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ISSUE 4 2012

Chief Editor : PW Lai
Editors : KC Teo, YH Gan, WT Hon, SF Lim & Dilshad Alam

CIBENZA® DP100

CIBENZA® DP100: A Protease Enzyme Feed Additive to Improve Protein Digestibility and Reduce Feed Cost in Pigs

Rungcharoen P., Court S. and Escobar J.
Novus International Co., Ltd (Thailand)

CIBENZA® DP100

CIBENZA DP100 is a heat-stable, protease enzyme feed additive produced by Bacillus licheniformis PWD-1, which hydrolyses casein, collagen, kafirin, elastin, gluten and several other proteins such as keratin, which contains cystine disulphide bonds.

Same Ingredients, More Nutrients

In swine diets, most of the crude protein is obtained from feed ingredients such as soybean meal, which is considered to be utilized efficiently by the weaned pig (approximately 90%). Corn-soybean meal diets are therefore considered to be highly digestible at about 85%. However, they may contain a variety of complex proteins that may not be easily digested by young pigs due to low levels of necessary endogenous enzymes during early stages of life. In addition, high market prices of SBM push producers to look for cheaper alternative feed ingredients such as feather meal, meat and bone meal, rapeseed meal, copra meal, and even dried distillers grain with solubles (DDGS). Some of these ingredients may have higher protein content than SBM (i.e. feather meal), such ingredients typically have lower digestibility than SBM, making the need for exogenous protease more desirable.

Broad Spectrum Proteolytic Enzyme for Various Feed Ingredients

Novus has conducted a number of in vitro studies to quantify the improvement in protein digestibility in various types of feed ingredients, including alternative protein sources, when CIBENZA® DP100 is present (Figure 1). The average of improvement in protein digestibility in vitro was about 7.5%.

CIBENZA® DP100 Improves Crude Protein and Amino Acid Digestibility in Pigs

Published results indicate the ability of CIBENZA DP100 at 500 g/ton, when added to corn-soybean meal based diets, significantly increase protein digestibility in weaned pigs (Wang *et al*., 2011a) and amino acid digestibility levels in grower pigs (Wang *et al*., 2011b), with a significant average increase in digestibility for crude protein (+3.2% points) and essential amino acids (+3.1% points). A 3.4% increase in average daily gain was obtained when a corn-soybean meal based diet with lysine deficiency was supplemented with 500 g/ton of CIBENZA® DP100 (Figure 2, Harrell *et al*., 2012), indicating that CIBENZA® DP100 increased protein and amino acid digestibility. Most importantly, pigs can use the extra digested amino acids to increase growth performance.

CIBENZA® DP100 Improves Gut Health in Pigs

Protein that is not digested by the end of ileum reaches the pig's hindgut where it will endure bacterial fermentation, yielding ammonia, and consequently leading to an overall higher pH. Increased protein fermentation and elevated hindgut digesta pH are associated with increased proliferation of potential pathogenic bacteria in pigs. Diets supplemented with CIBENZA® DP100 significantly reduced digesta ammonia content in the ileum, cecum, and colon of weaned pigs, accompanied by lower digesta pH values and an improved fecal score (Wang *et al*., 2011a). There was a significant reduction in E. coli and increase of lactobacilli in the cecum and colon. These results demonstrate that CIBENZA® DP100 can improve the intestinal health of pigs, contributing to further growth benefits.

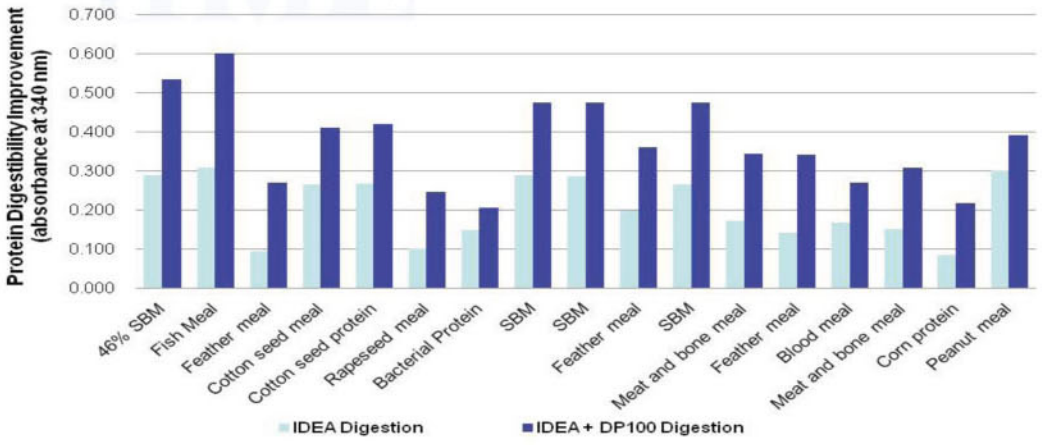

Figure 1. CIBENZA DP100 increases in vitro protein hydrolysis in various ingredients.

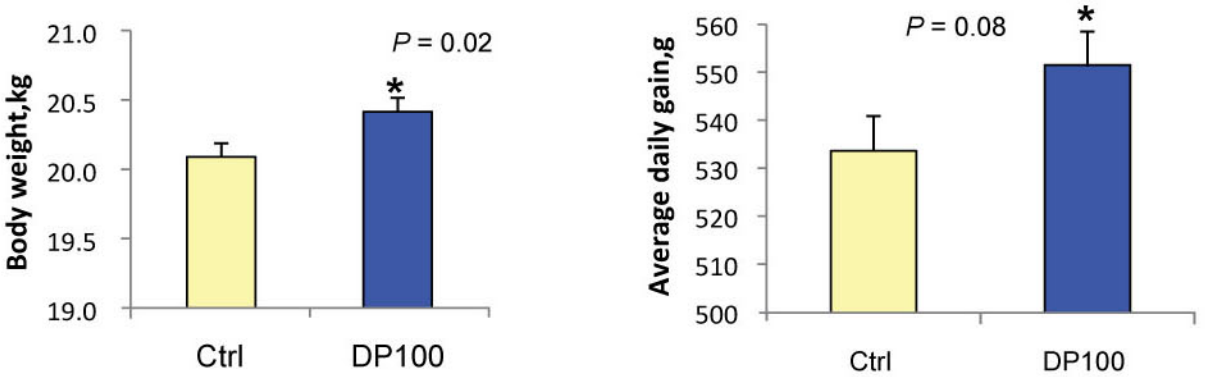

Figure 2. CIBENZA® DP100 improves growth performance of nursery pigs consuming a corn-soybean meal diet deficient in amino acids.

Using Alternative Feed Ingredients for Feed Cost Saving

A research study was conducted to evaluate the efficacy of CIBENZA® DP100 supplementation in a diet containing alternative feed ingredients in finisher pigs weighing 82-130 kg (Escobar et al., 2013). A typical corn-soybean meal based diet (85% corn, 13% SBM) served as a positive control. A negative control diet containing 56% wheat, 30% DDGS, 10% corn and 1% MBM was formulated to contain an equal amount of available nutrients as the positive control. The negative control diet was supplemented with 500 g/ton of CIBENZA® DP100 (Alt+Cib) and a carbohydrase mixture. The diet containing alternative ingredients and CIBENZA® DP100 had a significant cost-saving effect, approximately 6.7%, compared to the positive control. Furthermore, feeding cost per pig of the alternative formulation with CIBENZA® DP100 was 8.6% lower ($P<0.005$) than the corn-soybean meal based positive control diet. Growth performance parameters of body weight (BW), average daily gain (ADG), and G:F for pigs fed diet with alternative ingredients + CIBENZA® DP100 and those fed corn-soybean meal based diets were not significantly different (Figure 3). Similarly, carcass characteristics including weight, lean content %, and loin depth were not different between the positive diet and the alternative formulation containing CIBENZA® DP100. In summary, inclusion of CIBENZA® DP100 to an alternative formulation improved growth performance.

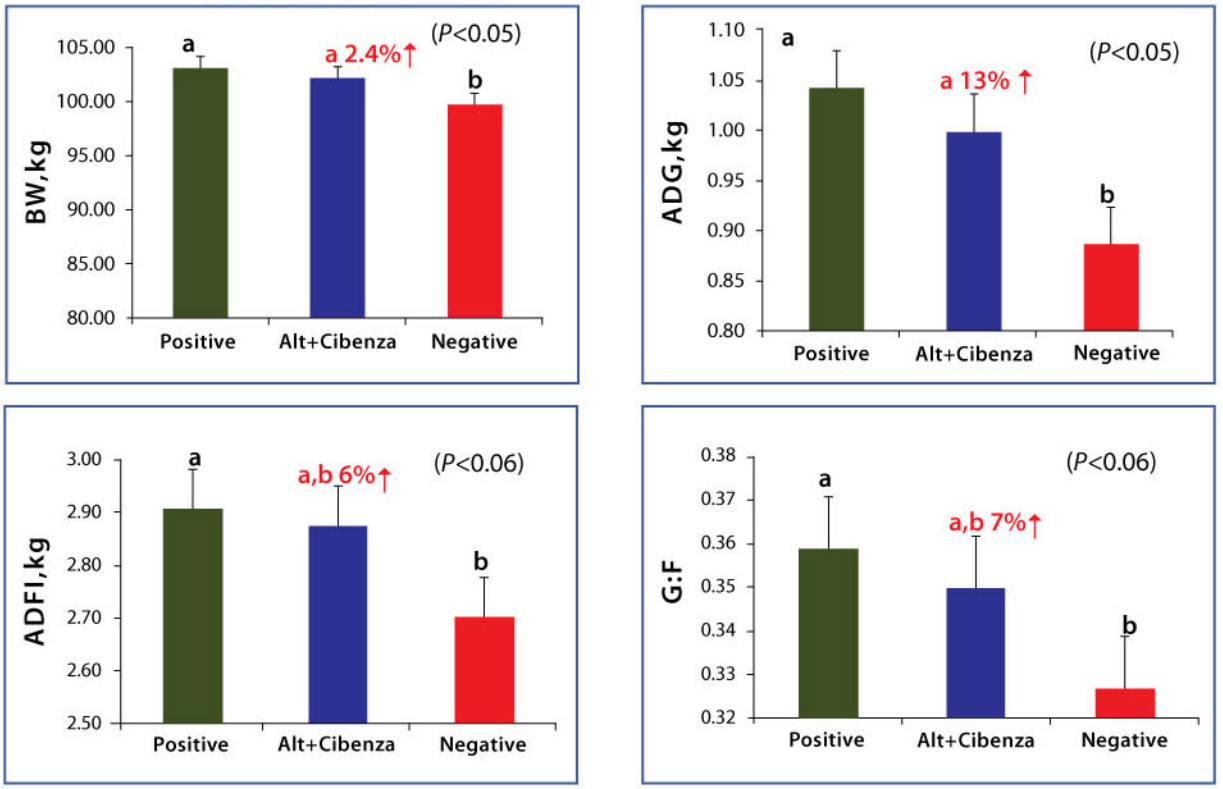

Figure 3. Effect of CIBENZA® DP100 supplementation on growth performance of finishing pigs fed alternative feed ingredients compared to typical corn-soybean meal diet.

Feed Cost Saving Using CIBENZA® DP100

CIBENZA® DP100 is used to increase the efficiency of protein digestion and release of amino acids. This allows producers to reduce the overall protein and amino acid content of the diet with no adverse effects on growth performance of pigs while saving, in an average, around 3 USD (RM 9.15) per ton of feed. Inclusion of CIBENZA® DP100 in swine diets that contain high levels of alternative ingredients with low amino acid digestibility have resulted in growth performance rates comparable to those of a corn-soybean meal diet at a lower cost.

Summary

CIBENZA® DP100 is a science-based solution from Novus used to effectively reduce feed costs in pigs. Some strategies include:

1) Reformulating the diet to reduce protein and amino acid content.

2) Using higher levels of alternative feed ingredients in feed formulations.

3) Using a combination of both of the above strategies.

Whichever approach you use, there is no sacrifice on the growth performance of the pigs. Using CIBENZA® DP100 is an extremely cost-effective strategy.

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1) Escobar, J., Y. Ma, N. Odetallah and M. A. Vazquez-Anon. 2013. American Society of Animal Science Midwestern Section Midwestern Branch Annual Meeting, Des Moines, IA, USA.

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ISSUE 4 / 2012
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Can We Substitute Avilamycin by A Non Medicated Solution in Broiler Production ?

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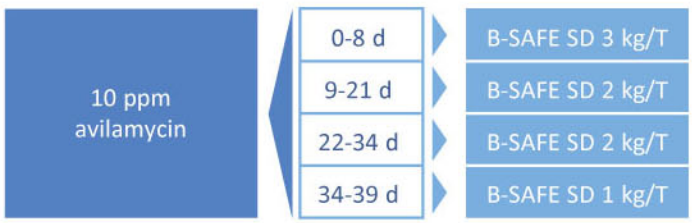
Introduction

Antibiotics have been used for decades in broiler chicken production for their gut microflora regulation effect, resulting in growth promotion. Governments and consumers are more and more aware of damageable consequences of in routine use of antibiotics and as a consequence, there is a growing need for farmers to find alternatives without loosing profitability. In this context, a patented activated clay, commercially named B-Safe, was compared to avilamycin in a field study.

Material and methods

468 000 broilers – ROSS 308

CONTROLS	TEST
12 buildings	12 buildings
x 19 500 broilers	x 19 500 broilers

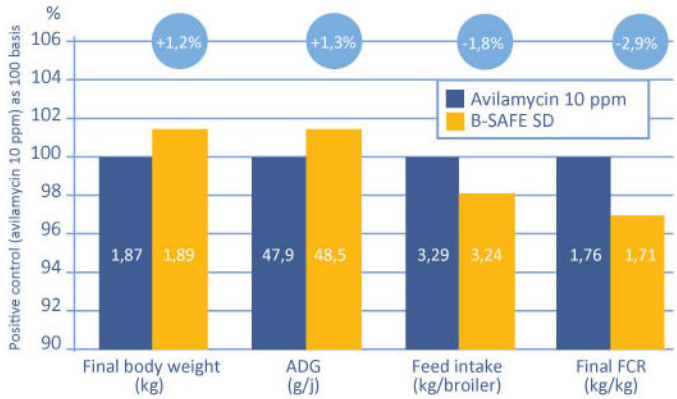


The following data were registered :

- global feed intake, final body weight, feed conversion ratio, mortality
- intestinal integrity at 28 and 35 days of age (HTSI methodology-Elanco).

Results

Effect of B-SAFE SD
on performances at 39 days



Regarding intestinal integrity, avilamycin and B-Safe groups were very similar ; they respectively obtained a score of 86.6 and 86.0 at 28 days and of 89.2 and 89.2 at 35 days.

Mortality was similar between avilamycin and B-Safe groups, respectively 4.8% and 4.5%. Animals receiving B-Safe consumed a little less feed (- 1.8%) but had a slightly better growth (+1.3%) because of a better feed conversion (- 2.9%) compared to animals receiving avilamycin.

Conclusion

In the conditions of this large-scale study, B-Safe enabled similar or slightly better zootechnical performances and intestinal integrity than avilamycin. Moreover profitability was even improved for the integrator (+0.016€/bird=RM0.77/bird). As a consequence, B-Safe can be considered as a promising alternative to avilamycin for broiler production.

Effects of A Patented Activated Clay on Laying Hens Performances

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Introduction

With the increase of microbes resistance, the use of antibiotics as growth promoters is decreasing worldwide. As a consequence, there is a need for alternative products able to maintain production performances without antibiotics. In this contrext, a trial was conducted on laying hens to evaluate the effects of a patented activated clay (B-Safe)

Material and methods

A – negative control	B – positive control	C – test diet
No antibiotic – no feed additive	A + 50ppm zinc bacitracin	A + B-SAFE (2kg/T)
Per group: 60 Bovans hens in collective cages		

The performances were recorded during 8 weeks, between 52 and 59 weeks of production. The following data were registered :

- number of eggs produced, average eggs weight, number of downgraded eggs
- daily feed consumption, feed conversion ratio

All data were subjected to analysis of variance procedure with diet, time and cage nested in diet as the 3 fixed factors of the model. Statistically different means were separated using Duncan's multiple range tests ($p< 0.05$).

Results

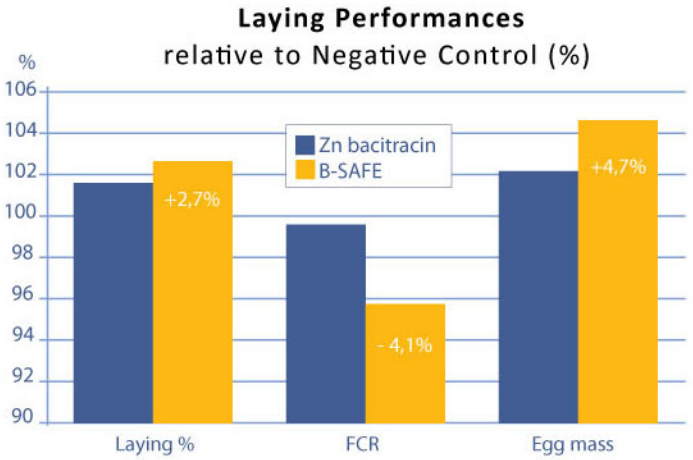
B-Safe significantly improved laying percentage (+ 2.7 %, $p<0.05$), average egg weight (+1.7%, $p<0.001$) and feed conversion ratio (-4.1%, $p<0.001$) in comparison with the negative control. The egg mass was improved by 4.7% ($p<0.001$).

Zinc bacitracin also improved performances in comparison with the negative control non significantly except for the average egg weight (+0.8%, $p<0.001$) and the egg mass (+2.4%, $p<0.001$).

No significant difference was observed on the number of downgraded eggs with any of the diets.

	LP (%)	AEW (g)	DFI (g/d)	FCR (g/g)	EM (g/d)
Neg. control	84.7b	63.2c	116.1b	2.17b	53.5c
Pos. control	86.0ab	63.7b	118.2b	2.16b	54.8b
B-SAFE	87.0a	64.3a	115.9a	2.08a	56.0a
Sign. (p<)	<0.05	<0.001	<0.001	<0.001	<0.001
St. Dev.	4.68	1.22	4.72	0.13	3.02

LP% : Laying percentage, AEW : Average Egg Weight, DFI : Daily Feed Intake, FCR : Feed Conversion Ratio, EM : Egg Mass



Conclusion

In the conditions of the trial, B-Safe significantly improved layers performance in comparison with the negative control. Performances obtained on the B-Safe group were also higher than those obtained on the zinc bacitracin group. As a consequence, B-Safe can be considered as an efficient solution to improve egg production.

IPEX 2012, Pakistan

Again another year flew by... Exhibitions and seminars were again a big part of our year long journey. Through these exhibitions and seminars, it was great to meet old and new clients, friends and of course not forgetting updating our networks.

One of the main exhibitions that I have participated in this year was the IPEX 2012 exhibition, which was held in Lahore, Pakistan from 28th to 30th September 2012. As usual, we only have one main aim of attending the exhibition, which is to promote our company as well as our products, which has no doubt a success in the recent years.

In the exhibition, not only that we get to widen out company's networking with people from all around Pakistan in various fields, our main purpose would be to assist our clients as well as promoting our products. Through this way, we are able to find more customers, to sell our products.

People from near and far attended the exhibition. They were of all professions such as veterinarians, nutritionists, farm consultants, integrators and etc. It was a very successful exhibition as there were many people who came and we managed to exchange information with them. More importantly, we got the opportunity to share our products to many of them.

The upcoming events in the coming year are to organize seminars in different provinces in Pakistan for products sharing and promoting to the local livestock industry. We hope to reach out to more people of our kind. Again, we will do our very best and bring out the best of the coming year ahead.

As we now move to another new chapter, I wish you all a blessed year ahead. - YH Gan

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CIBENZA® DP100

CIBENZA® DP100:添加蛋白酶以改善猪只蛋白质消化率和减低饲料成本

Rungcharoen P., Court S. and Escobar J.
Novus International Co., Ltd （泰国）

CIBENZA® DP100

CIBENZA® DP100是一种热稳定的蛋白酶饲料添加剂，生产于*Bacillus licheniformis* PWD-1，可水解酪蛋白，胶原蛋白，高粱醇溶蛋白，弹性蛋白，面筋和其它几种蛋白，如含胱氨酸二硫键的角蛋白。

同样的成分，更多的营养

在猪饲料中，大部分的粗蛋白源自可有效地被奶猪利用（约90%）的黄豆粕。因此，玉米－黄豆日粮的可消化率也被认为是高的（约85%）。然而，由于仔猪在早期阶段含低量的内源酶，饲料中多种的蛋白质复合物可能不容易被消化。此外，高价的黄豆粕促使生产者寻找较便宜的替代饲料原料，如羽毛粉，肉骨粉，菜籽粕，椰子粕，甚至玉米酒粕(DDGS)。某些原料可能比黄豆粕含更高的蛋白质（如羽毛粉），这种原料的消化率却比黄豆粕低，因此，必须添加外源蛋白酶。

饲料原料和蛋白水解酶

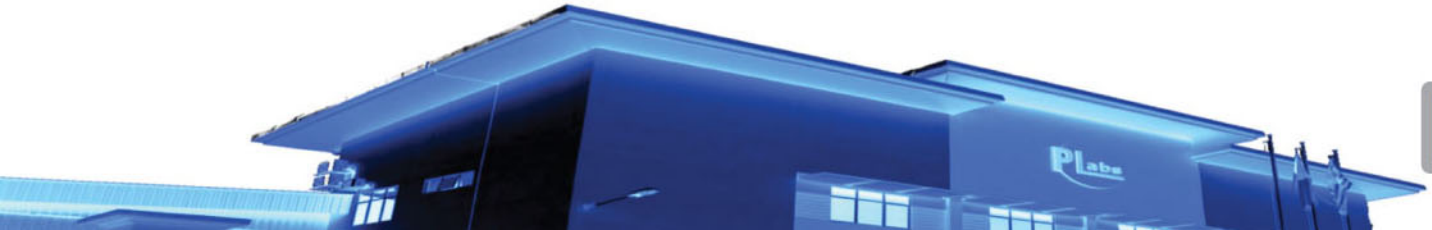
Novus进行了一些体外研究，以测量CIBENZA® DP100对不同饲料原料的蛋白质消化率之改善，包括替代蛋白源（图一）。体外蛋白质消化率的改善，平均约为7.5%。

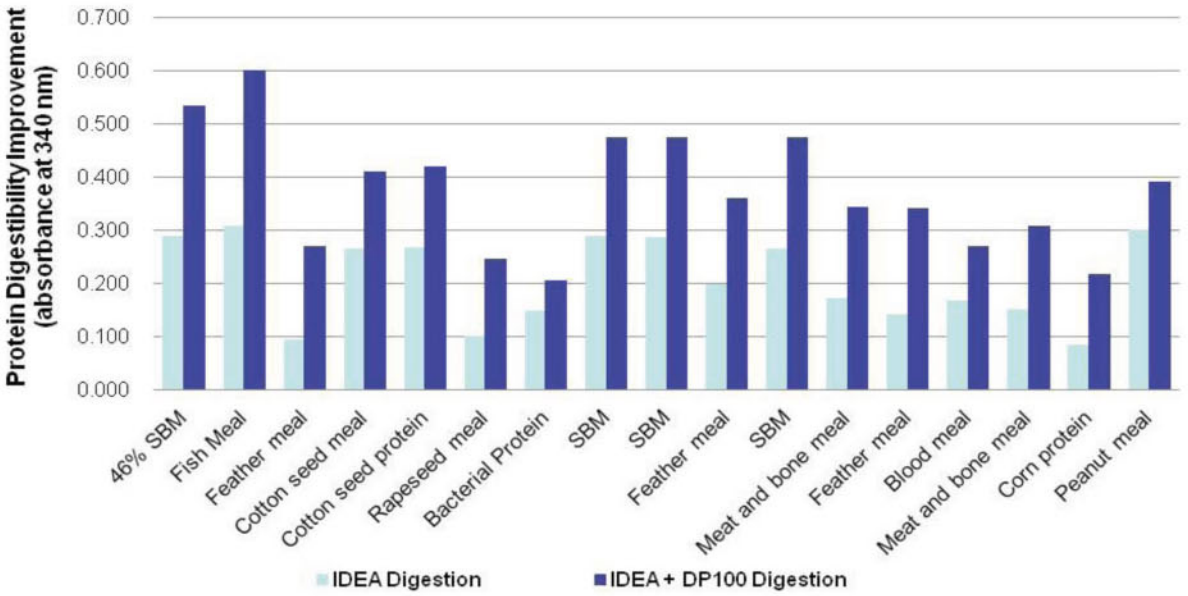
CIBENZA® DP100改善猪只粗蛋白和氨基酸消化率

已发表的结果显示，在玉米-黄豆粕基础日粮中添加500克/吨的CIBENZA® DP100可显著地提高奶猪蛋白质的消化率(Wang *et al.*, 2011a)和生长猪的氨基酸消化率(Wang *et al.*, 2011a)，平均显著地提高粗蛋白(+3.2%点) 和必需氨基酸(+3.1%点)的消化率。喂饲猪只添加500克/吨的CIBENZA® DP100于缺乏离氨酸之玉米-黄豆粕基础日粮可提高平均日增重3.4%（图二，Harrell *et al.*, 2012），这显示CIBENZA®DP100增加蛋白质和氨基酸的消化率。最重要的是，猪只可以使用额外的氨基酸，以提高生长性能。

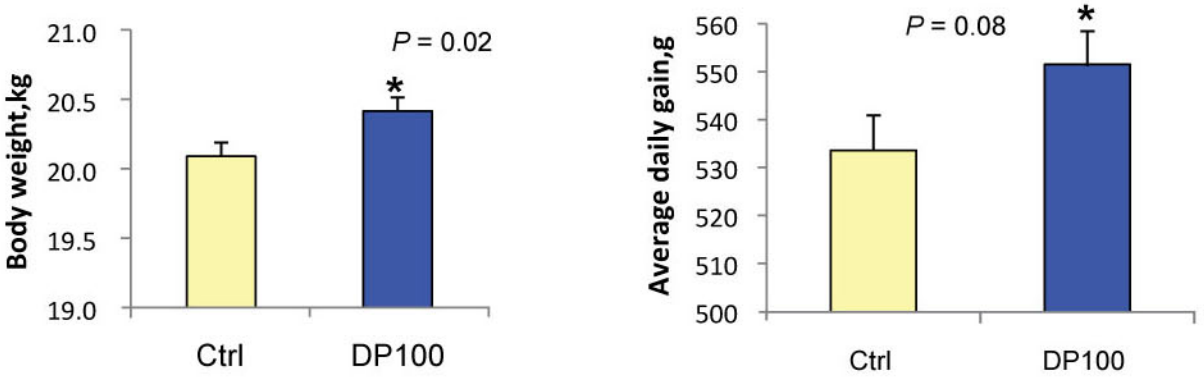
CIBENZA® DP100改善猪只肠道健康

在回肠末端不被消化的蛋白质会到达猪的后肠，细菌发酵会产生氨，从而导致较高的pH值。蛋白质发酵的增加和后肠食糜的pH值升高，与致病细菌的增殖有关。奶猪饲料中添加CIBENZA® DP100可显著地降低在回肠、盲肠和结肠食糜中的氨，伴随着降低食糜的pH值和改进的粪便评分(Wang *et al.*, 2011a)。在盲肠和结肠中的大肠杆菌(*E.coli*)也显著地减少，乳酸菌(lactobacilli)却增加。这些结果表明CIBENZA® DP100可以改善猪只肠道健康，有助于生长。





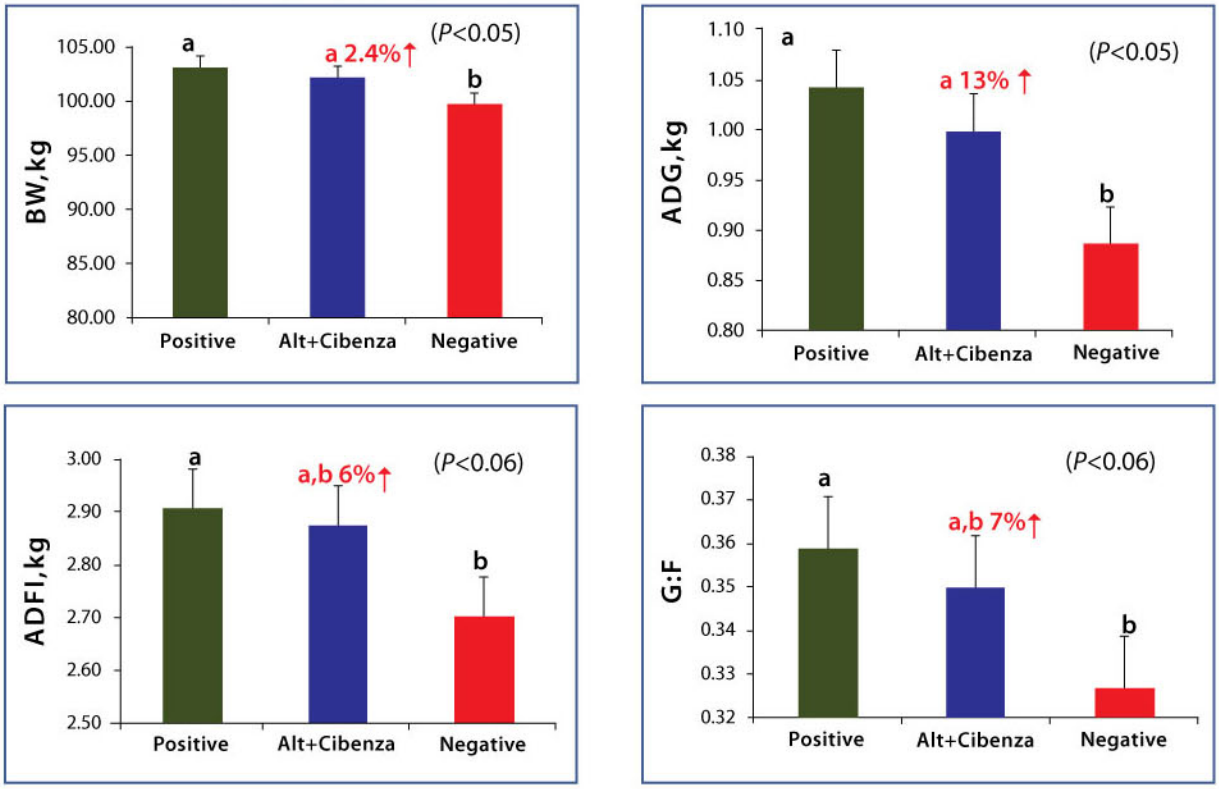
图一、CIBENZA® DP100提高不同原料之体外蛋白质分解率



图二、CIBENZA® DP100改善喂饲缺乏氨基酸玉米-黄豆粕基础日粮奶猪之生长性能

使用替代原料以降低饲料成本

Escobar *et al.* (2013)评估添加CIBENZA® DP100于含替代原料饲料中对82-130公斤肥育猪生长性能之影响。典型的玉米-黄豆粕基础日粮（85%玉米，13%黄豆粕）作正对照组，含56%小麦、30% DDGS、10%玉米和1%肉骨粉作为负对照组，与正对照组有同等的有效养分。在负对照组中添加500克/吨CIBENZA® DP100 (Alt+Cib)和糖酶混合物。与正对照组相比，含替代原料和CIBENZA® DP100的饲料有显著的成本节约效应，约6.7%。此外，另一个含CIBENZA® DP100的配方比正对照组的玉米-黄豆粕基础日粮每头猪饲料成本减少8.6% (P <0.005)。喂饲替代原料+ CIBENZA® DP100猪只的体重(BW)，平均日增重(ADG)和饲料效率(G:F)和喂饲玉米-黄豆粕基础日粮的猪只没有显著差异（图三）。同样的，两组之间的屠体特性包括体重，瘦肉率%和腰眼深度也没有差异。总之，在含替代原料配方中添加CIBENZA® DP100可改善生长性能。



图三、与喂饲典型玉米-黄豆粕基础日粮的猪只相比，在含替代原料饲料中添加CIBENZA® DP100对肥育猪生长性能之影响。

使用CIBENZA® DP100节约饲料成本

CIBENZA® DP100可提高蛋白质消化率和氨基酸的释放。这促使业者在不影响猪只生长性能的状况下降低饲料中整体的蛋白质和氨基酸含量，同时每吨饲料节省平均大约3美金（9.15零吉）。喂饲猪只含低氨基酸消化率之高量替代原料饲料中添加CIBENZA® DP100之生长性能与喂饲玉米-黄豆粕基础日粮的猪只相同，但是成本价格较低。

结论

CIBENZA® DP100是Novus以科学为基础的解决方案，可有效地降低猪饲料成本。一些策略包括：

1) 调整配方，减少蛋白质和氨基酸含量。
2) 在饲料配方中使用较高量的替代原料。
3) 使用上述的两种策略组合。

无论使用哪一种方案，并没有影响猪只生长性能，使用CIBENZA® DP100是一个极具成本效益的策略。

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我们是否能夠以非药性的方案替代阿维拉霉素(Avilamycin)生产肉鸡?

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简介

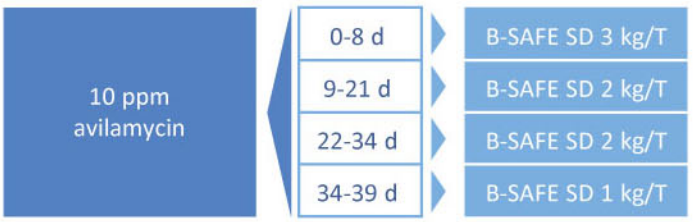
在这几十年以来，抗生素普遍使用于肉鸡生产，调节其肠道菌群，从而促进生长。政府机构和消费者意识到惯例使用抗生素所帶來的负面后果；因此，在不影响盈利的状况下，农民寻找替代品的需求不断地增长。这篇文章主要是在现场的状况下，以B-Safe，一种已取得专利的活性黏土和阿维拉霉素(avilamycin)相比，对肉鸡生产性能之影响。

材料与方法

468 000 肉鸡– **ROSS 308**

对照组
12畜舍
x 19 500肉鸡

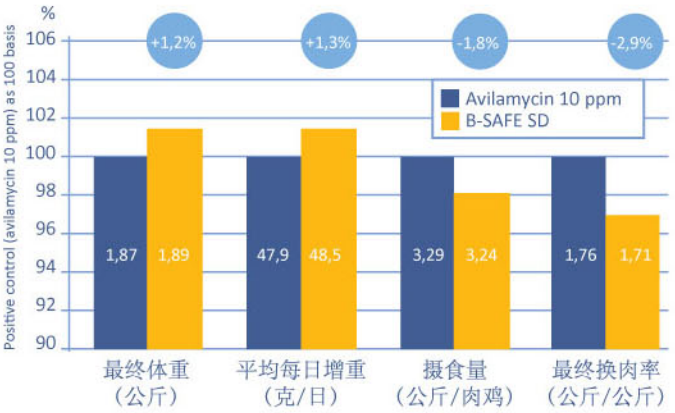
处理
12畜舍
x 19 500肉鸡



收集的数据包括:
-摄食量、最终体重、换肉率、死亡率
-在28和35日龄检测肠道的完整性（HTSI方法-Elanco）

结果

B-safe SD
对于39日龄肉鸡生长性能之影响



关于肠道的完整性，阿维拉霉素(avilamycin)和B-Safe组的结果非常相似；在28日龄，他们分别获得86.6和86.0分，35日龄为89.2和89.2分。阿维拉霉素(avilamycin)和B-Safe组的死亡率的结果也相似，分别为4.8%和4.5%。 喂饲B-Safe的动物摄取较少的饲料(-1.8%)，但有稍微较好生长(+1.3%)，因为与喂饲阿维拉霉素(avilamycin)的肉鸡相比，B-Safe组的肉鸡有较好的换肉率(-2.9%)。

结论

在这种大型的研究条件下，B-safe和阿维拉霉素(avilamycin)相比，可提供相似或者略好的生长性能和肠道的完整性。此外，也提高了生产者的盈利（+0.016€/只 = +马币0.077/只）。因此，对于肉鸡生产，B-safe可替代阿维拉霉素(avilamycin)。

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活性黏土对于蛋鸡生产性能之影响

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简介

随着微生物耐药性的增加，全球以抗生素作为生长促进剂的使用逐渐减少。因此，有必要寻找适当的替代产品，在无抗生素的状况下，维持生产性能，这篇文章主要是在报导试验使用一种已取得专利的活性黏土(B-Safe)对于蛋鸡生产性能之影响。

材料与方法

A-负对照组	B-正对照组	C-处理组
无抗生素 - 无饲料添加剂	A + 50 ppm锌枯草杆菌素 (zinc bacitracin)	A + B - Safe (2公斤/吨)
每组有60只Bovans蛋鸡		

记录8周的产蛋性能（52至59周龄）
收集的数据包括：
产蛋量、平均蛋重、降级蛋的数量
每日摄食量、换肉率

所有的数据以饲料，时间和笼子为模型的三个固定因素进行变异数程式分析，各处理间的差异显著性由邓肯氏多变域测验检测($p < 0.05$)。

结果

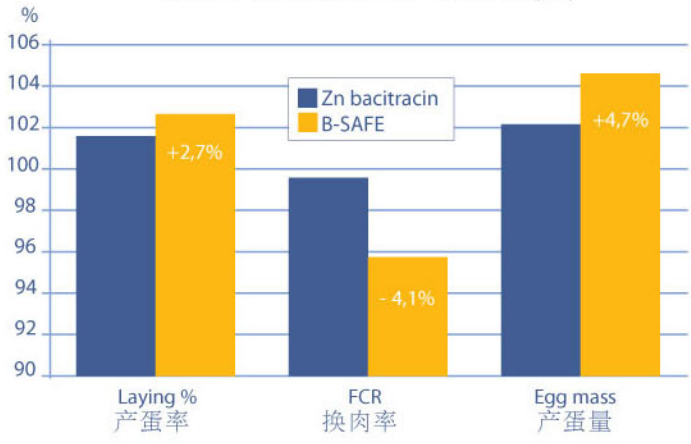
与负对照组相比，B-Safe显著地改善产蛋率(+2.7%, $p<0.05$)，平均蛋重(+1.7%, $p<0.001$)和换肉率(-4.1%, $p<0.001$)。产蛋量也改善4.7% ($p<0.001$)。

除了平均蛋重(+0.8%, $p<0.001$)和产蛋量(+2.4%, $p<0.001$)，与负对照组相比，锌枯草杆菌素(zinc bacitracin)对于产蛋性能的改善并不显著。

各处理组之间的降级蛋数量并没有显著差异。

	产蛋率	平均蛋重	每日摄食量（克/日）	换肉率（克/日）	产蛋量（克/日）
负对照组	84.7b	63.2c	116.1b	2.17b	53.5c
正对照组	86.0ab	63.7b	118.2a	2.16b	54.8b
B-SAFE	87.0a	64.3a	115.9b	2.08a	56.0a
显著性	<0.05	<0.001	<0.001	<0.001	<0.001
标准偏差	4.68	1.22	4.72	0.13	3.02

相对于负对照组之产蛋性能(%)



结论

实验结果显示B-Safe较负对照组可显著地改善产蛋性能。B-Safe组的产蛋性能也高于锌枯草杆菌素(zinc bacitracin)组。因此，B-Safe可有效地替代锌枯草杆菌素(zinc bacitracin)，改善产蛋率。

IPEX 2012，巴基斯坦

今年又快结束了...展览会和研讨会在开发外国市场中扮演着重要的角色。通过这些展览会和研讨会，我们不仅可以和现有的客户及朋友们见面，当然也强化了人际网络。

我们在2012年9月28日至30日，参与了今年主要的展览会之一，那就是在巴基斯坦拉合尔举行的IPEX 2012展览会。像往常一样，我们的主要目的就是推广我们的公司以及产品，毫无疑问的是这近几年有所成就的。

在展览会上，我们不仅可以把公司推广于在巴基斯坦各领域的人，主要的还是协助现有的客户以及推广我们的产品。通过这种方式，我们能够找到更多的客户来销售我们的产品。

来参加此展览会的人包括兽医师，营养师，农场顾问，饲料厂商等。这是一个非常成功的展览会，因为那是一个给我们可以和他们有资讯交流的平台，而更重要的是我们可以借此机会向他们推销我们的产品。

在新的一年里，我们即将在巴基斯坦不同的省区举办研讨会，推销产品给当地的畜牧行业者。

希望在来临的一年里，我们可以做得更好，也在此祝福大家。- 颜诒豪