

SYNBIOTICS: THE LATEST IN HEALTH AND PERFORMANCE

Synbiotics - a word coined by W.H.O. in the second half of this decade - is a synergistic interaction between probiotics and prebiotics. Studies in mammals showed that the combined use of probiotics and prebiotics have greater beneficial effects than if these two constituents were to be used alone. Particularly in pigs, a study conducted by Budiño *et al.* in 2005 demonstrated that weaned pigs fed with synbiotics had a gut with higher integrity that would ensure better assimilation of nutrients:

Synbiotic vs. Probiotic and Prebiotic					
(Budino F.E.L. <i>et al.</i> 2005, Brazilian Archives of Biology and Technology, Vol.48, No.6)					
Mean height (µm) and density (n° of microvilli/µm ²) of microvilli of weaned piglet intestinal epithelium					
Variable	Basal	Antibiotic*	Probiotic	Prebiotic	Synbiotic
<u>Height</u>					
Duodenum @ day 7	0.88	0.75	0.76	0.67	0.87
Duodenum @ day 14	0.70	0.75	0.87	0.75	1.05
<u>Density</u>					
Jejunum @ day 7	98.3	82.0	86.4	94.9	100.6
Jejunum @ day 14	86.4	89.5	101.8	98.5	100.2
* Zinc bacitracin					

PRIMOS 25 - A SYNBIOTIC FOR GROWING-FINISHING PIGS PAR EXCELLENCE

PRIMOS 25 is a true synbiotic that commercially has been proven to significantly improve the production parameters of pigs during the growing and finishing stages.

In an animal study conducted in a farm in Tarlac (the Philippines) in 2005, **PRIMOS 25** demonstrated improvement in A.D.G. and F.C.R. by 13.0% and 12.2% respectively, vs. a commercial probiotic:

Pig no.	PROBIOTIC Group	PRIMOS 25 Group	Pig no.	PROBIOTIC Group	PRIMOS 25 Group
1	2.40	2.00	1	98	109
2	2.43	2.10	2	93	107
3	2.71	2.33	3	85	100
4	2.47	2.07	4	92	106
5	2.71	1.97	5	87	112
6	2.80	2.23	6	84	99
7	2.84	2.91	7	85	85
8	2.84	2.32	8	86	100
9	2.38	2.41	9	96	95
10	2.55	2.32	10	90	97
Mean FCR	2.61	2.27	Mean final wt. (kg)	90	101

This was supplemented by another study conducted by the livestock research institute of the Kasetsart University (Thailand) in 2009. **PRIMOS 25** demonstrated a significant improvement in the following parameters vs. a commercial probiotic:

1. Improvement in final weight by 4.8%;
2. Improvement in A.D.G. by 5.3%;
3. Improvement in F.C.R. by 12.9%.

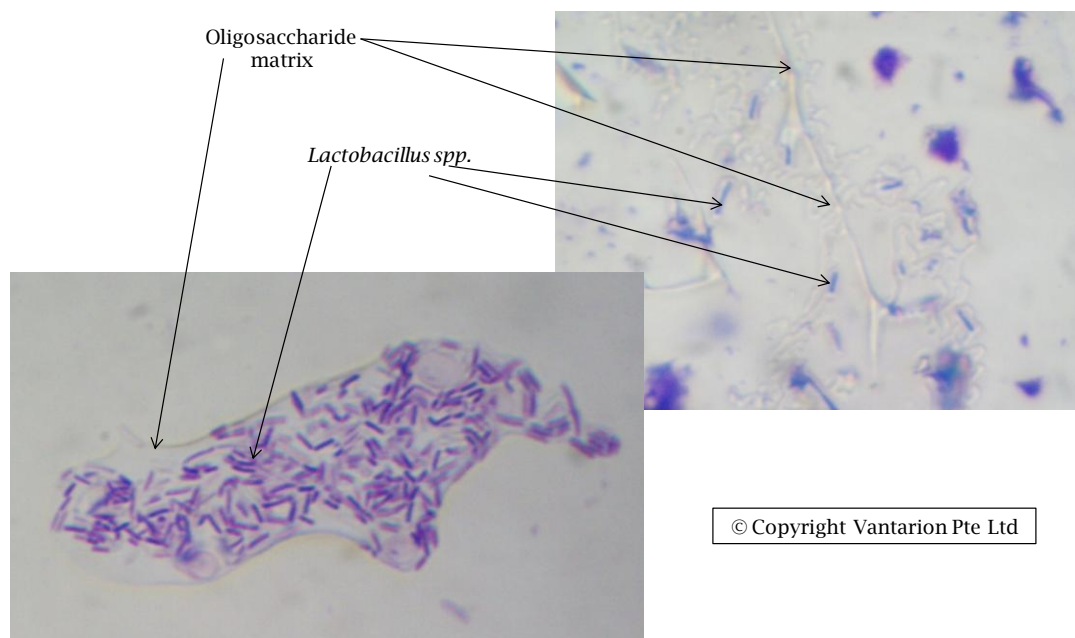
PRIMOS 25 vs. commercial probiotic							
Kasetsart University (2009), Thailand							
PRODUCTIVITY			CARCASS QUALITY				
	ALL MALE + FEMALE (n = 20 per group)			ALL MALE + FEMALE (n = 4 per group)			
Groups	Final Wt (kg)	A.D.G. (g)	F.C.R.	Groups	BackFat	Longissimus	% Lean
Control	98.42	722.46	3.07	Control	1.24	37.64	55.03
PRIMOS 25 @ 0.05%	99.15	737.53	2.76	PRIMOS 25 @ 0.05%	1.33	39.39	55.48
Probiotic @ 0.1%*	94.60	700.57	3.17	Probiotic @ 0.1%*	1.40	39.19	55.11

* Probiotic @ 0.1% comprising of lyophilized *Lactobacillus fermentum* with a label claim of 10⁸ CFU / gram, incorporated at 1,000 grams / ton.
All groups are fed with a basal diet of cassava and soybean meal.

Each test group consists of 5 pens representing 5 replicates and each pen has 4 pigs.

The improvement in final weight was translated in a better percentage of lean meat and a reduced thickness of the back fat obtained at slaughter.


To achieve such results, research and development into the industrial fermentation processes of lactic-acid bacteria and yeasts is necessary. Vantarion develops unique and proprietary fermentation processes that allow the combined and synergistic growth of lactic-acid bacteria and yeasts, rather than in individual fermentation vats. This ensures that both the lactic-acid bacteria and yeasts co-exist from the start and secrete unique bio-active compounds beneficial to the growing-finishing pigs. Furthermore, the unique and proprietary fermentation processes enhance the production of oligosaccharides that encapsulate the lactic-acid bacteria and yeast cells:



This encapsulation of the probiotics confers unique properties in the finished product, **PRIMOS 25**, that are rarely found under standard fermentation processes:

1. The ability of the lactic-acid bacteria to resist commonly used antibiotics in swine feed;
2. The ability to remain viable in gastric pH up to 4 hours;
3. The ability to remain viable in intestinal bile up to 4 hours.

The ability to resist in-feed antibiotics was demonstrated by the Philippine government accredited laboratory, LIPA Quality Control Center (LQCC) on 3 consecutive batches of PRIMOS 25. A total of 7 in-feed antibiotics were tested in 2009:



LIPA QUALITY CONTROL CENTER

Accredited/Recognized by:
Bureau of Food and Drugs (BFAD) • Department of Agriculture-Bureau of Animal Industry (DA-BAI)
Department of Environment and Natural Resources (DENR) • Department of Health (DOH)

p. 1 of 4 ADDL-MICTRF-406

MICROBIOLOGICAL TEST RESULT

Test Report No.: N-09-DL-ETC-000016 Date Received: Aug. 19, 2009
 Lab Access No.: N-09-DL-ETC-0016 Date Requested: Aug. 27, 2009
 Name of Client: **VIRBAC ANIMAL HEALTH** Date Released: Aug. 29, 2009
-DR. M. AGUIRRE

Address: 12F PSC Building (Textite East Tower) Ortigas Center Pasig
 Tel./Fax Nos.: 0918 – 928 – 1381 / (02) 635 - 9987

SAMPLE DESCRIPTION: Primos 25 10 grams

ANALYSIS: ANTIBIOTIC SENSITIVITY TESTING

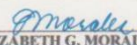
ANTIBIOTIC DISCS USED	Primos 25 10grams Sample 1 (1:1 dilution)
AMPICILLIN 10 mcg	No zone of inhibition observed from the 7 antibiotic discs used after 24 – 48 hours incubation period.
CEFTIOFUR 30 mcg	
CHLORAMPHENICOL 30 mcg	
NEOMYCIN 30 mcg	
TYLOSIN 30 mcg	
SULFADIMIDINE 23.75 mcg /TRIMETHOPRIM 1.25 mcg	
TRIMETHOPRIM 1.25 mcg/ SULFAMETHOXAZOLE 23.75 mcg	

S- Sensitive, I- Intermediate, R- Resistant

Reference/s:
Veterinary Diagnostic Procedure, Dalusong D. R. et al

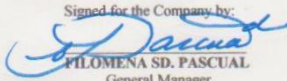
*This report must not be reproduced in part or in full without written authority from the management of LQCC.

Certified true and Correct by:



ELIZABETH G. MORALES
Laboratory Head
Registered Medical Technologist
PRC NO: 2216
Valid Until: 09/16/2010

Signed for the Company by:



FILOMENA S.D. PASCUAL
General Manager
Registered Agriculturist
PRC NO: 4384
Valid Until: 03/21/2012

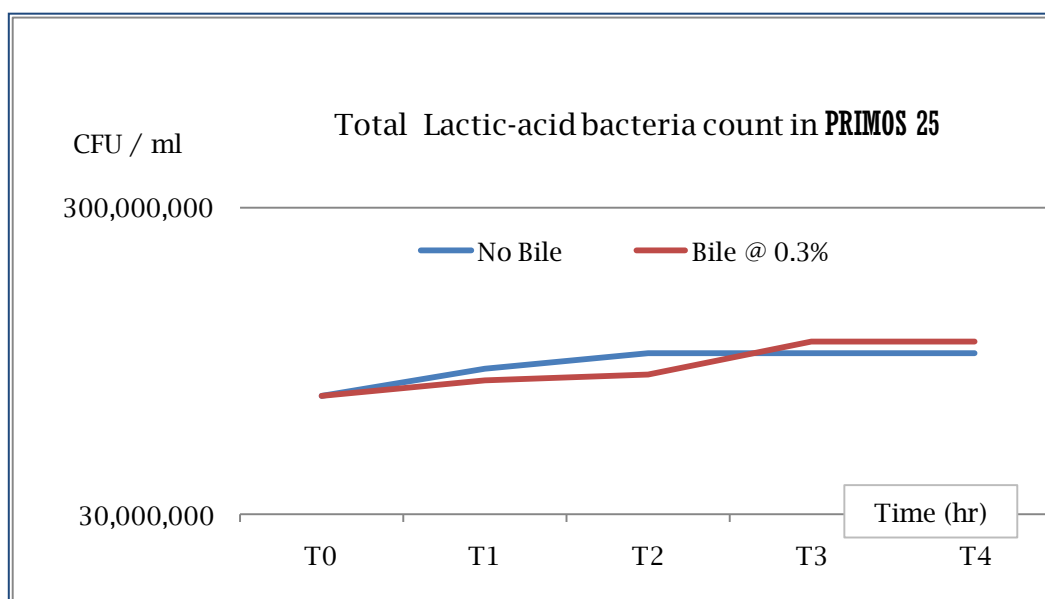
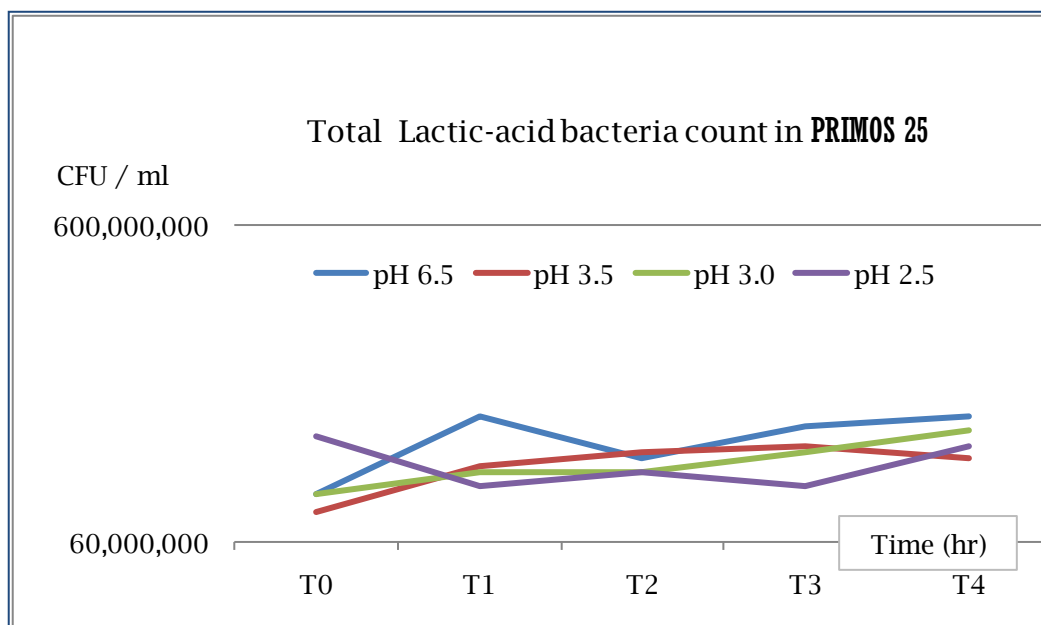
Top Floor Señora Maria Building, P. Torres St. cor. C.M. Recto Ave., Lipa City, Batangas 4217

Analytical Service Laboratory
Telefax: (043) 756-6220 to 22 • Tel.: 312-2511
E-mail: lqcc_asl@yahoo.com.ph

Animal Disease Diagnostic and Microbiology Laboratory
Telefax: (043) 756-3315
E-mail: lqcc_addl@yahoo.com.ph

This resistance is not due to any genetic mutation of Vantarion’s lactic-acid bacterial cultures, as the mother cultures are sensitive to these antibiotics. It can therefore be assumed that the presence of the oligosaccharide matrix surrounding the lactic-acid bacteria after manufacturing could act as a barrier, preventing the penetration of the antibiotics into the bacterial cells.

In vitro studies in 2010 showed that the lactic-acid bacteria in **PRIMOS 25** remained as viable as they were in their optimal pH of 6.5. There was no significant drop in their count in pH as low as 2.5 and in a 0.3% bile solution over a four-hour observation period:



It is equally important to note that **PRIMOS 25** contains only non-spore forming lactic-acid bacteria. This ensures consistent efficacy of the product in growing-finishing pigs.

Spore-forming *Bacillus subtilis* are used as direct-fed microbial in livestock feeds. Their presence in the feed is usually the dormant spore form. Spores are not active. If the theory of gut colonization holds true, then when they are consumed and in the gut, they must first be shown to germinate before having any beneficial effects on the animal. Germination requires specific conditions.

It is perhaps for these reasons that Orwin Simon, when having reviewed 22 publications on the use of probiotics in swine feed, reported at the Baniff Pork Seminar in 2005 that the beneficial effects on weight gain and feed conversion ratio of the probiotics tested then remained inconclusive.

PRIMOS 25 CONSISTENTLY DELIVERS IN THE FIELD

Studies conducted throughout Asia demonstrated **PRIMOS 25**'s consistent efficacy in growing-finishing pigs, from convalescing that is marked by slower growth, to growth performance and finally to carcass quality.

1. CONVALESCING OR RECOVERY

In the following customer trial in Bulacan (the Philippines) in 2009, slower growing pigs were fed with **PRIMOS 25** at 1 kg per ton of swine feed and compared their performance with normal growing pigs:

500-sow level farm, Bulacan, the Philippines (2009)			
Variable	Slower growers	Normal growers	Δ
Number of pigs per group	44.00	50.00	
Grow-out (days)	118.00	118.00	
Ave. wt. at birth (kg)	1.22	1.60	
Ave. wt. at weaning (kg)	5.89	9.52	
Ave. wt. @ 70 days old (kg)	16.44	21.92	
PRIMOS 25	1 kg per ton	None	
Start wt. - average (kg)	17.30	24.11	-28.2%
Slaughter wt. - average (kg)	68.01	73.86	-7.9%
Average age at sale (days)	174.40	172.12	
Ave. feed consumed (kg)	147.97	154.39	
A.D.G. (kg)	0.486	0.487	-0.3%
F.C.R.	2.92	3.10	6.0%

The slower growing pigs were significantly at a weight disadvantage of 28.2% compared to the normal growing pigs at the start of the feeding trial. Having fed with **PRIMOS 25** over a 118-days period, the slower growing pigs, at slaughter age, were only at a weight disadvantage of 7.9% compared to the normal growing pigs. The customer managed to sell all pigs in the feeding trial at the same price per kg of live weight. In addition, the customer was able to gain in feeding cost due a 6.0% improvement in F.C.R.

2. GROWTH PERFORMANCE

Between 2009 and 2010, clinical studies were conducted to demonstrate the efficacy of **PRIMOS 25** in improving weight gain and feed conversion ratio in pigs that are of good general health. These clinical trials were conducted in China, Japan, the Philippines and Thailand under different clinical conditions.

In 2009, a clinical study was conducted at a customer farm located in Bulacan (the Philippines). The results of the study comparing **PRIMOS 25** with a registered growth-enhancing molecule, ractopamine, were reported in the *Philippine Journal of Veterinary and Animal Sciences (PJVAS)*, 2010, Vol. 36, Issue 1. In summary, pigs fed with **PRIMOS 25** throughout the

trial duration showed significant ($p < 0.05$) improvement in their slaughter weight and A.D.G. when compared with

1. Pigs fed with ractopamine by 10.8% and 12.4% respectively;
2. Control pigs by 15.4% and 17.4% respectively.

<u>Philippine Journal of Veterinary and Animal Sciences, 2010, Volume 36, Issue 1, pp 19-28</u>			
Group	PRIMOS 25	Ractopamine	Control
Number of pigs	132	131	134
Average start wt (kg)	27.0	26.0	25.9
Average slaughter wt (kg)	89.7 ^c	80.95 ^{a,b}	77.7 ^a
Total feed consumed (kg)	26,832	24,515	22,507
A.D.G. (g)	0.687 ^c	0.611 ^b	0.585 ^a
F.C.R.	3.25	3.42	3.21

In 2009, a clinical study was conducted at the Livestock Research Institute of the Kasetsart University using a basal diet of cassava, rice bran and soy bean meal. 2 of the 3 productivity parameters in pigs fed with **PRIMOS 25** showed significant ($p < 0.05$) improvement when compared to the control pigs in the study:

1. 2.2% improvement in A.D.G.
2. 9.9% improvement in F.C.R.

<u>Kasetsart University, Nathon Pathom, Thailand (2009)</u>			
PRODUCTIVITY	ALL MALE + FEMALE (n = 20 per group)		
Groups	Final Wt (kg)	A.D.G. (g)	F.C.R.
Control	98.42	722.46	3.07
PRIMOS 25 @ 0.05%	99.15	737.53	2.76

Each test group consists of 5 pens representing 5 replicates and each pen has 4 pigs.

In the summer of 2010, a clinical study was conducted at the research station of a tier-one feed mill of a multi-national corporation in Guangdong province of China using a basal diet of corn, wheat bran and soybean meal. The feed mill concluded that they were able to sell pigs fed with **PRIMOS 25** 7 days earlier than the control pigs, due to a significant ($p < 0.05$) improvement in A.D.G. of 10.0%:

<u>Tier-one feed mill, Guangdong, China (2010)</u>				
Group	Initial Wt	Final Wt	ADG	FCR
control	10.05±0.14	95.15±2.14	0.70±0.015	2.68±0.003
PRIMOS 25	10.02±0.67	102.80±1.07	0.77±0.033	2.66±0.091
Difference:	-0.3%	8.0%	10.0%	-0.7%

Each test group consists of 3 pens representing 3 replicates and each pen has 6 pigs.

In the winter of 2010, a multi-centric trial was conducted at the Kagawa Prefecture Livestock Research Station (KPLRS) of Japan. The government-run field extension service was keen to evaluate the efficacy of **PRIMOS 25**, having tested inconclusively many previous probiotics that were commercially available in Japan. The objective was to run 3 separate clinical studies at the research station located in Kagawa Prefecture, Japan, to demonstrate reproducibility of the beneficial effects of **PRIMOS 25**. To date, 2 of the clinical studies are on-going and the 3rd will start in spring of 2011. Intermediate results of live weight as of 4 February 2011* demonstrated significant improvement in A.D.G. in both clinical studies:

<u>Kagawa Prefecture Livestock Research Station, Japan (2010)</u>							
Clinical trial no. 1				Clinical trial no. 2			
Group	Wt. on 5-11-2010	Wt. on 4-2-2011	A.D.G.	Group	Wt. on 20-11-2010	Wt. on 4-2-2011	A.D.G.
PRIMOS 25	25.1	103.1	0.857	PRIMOS 25	21.9	79.9	0.828
Control	23.9	95.0	0.781	Control	21.1	74.3	0.761
Difference	5.1%	8.6%	9.7%	Difference	4.2%	7.5%	8.8%

Each test group consists of 3 pens representing 3 replicates, and each pen has 2 pigs.

* The clinical studies will end at the marketable weight of 110 kg. As such these clinical studies were on-going at the time of write-up of this publication.

3. CARCASS QUALITY

With a good growth rate, farmers move to focus their production on attaining carcass quality and finally meat quality. Carcass quality focuses principally on higher percentage lean meat and reduced thickness of back fat. Reduced thickness of back fat gives a better conformity of the animal, allowing higher selling price per kg of live weight.

Between 2009 and 2010, clinical studies were conducted to demonstrate the efficacy of **PRIMOS 25** in improving carcass quality in pigs that have generally good growth rates.

In 2009, clinical study was conducted at the Livestock Research Institute of the Kasetsart University using a basal diet of corn, rice bran and soy bean meal. **PRIMOS 25** was fed at the starter, grower and finisher stages. Results indicated improvement in especially the back fat of pigs fed with **PRIMOS 25**:

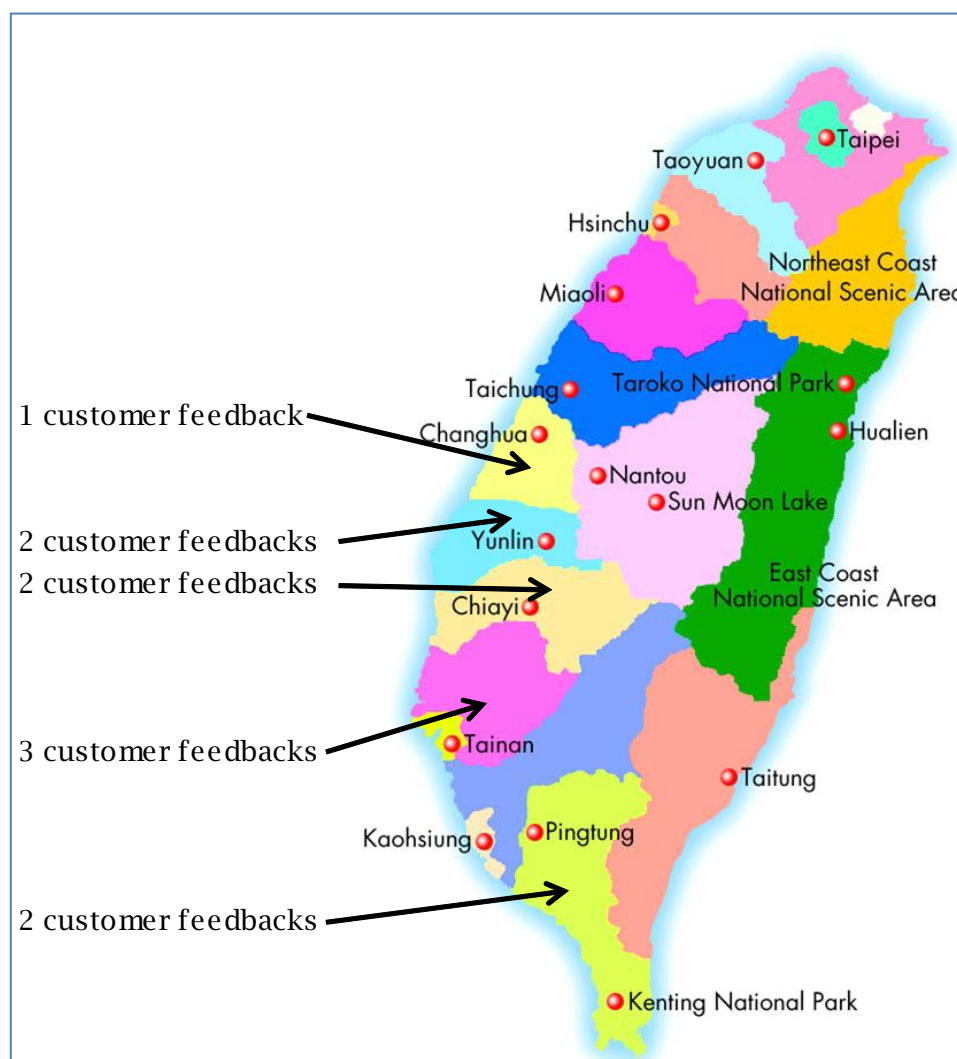
<u>Kasetsart University, Nathon Pathom, Thailand (2009)</u>			
Group	Control	PRIMOS 25	% Difference
Number of pigs	25	25	
Backfat depth (cm)	1.36	1.27	-6.6%
Longissimus muscle area (sq. cm)	39.12	39.39	0.7%
% Lean	54.77	55.92	2.1%

Each test group consists of 5 pens representing 5 replicates and each pen has 4 pigs.

The results were further confirmed by a customer in 2010, the second largest swine integrator in the Philippines. In this instance, the customer tested by feeding **PRIMOS 25** only at the finishing stage and at 1 kg per ton of swine feed. The customer concluded a significant improvement in back fat reduction of pigs fed with **PRIMOS 25** (refer to table on page 8).

<u>Swine integrator, Philippines (2010)</u>			
	PRIMOS 25	Control	
PRIMOS 25	1 kg / ton of feed	-	
No. of pigs	80	80	
Duration	40 days	40 days	
Stage	Finisher	Finisher	
Type of feed	Finisher	Finisher	
Parameters tested:			Difference
Market weight (kg)	79.47	79.33	0.2%
Backfat thickness (cm)	1.21	1.75	-30.9%

Throughout 2010 during the launch of **PRIMOS 25**, customer feedback in Taiwan (ROC) provided field confirmation of the improved conformity in pigs fed with **PRIMOS 25** at 0.5 kg per ton of swine feed. In all cases, **PRIMOS 25** was given during the finisher stage. The overall average price increase reported by these customers was US\$8.33 per 100 kg of live weight:



PRIMOS 25 - CONCLUSION

Pork is a key animal protein for many Asians. The Asia-Pacific countries produce more than 60% of world production with China leading the way. The key to profitable pig farming is keeping your pigs in constant good health through right feeding and nutrition. Simple as it sounds, this actually requires the farmer to constantly jostle between growth performance and the economies of production, of which feed cost constitutes more than 65% of OPEX. Finally, as consumers become more aware of eating healthily, pig farmers will also be driven to focus on the use of natural products to enhance growth and carcass quality.

Synbiotics are the most recent advances in natural growth enhancers, and are proven to be superior to either probiotics or prebiotics. **PRIMOS 25** is a synbiotic and **PRIMOS 25** is shown to aid in the growth of pigs during a recovery phase, to improve production parameters during the growth phase of healthy pigs and finally to enhance the carcass quality of high performance pigs.

PRIMOS 25 - BENEFITS

- ✓ Is a novel, 100% natural product belonging to the class of Synbiotics.
- ✓ Aids the slower growing pigs during their recovery period to reach close to the slaughter weights as their healthy peers, without raising feeding cost.
- ✓ Acts as a 100% natural growth enhancer allowing healthy pigs to be raised faster and earlier time to market, without raising feeding cost.
- ✓ Provides a 100% natural alternative in improving the conformity of the carcass through a reduction in back fat and/or increase in lean meat.

NO WITHDRAWAL PERIOD. USE DAILY WITH CONFIDENCE.

© 2011. VANTARION PTE LTD

No.2, Second Chin Bee Road. Singapore 618769.

Tel: +65-6265-7725. Fax: +65-6265-7735. Email: enquiries@vantarion.com.

DISCLAIMER: ALTHOUGH DUE CARE AND ATTENTION HAVE BEEN TAKEN TO ENSURE THAT THE PREPARATION OF THIS MATERIAL IS AS ACCURATE AS POSSIBLE, THE CONTENTS OF THIS BROCHURE ARE PROVIDED FOR INFORMATION PURPOSES ONLY. NEITHER VANTARION PTE LTD NOR ITS DISTRIBUTORS OFFER ANY WARRANTY, WRITTEN, EXPRESSED OR IMPLIED, DUE TO THE NATURE OF VARIABILITY OF RESPONSE IN ANIMALS AND FARMING CONDITIONS.