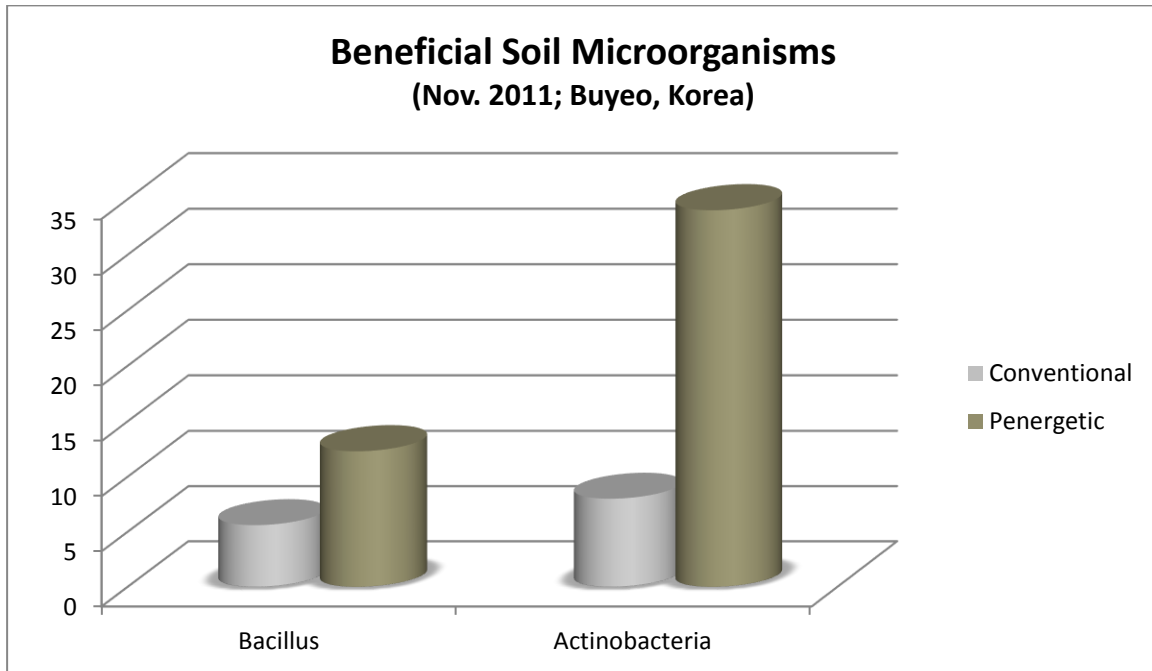
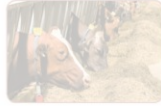
Liquid fertilizer from pig slurry using Penergetic products.

Product	Usage	Dosage
<b>Penergetic-t</b>	Feed additive	6 kg per 100 tons of fodder
<b>Penergetic-g</b>	Slurry treatment	10 g per LSU per week
<b>Penergetic-k</b>	Compost and soil treatment	3 g per m <sup>2</sup> 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.

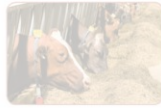
## Application Cases

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



Cultivated by Min-Hyung Cho; 10 hectare (used 25ℓ of liquid fertilizer per 3.3m<sup>2</sup>)





## Number of Stems (Aug 22, 2006)

### Traditional Cultivation



# of stems : 16.7

### Penergetic Treated Slurry (Replaced chemical fertilizer by 90%)



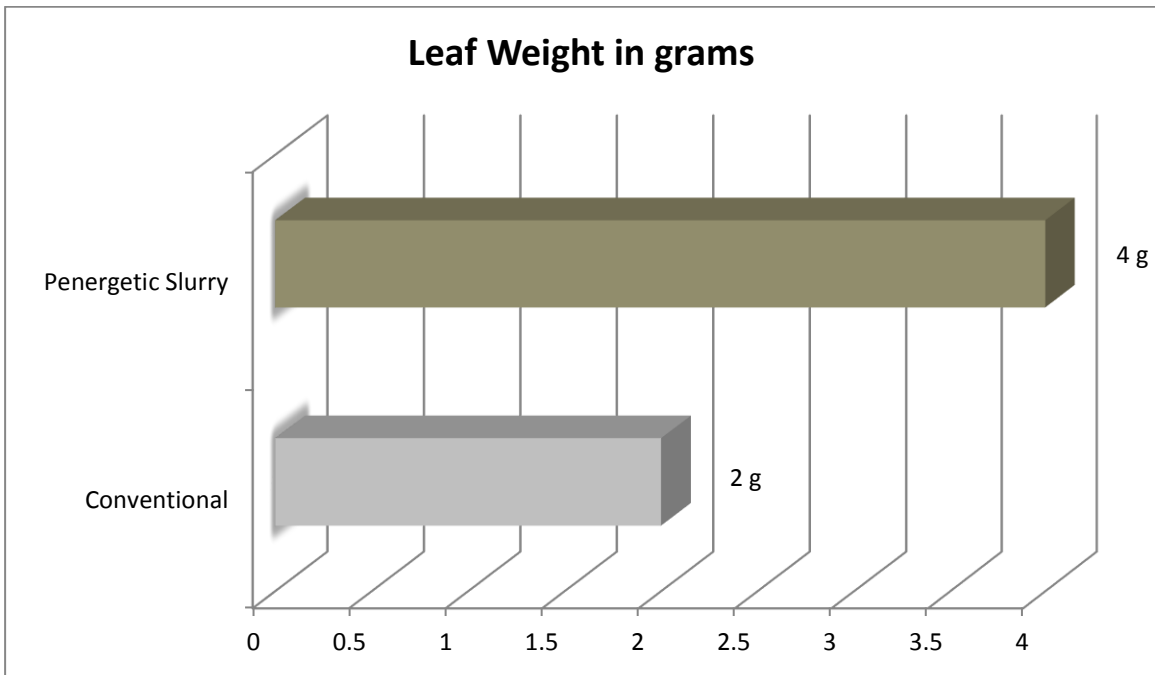
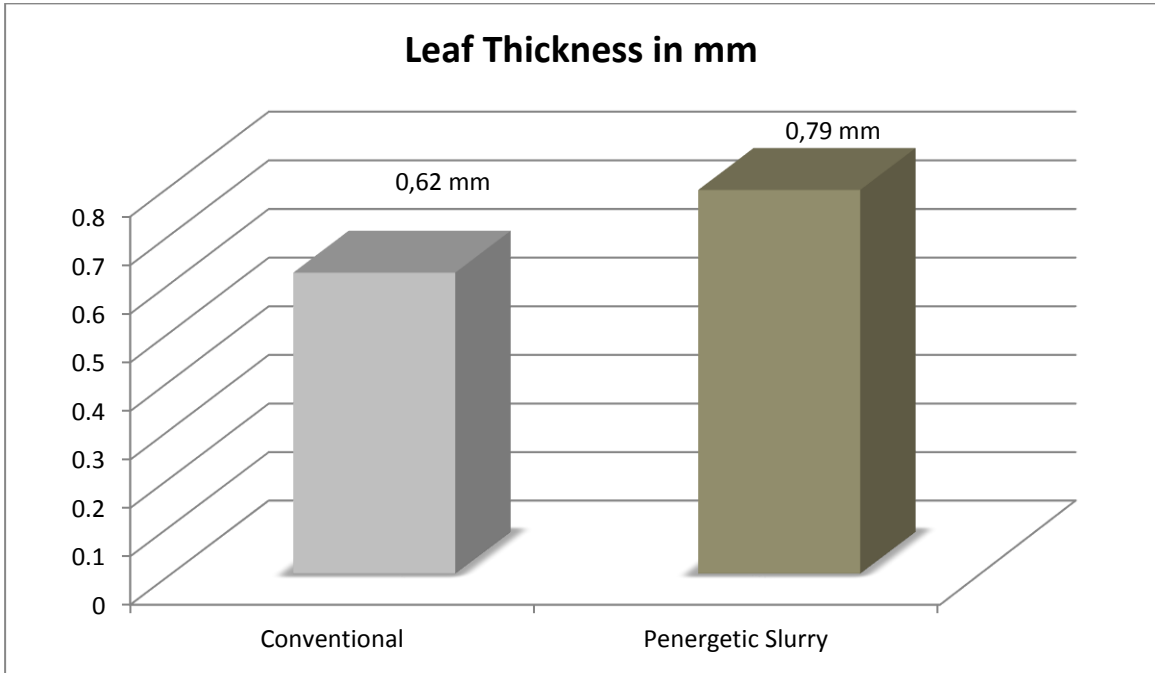
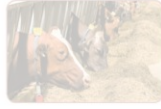
# of stems: 24.7 (+148%)

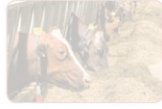
## (2) Potato Cultivation (July 28, 2006; Chuncheon, Korea)



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







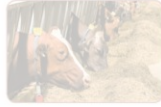
### Potato Crop (10 stems)



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

서훈천 농업 영농계도사 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 3.3m<sup>2</sup>

Weight of Spinach (based on 12 plants)



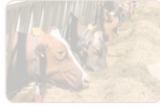
**PENERGETIC**  
430g



**Chemical Fertilizer**  
280g



**Organic Fertilizer**  
320g



## Certificate of Results

### 양돈분노활용 발효액비 농작물 재배 비교시험 확인서

#### 1. TEST 내용

- \* 일 시 : 2010. 11. 24
- \* 장 소 : 부여군 상항리 본인 재배 비닐하우스
- \* 시비내용 : ① 화학비료 ② 유기질 퇴비 ③ 발효액비(백제양돈농조합 생산)
- \* 재배작물 : 시금치 선정(동절기 감안), 3구 3반복 시험
- \* 입회 및 참석자 : 관외 - 농식품부, 농촌진흥청, 농업실용화재단 각 관계자  
관내 - 부여군농업기술센터 기술보급과장의 1명, 상항리 이장,  
부여백제양돈농조합 대표 남성민  
기타 - 액비 관심 관계자
- \* 총괄지도 : 육성코리아 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.
- \* 백제양돈농조합 액비는 "약취가 전혀 없고", "본인 외 1명이 소루 텃으로 각각 한잔씩 직접 마신(실위) 결과 설사 등 인체에도 이상증상이 없었고", "검종기관에서 병원성대장균 등의 검사결과 음성으로 판정되어" 안전성이 확보된 양질의 발효액비라는 것이 입증되어, 표양개량 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 요청합니다.

2011. 3. .

확인 및 소견자

재배농민 부여군 상항리 권경수 (서명)

휴대폰 번호 : 010-3405-7197

별지 : 각 시금치 뿌리 및 무게비교(2매)