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CHR. HANSEN
Improving food & health

The Benefits of Modulating Poultry Gut Microbiota with Probiotic at Early Stage

By Ee Teik, Lee, Chr-Hansen, Regional Technical Sales Manager, APAC

In recent years, knowledge about poultry gut microbiome has increased tremendously in poultry industry. There is much research leading to the conclusion that gut microbiome has an unbelievable impact on gut health, immune system and nutrient digestibility and uptake. Microbiome stability defined as the optimal robustness over time between the beneficial bacteria and the pathogenic or non-beneficial bacteria in the intestinal tract of the birds.

Gut microbiome stability is regarded as a metabolic powerhouse that provides the host with wide range of enzymes and substrates required for growth. Gut microbiome stability plays a role in modulating the immune system, competitive exclusion of pathogens and optimising the villi integrity and its barrier function.

The first week of broiler is defined as the 'window opportunity' which has short and long terms effects on the overall health and development of birds. Chicks undergo significant physiological transitions after hatch where immaturity of immune system and intestinal system.

This first inoculum is very important because it impacts the further gut microbiome stability in term of functional gut development, immunomodulation and then to optimizing the peak potential of flock performance.

At early stage, a chick will be facing many challenges to seeding with beneficial bacteria from environment. Any bacteria present in the environment of the day-old birds is likely to be present in the gut of the chick.

Probiotic plays a key role in priming of gut microbiota under this situation and its paves the way to the establishment of a well-balanced, well-functioning and highly diverse microbiota. The early priming and colonization is the first strategic component of the microbiome stability throughout the cycle.

In conclusion, early priming with probiotic able to modulate the immune response to the ratio CD4/CD8 and increase the number of goblet cell (Journal of Poultry Science 11(10): 630-634). In addition to that, the ratio of villous: crypt increased numerically (+16%) which showing a better digestive capacity of small intestine.

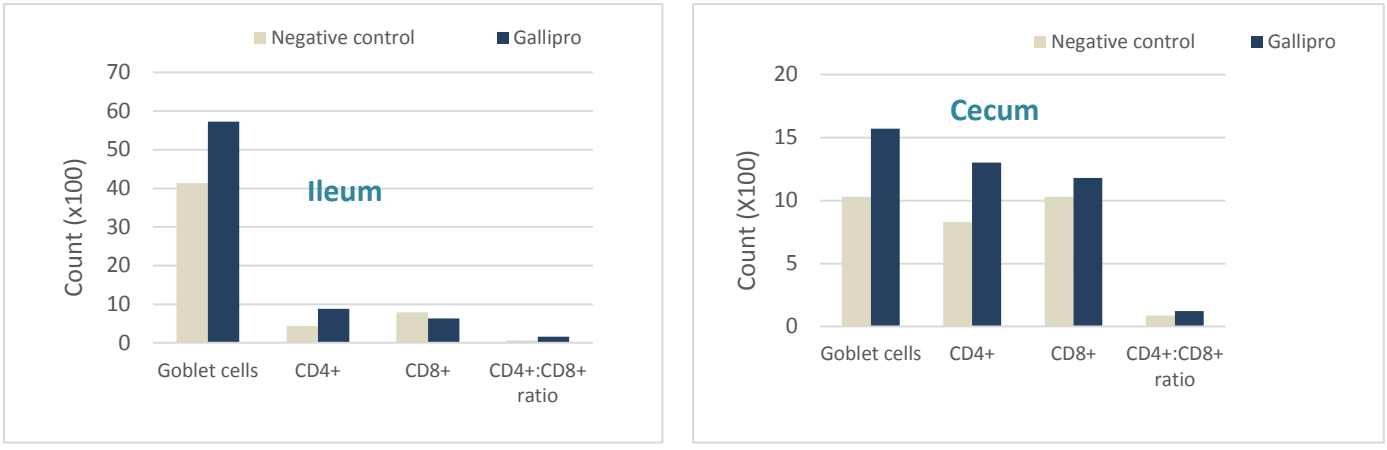


Figure 1. Goblet, CD4+ and CD8+ cell counts per field and CD4+:CD8+ ratio in ileum and cecum from broilers at 7 days of age.

GalliPro® interfere with the innate immune response in increasing significantly goblet cells and CD4+ cell counts in ileum and cecum. A high CD4: CD8 ratio are related to a well functioning immune system .

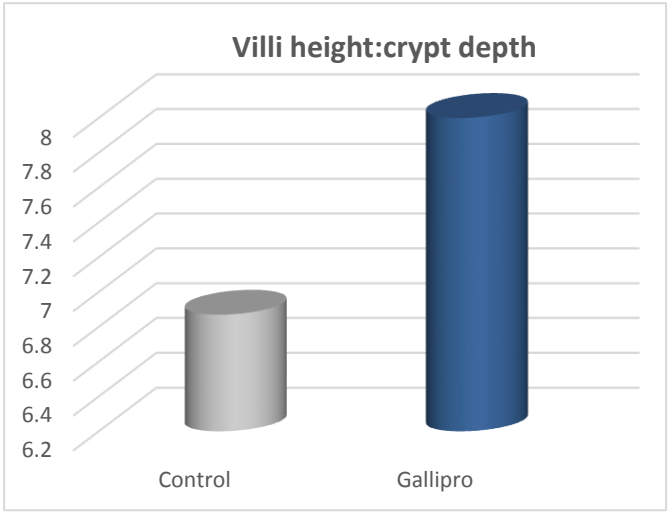


Figure 2. Villi height: crypt depth

GalliPro® increased numerically villous : crypt ratio showing better digestive capacity of small intestine.

provimi

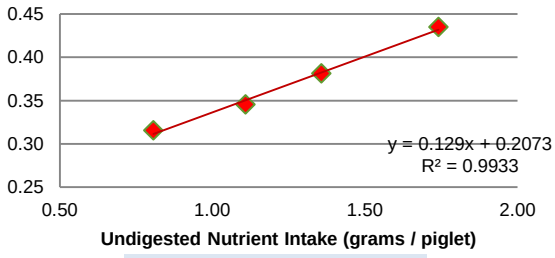
Provisoy: Enhance Piglets' Digestibility and Performance

Article adapted from Protein And Carbohydrate: Strategies To Improve Piglet Diet Digestibility by EDISON ROXAS, Regional Strategic Nutritionist, Provimi Southeast Asia, Livestock & Feed, May 2018

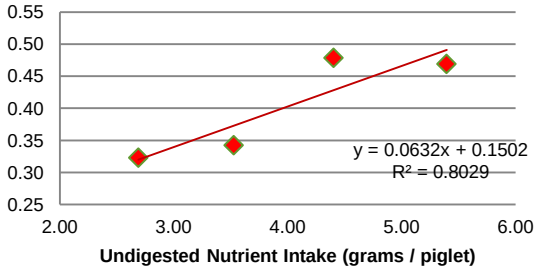
To maintain a strong performance into the grow-out stage, young pigs require good nutrient intake from birth. Often inadequate to sustain all piglets in the litter throughout lactation, sow's milk can be supplemented by creep feeding which helps stimulate the piglet's digestive enzymes. A good creep diet enables a smooth liquid-to-solid feed transition. Studies also show that exposing young animals to solid feed days before weaning creates more "eaters" (Sulabo et al., 2010). Poor digestion escalates the incidences of diarrhea in Figure 1, a direct correlation between stool score and undigested nutrient in feces.

Incidence of piglet diarrhea at 0-7 and 7-21 days post weaning (using visual scoring)

Data represents 3 different trials.
Diarrhea was scored with 1.
No diarrhea was scored as 0.
In the graphs all data is classified into 4 groups. Averages per class are plotted.



PHASE 1 (Day 0-7 p.w.)



PHASE 2 (Day 7-21 p.w.)

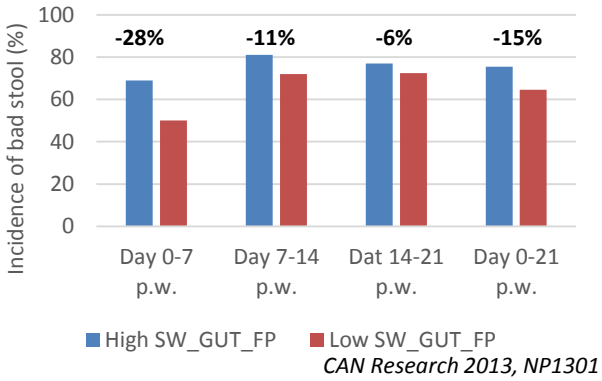
Although creep diets should contain high amounts of energy and nutrients, limited enzyme activities in the gut cannot fully digest these nutrients. Undigested nutrients are acted upon by enteric bacteria through fermentation. Diarrhea occurs when the villi secretes water to eject the bacteria, toxins and undigested feeds. Undigested nutrients in the ileal region triggers a feedback mechanism (ileal brake). The body interprets that the digesta would require more time to be digested; the ileal brake would slow its passage rate (Read et al., 1984; Spiller et al., 1984, 1988), thus hampering voluntary feed intake (Van Citters and Line, 1999). Thus, diets require carefully selected ingredients and special formulation strategies to prevent enteric bacteria from feeding on undigested nutrients.

Enhancing protein digestibility

A protein source's digestibility and quality influence gut health. Given the digesta's short transit time along the piglet's gut, protein sources must be easily digested. Undigested protein causes bacterial fermentation in the large intestine and the subsequent production of toxins metabolites, consequentially impacting the intestinal mucosa and shifting energy to ammonia excretion that could otherwise support growth. The insufficient gastric acid and protease activity give rise to undigested nutrients by the time the digesta reaches the hind gut. Cargill Animal Nutrition (CAN) addresses this issue with a nutrient called swine gut fermentable protein (SW_GUT_FP) when formulating piglet feed.

SW_GUT_FP exists in many ingredients (whey protein concentrate, 1.42%; fishmeal, 2.34%; and soybean meal, 3.66%). Figure 2 shows that a high SW_GUT_FP resulted in poor stool quality in the first week and first 3 weeks post weaning compared to a low SW_GUT_FP diet. Toxic metabolites damaged the gut integrity resulting in poor stool quality.

Figure 2. Effect of high vs low SW_GUT_FP on stool quality



CAN Research 2013, NP1301

Different protein sources based on villi characteristics can also affect piglet performance (the best protein source is milk as in Table 1).

Table 1. Protein sources and gut development

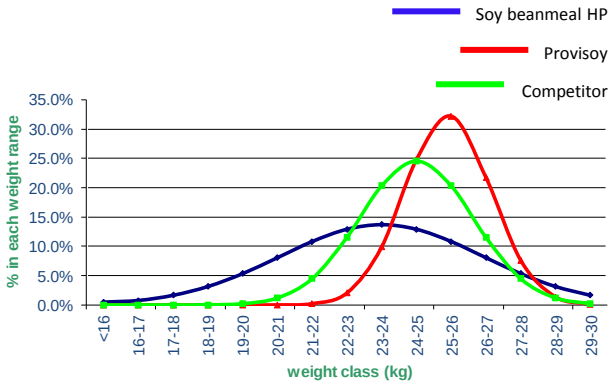
Parameter	Milk protein	Soybean meal	Soy protein concentrate	Provisoy
Villi Height (µm)	364	234	309	319
Crypt depth (µm)	198	222	214	196
ADG 0-14d (g/d)	326	182	208	227
FCR	0.99	1.38	1.14	1.09

Additionally, when considering protein plant sources, it is important to select processed ingredients which are absent of impurities and anti-nutritional factors that affect the piglet's gut. CAN's findings show that hydrothermally extruded soybean, Provisoy promotes higher growth rate (Table 2) and uniformity (Figure 3) in weaned piglets.

Table 2. Customer trials in Korea, 2016

	(33 - 47 days of age)		(46 - 60 days of age)	
Parameters	**Control (SBM)**	**Provisoy 4%**	**Control (SBM)**	**Provisoy 4%**
Initial Weight (kg)	9.35	9.34	12.27	12.23
Final Weight (kg)	12.89	13.28	19.10	20.04
ADG (g/day)	253	281 (+11%)	488	558 (+20.5%)
ADFI (g/day)	494	485 (-1.82%)	833	878 (+5.4%)
FCR	1.95	1.72 (-11.7%)	1.71	1.57 (-8.2%)

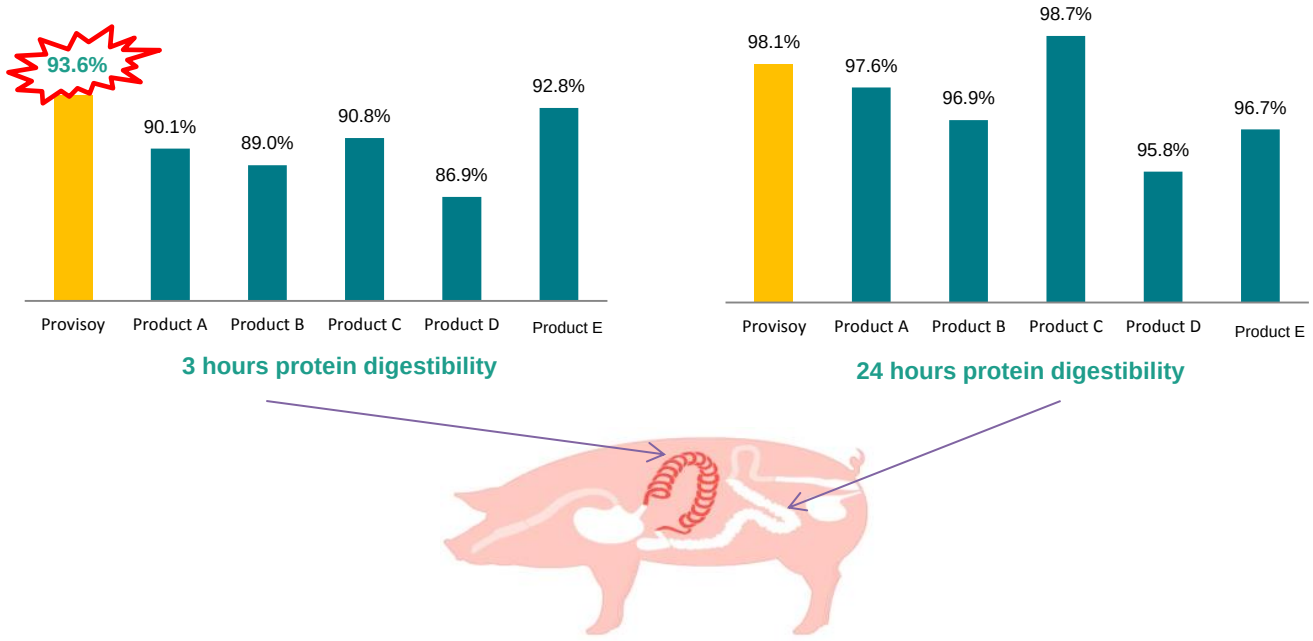
Figure 3. Effect of Provisoy on piglet uniformity



Source: Provimi Research

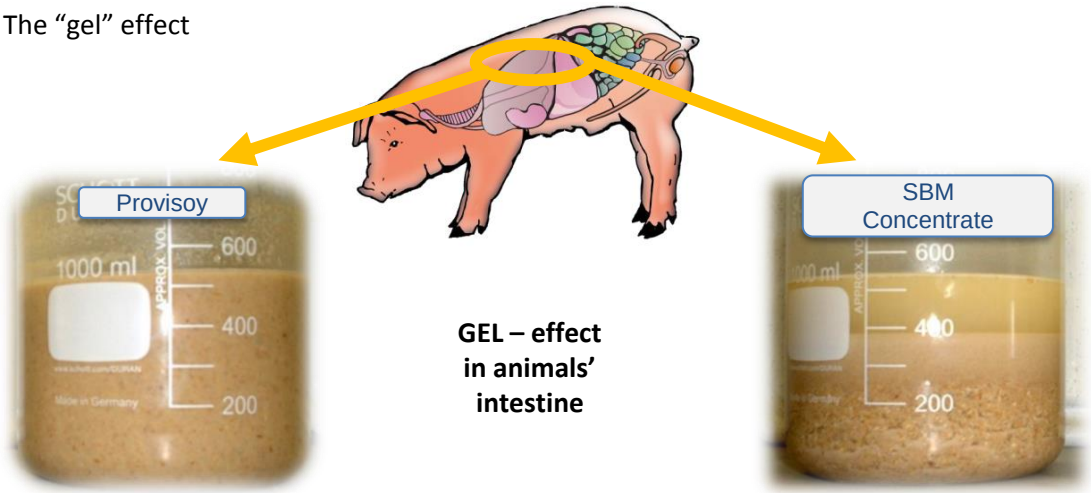
With a higher protein digestibility in the first 3 hours than other conventional protein sources (Figure 4), Provisoy improves piglet performance and gut health with less diarrhea problems.

Figure 4. 3 hr vs. 24 hr protein digestibility



Provisoy also works optimally with a gel effect in the stomach and small intestine that ensure homogenous distribution of enzymes. CAN recommends improving nutrient utilization through a comprehensive strategy in gut health and a good understanding of nutrients in feed ingredients (such as SW_GUT_FP) to help develop diets with better protein digestibility.

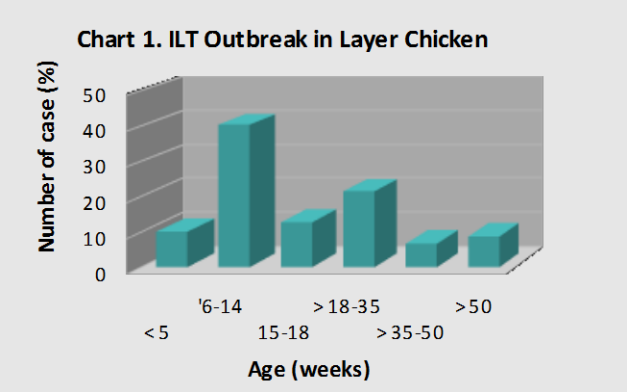
Figure 5. The "gel" effect



Successful Control of Infectious Laryngotracheitis (ILT) in Chicken

What is ILT ?

Infectious Laryngotracheitis (ILT) is a highly contagious, respiratory disease of chickens caused by Herpesvirus. The chickens is the primary natural host of ILT. ILT are more commonly found in layer than broilers. Although the disease affects all ages, the most characteristic signs are observed in chicken around 6-14 weeks old (Chart 1). ILT is spread from infected chickens to upper respiratory system and eyes of other chickens. Its virus can airborne for up to 500 meters (approximately 0.3 miles).



Source: Medion, 2017

The economic loss as a consequence of ILT that induced mortality and decreases egg production and similar losses likely occur in intensive poultry industries. No drug has been shown to be effective in reducing the severity of lesions or relieving disease signs. Controlling ILT with vaccination and high level of biosecurity may induce adequate protection before they become exposed.

The Effect of ILT Infection

- A mild drop in egg production (10-20%)
- Mild forms of the disease result in very low mortality (less than 2%)
- Severe forms result in variable mortality (5-70%), with an average mortality 10-20%
- High morbidity (50-100%)
- Chickens that have recovered from ILT may carry the virus and it can secrete the virus when the chickens are stressed

What is the Clinical Sign of ILT ?

Clinical signs generally appear 6-12 days following natural exposure. Characteristic clinical signs include nasal discharge and moist rales followed by coughing and gasping. Marked dyspnea and expectoration of blood-stained mucus is characteristic of severe epizootic forms of the disease. Clinicals signs associated with mild enzootic forms include unthriftiness, decreased egg production, watery eyes, conjunctivitis, swelling of infraorbital sinuses, persistant nasal discharge and hemorrhagic conjunctivitis. The course of the infection varies with the severity of lesions. Generally, most chicken recover in 10-14 days.

Clinical Findings and Macroscopic Lesions

Difficulty breathing, coughing and gasping

Watery eyes and conjunctivitis

Inflammation and plug of cheese-like material in larynx and trachea

Bloody mucous exudation in the tracheal lumen

How to Control ILT Infection ?

1. High Level of Biosecurity
ILT virus infectivity is readily inactivated outside the host chicken by disinfectants and warm temperatures. Carryover between successive flocks in a house can prevented by adequate clean up. Buildings and equipment should be washed and then sprayed with disinfectants.

2. ILT Vaccination
Vaccination has proven to be a satisfactory method for developing resistance in susceptible chicken population. Successful immunization against ILT was accomplished by application with eye drop. Eye drop administration is able to stimulate optimum antibody titer, higher than nose drop and cloaca swab administration.

Medivac ILT
Recommended to Prevent ILT Infection in Chickens

Stimulates Optimum Antibody
Medivac ILT is able to stimulates high level of antibody, 2 weeks post vaccination. Its high immunogenicity induces a long lasting protection until 9 weeks post vaccination

High Capability
Medivac ILT have a high capability to protect the chicken after challenged with a virulent strain of ILT virus.

Low Stress Post Vaccination Reaction
Medivac ILT administration causes low stress post vaccination reactions and will disappear at 9 days post vaccination.

The Vaccination Program
This program may be used as a general guide. It may be modified to suit certain condition.
For broilers or roosters:
- At the age of 2-3 weeks

For layers or breeders:
- In area with low risk of ILT outbreak, vaccination should be given at the age of 10-16 weeks
- In area with high risk of ILT outbreak, vaccination should be given at the age of 6-7 weeks and revaccination should be given at the age of 16-17 weeks

PeterLabs Staff Outing – Thistle Hotel Port Dickson

PeterLabs Holding Berhad has organized a company outing at Thistle Hotel Port Dickson, located about 65 km from our office. The beach resort event was held from 22 June till 24 June, 2018 with full board, team activities, BBQ and sightseeing.

The objectives were to instil leadership and to improve teamwork among participants who attended. All employees enjoyed the fun activities throughout the day held nearby the sandy beach. Employees enjoyed the buffet breakfast and lunch at the resort . During the BBQ dinner event, employees were entertained by a live music band, games and prize give away for the winners.

The outing was a huge success as all of them showed tremendous moral support . Employees are looking forward for the next annual event.

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早期使用益生菌以调节家禽肠道微生物组所带来的好处

By Ee Teik, Lee, Chr-Hansen, Regional Technical Sales Manager, APAC

近年来，关于家禽肠道微生物组的知识已经逐渐增加和进步。许多研究得出了结论，即肠道微生物组对肠道健康、免疫系统、营养物质的消化率和营养摄取方面，具有令人难以置信的影响。肠道微生物组的稳定性被定义为肠道中有益细菌与致病性或非有益细菌之间随着时间推移的最佳稳健性。

肠道微生物组的稳定性也被认为是一种代谢能源，为动物提供生长所需的各种酶和基本物质。此外，肠道微生物组的稳定性能帮助调节免疫系统、竞争性排除病原 和优化肠绒毛及其屏障保护功能。

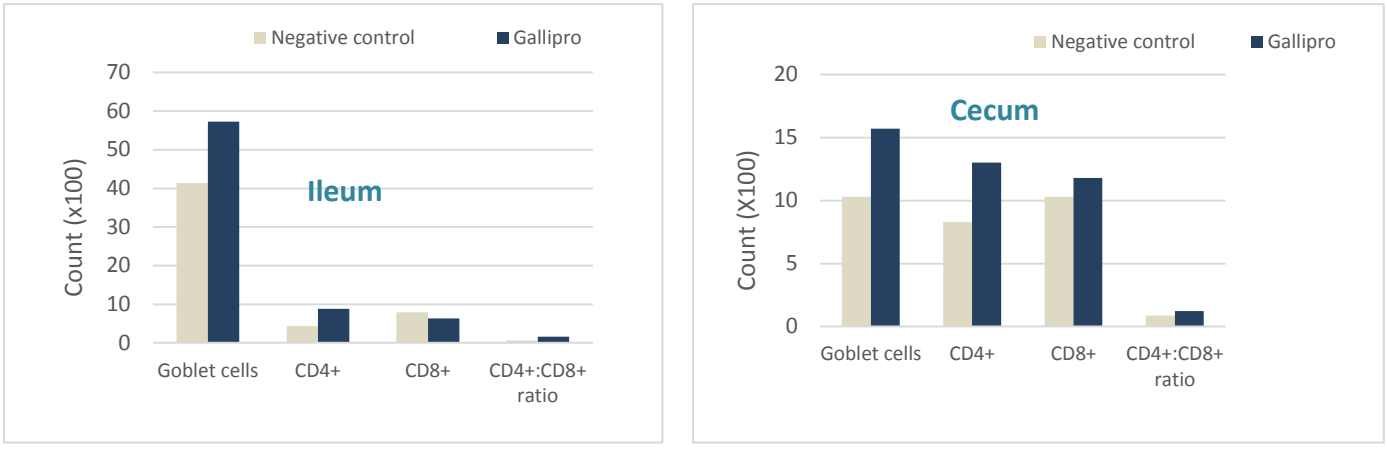
肉鸡的第一周是一个 “机会之窗”，因为第一周对鸡的整体健康和发育具有短期和长期的影响。小鸡孵化后，会经历显着的生理转变，其中免疫系统和肠道系统都还未成熟。

因此，第一个接种物非常重要，因为它将在功能性肠道发育和免疫调节方面影响日后肠道微生物组稳定性，然后优化鸡群成绩的峰值潜力。

此外，在早期阶段，小鸡要从环境中播种有益细菌时，将面临许多挑战，而且，存在于日龄小鸡环境中的任何细菌都有可能感染并存在于小鸡肠道中。

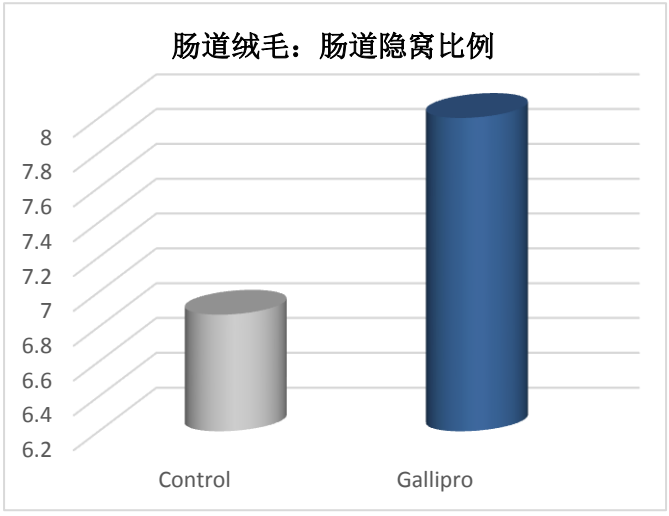
在这种情况下，益生菌发挥了关键作用，益生菌灌注好菌并调节肠道微生物群，也为建立均衡、功能良好及多样化的微生物群奠定了基础。因此，第一个重要战略是需要早期灌注和定植是整个养殖周期中微生物群组的稳定性。

总而言之，早期使用益生菌能够调节对 CD4 / CD8 比率的免疫反应， 也可以增加杯状细胞的数量（Journal of Poultry Science 11（10）：630-634）。除此之外，绒毛：隐窝的比例也会增加（+ 16％），这表明了小肠的消化能力更好。



图片 1 ： 七日龄肉鸡回肠和盲肠的杯状细胞，CD4+ 和 CD8+ 的数量及 CD4+ : CD8+ 比率

GalliPro® 增加回肠和盲肠中的杯状细胞和 CD4 + 细胞的数量，提升了先天免疫的反应。功能良好的免疫系统与高 CD4：CD8 比率息息相关。



图片2： 肠道绒毛: 肠道隐窝比例

GalliPro® 加绒毛：隐窝比例 ，表明了更好的肠道消化能力。

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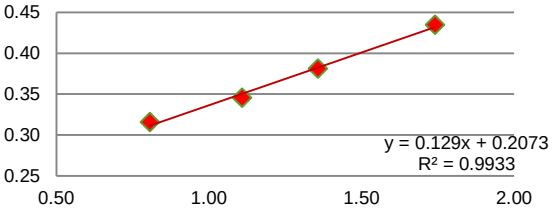
Provisoy：提高仔猪的消化率和生长性能

文章改编自 Protein And Carbohydrate: Strategies To Improve Piglet Diet Digestibility by EDISON ROXAS, Regional Strategic Nutritionist, Provimi Southeast Asia, Livestock & Feed, 2018年5月

为了维持良好的性能直到生长阶段，幼猪从出生就需要摄取良好的营养。在泌乳过程中，通常不足以维持整窝的仔猪，母猪的乳汁可以通过教槽饲料喂饲来补充，这有助于刺激仔猪的消化酶。 良好的教槽饲料可以实现顺畅的液体 - 固体饲料转换。 研究还表明，在断奶前喂饲幼小动物固体饲料会产生更多“食用者”（Sulabo 等，2010）。消化不良会增加下痢的发生率如图一，粪便评分与粪便中未消化的营养分之间的直接相关性。

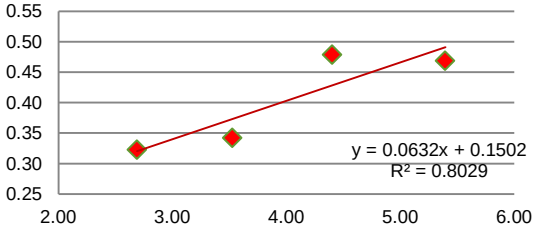
断奶后 0-7 和 7-21 天仔猪下痢的发生率（使用视觉评分）

数据代表 3 项不同的试验
下痢评分为 1，无下痢评分为 0。
在图中，所有数据分为 4 组，表明每组平均值。



未消化的营养分摄取量(克/小猪)

第一阶段（断奶后0-7天）



未消化的营养分摄取量(克/小猪)

第二阶段（断奶后7-21天）

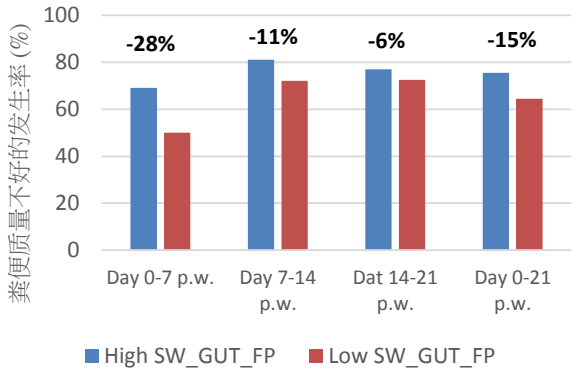
虽然教槽饲料中应含有大量的能量和营养，但肠道内有限的酶活性无法完全消化这些营养分。肠道细菌通过发酵对未消化的营养物质起作用。当绒毛分泌水分以排出细菌、毒素和未消化的饲料时，下痢就会发生。回肠中未消化的营养分触发反馈机制（回肠制动）。 身体解读消化物需要更多时间消化; 回肠制动会减缓其通过率（Read 等，1984; Spiller 等，1984, 1988），从而阻碍了自愿采食量（Van Citters 和 Line，1999）。因此，饲料需要精心挑选的原料和特殊的配方策略，以防止肠道细菌摄取未消化的营养分。

增强蛋白质消化率

蛋白质来源的消化率和质量会影响肠道健康。鉴于消化物沿着仔猪肠道的运输时间短，蛋白质来源必须易于消化。未消化的蛋白质导致大肠中的细菌发酵和随后毒素代谢物的产生，从而影响肠粘膜并将原本支持生长的能量转移至氨排泄。 当消化物到达后肠时，胃酸和蛋白酶活性的不足会产生未消化的营养分。 嘉吉动物营养（CAN）在配制仔猪饲料时使用一种叫做猪肠道可发酵蛋白（SW_GUT_FP）的营养分来解决这个问题。

SW_GUT_FP 存在于许多原料中（乳清蛋白浓缩物，1.42%；鱼粉，2.34%；和豆粕，3.66%）。 图二显示，与低 SW_GUT_FP 饲料相比，高 SW_GUT_FP 在断奶后第一周和前三周导致粪便质量差。 有毒代谢物破坏了肠道完整性，导致粪便质量差。

图二、在不同的断奶阶段，高和低 SW_GUT_FP 对粪便质量的影响



CAN Research 2013, NP1301

基于绒毛特征，不同的蛋白质来源也会影响仔猪的生产性能（最好的蛋白质来源是乳汁 - 见表一）。

表一、蛋白质来源和肠道发育

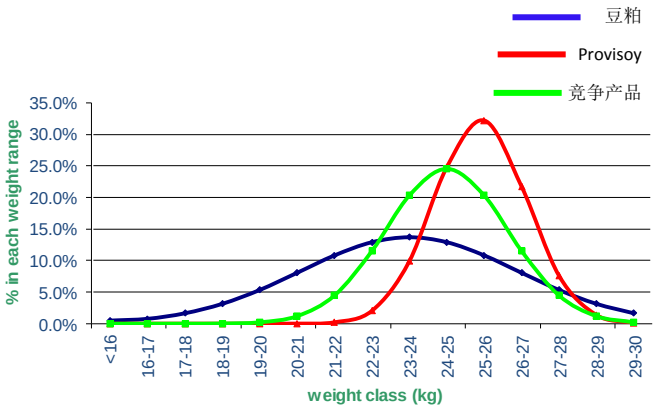
参数	乳蛋白质	豆粕	大豆浓缩蛋白	Provisoy
绒毛高度（μm）	364	234	309	319
隐窝深度（μm）	198	222	214	196
0-14天平均每日增重（克）	326	182	208	227
饲料转化率 FCR	0.99	1.38	1.14	1.09

此外，在考虑植物性蛋白质来源时，以不影响仔猪肠道，选择不含杂质成分和抗营养因子的原料是重要的。 CAN 的研究结果表明，热液挤压大豆 Provisoy 可以提高断奶仔猪的生长性能（表二）和均匀度（图三）。

表二、 2016 年韩国断奶仔猪试验

	33 - 47 日龄		46 - 60 日龄	
参数	对照（豆粕）	Provisoy 4%	对照（豆粕）	Provisoy 4%
初重（公斤）	9.35	9.34	12.27	12.23
最终重量（公斤）	12.89	13.28	19.10	20.04
平均每日增重（克）	253	281 (+11%)	488	558 (+20.5%)
平均每日采食量（克）	494	485 (-1.82%)	833	878 (+5.4%)
饲料转化率 FCR	1.95	1.72 (-11.7%)	1.71	1.57 (-8.2%)

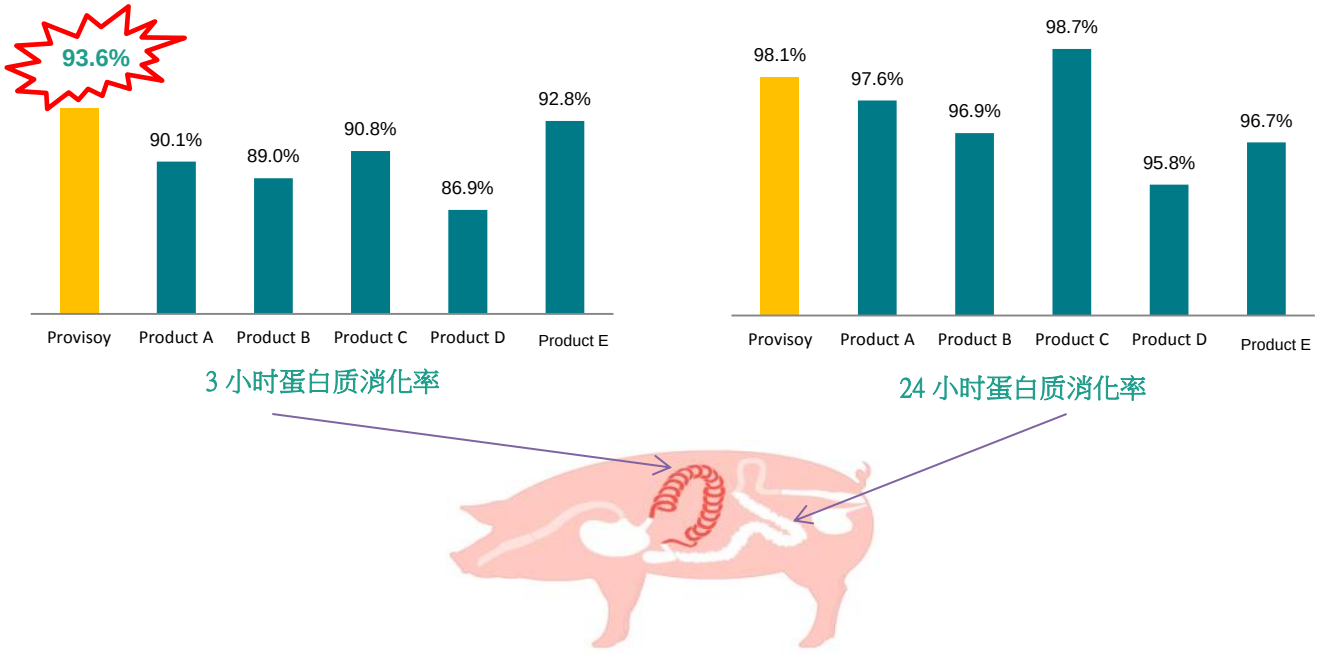
图三、 Provisoy 对仔猪均匀性的影响



来源：Provimi Research

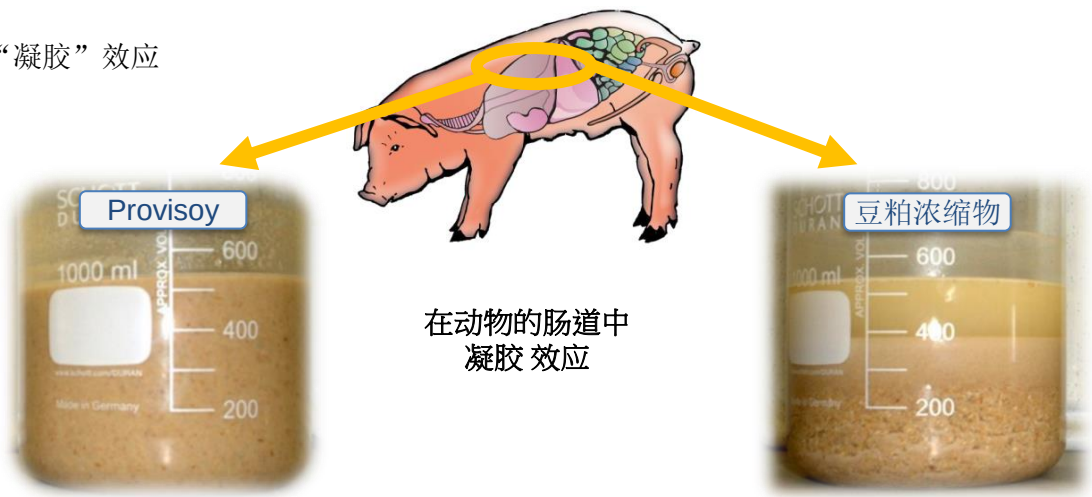
与其他传统蛋白质来源相比，Provisoy 的前 3 小时蛋白质消化率更高（图四），提高了仔猪的生产性能和肠道健康，减少了下痢问题。

图四、 3小时对 24 小时蛋白质消化率



Provisoy 还能在胃和小肠中发挥最佳的凝胶效应作用，确保酶均匀地分布（图五）。 CAN 建议通过全面性的肠道健康策略提高营养分的利用率和对原料营养分（如 SW_GUT_FP）的充分了解有助于开发具有更好蛋白质消化率的饲料。

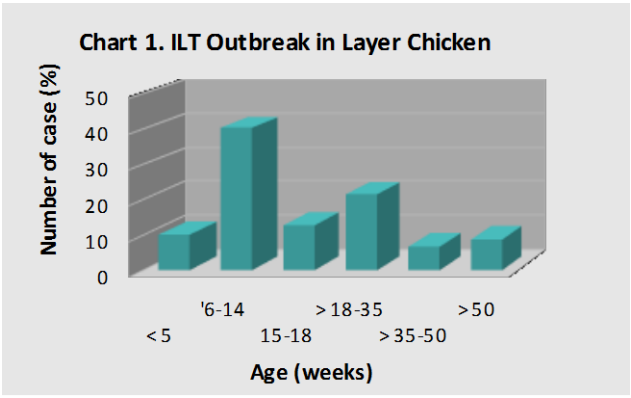
图五、“凝胶”效应



鸡只传染性喉气管炎 (ILT)管理之方针

什么是传染性喉气管炎 (ILT)?

传染性喉气管炎是由疱疹病毒引起的一种急性高度接触性呼吸道疾病。鸡只是 ILT 疾病主要的自然宿主，常发现在蛋鸡多於肉鸡。虽然 ILT 疾病可感染所有年龄的鸡群，但多数特征性症状常在 6-14 周龄的鸡群才能观察到（图表1）。ILT 病毒通过受感染的鸡群传播，并感染健康鸡群的呼吸道和眼部。该病毒可以通過空气传播长达 500 米（大约 0.3 英里）。



来源: Medion, 2017

ILT 促使蛋鸡产蛋量显著地下降和造成鸡只死亡，从而给养鸡戶造成经济损失，而密集养殖戶的损失更为巨大。至今没有药品能有效地降低病变的严重程度或缓解病症。然而通过 ILT 疫苗接种控制高水平的生物安全管理，能够帮助在发病前建立足够的保护。

ILT 感染的影响

- 产蛋率下降 （10-20 %）
- 溫和型发病死亡率低 （低於 2 %）
- 急性型 （发病死亡率差异大 （5-70 %）； 平均 10-20 %）
- 高发病率 （50-100 %）
- 康复的病鸡仍可附带病毒，並可传播於免疫力低的鸡群

ILT 疾病的临床症状?

自然感染的潜伏期为 6－12 天。本病的特征性症状为流涕和湿性锣音，随后出现咳嗽和喘气，严重的病例以明显的呼吸困难和咳出血样粘液为特征。溫和型病症较轻，鸡只多数无精打采，生长缓慢，产蛋下降，有结膜炎、眶下窦炎、鼻炎及气管炎。病程的长短以病变严重程度而异，一般 10-14 天後恢复。

临床症状与病变

呼吸困难，咳嗽和喘气

眼睛“水汪汪”的和结膜炎

喉部和气管中有乳酪状物质

血性粘液渗出气管腔

ILT 疾病的防治措施？

1。高水平的生物安全管理
ILT 病毒对外界环境的抵抗力不强，普遍的消毒剂也能有效的對抗该病毒。坚持严格的管理清洁和消毒饲养器具及鸡舍等防疫措施是防止此病传播的有效方法。

2。ILT 疫苗接种
疫苗接种已被确实可建立免疫力，並保护易感鸡群。最有效的接种方式为点眼。点眼方式接种疫苗后所产生的抗体力价远高过于滴鼻和泄殖腔棉试子的接种方式。

Medivac ILT
建议用於预防 ILT 感染

刺激最佳抗体
在接种 Medivac ILT 疫苗后2周， 能够达到高水平的抗体。 其高免疫能力可持久保护直至接种后 9 周。

高效力
Medivac ILT 接种后的鸡只在以 ILT 强毒株攻毒后具有更高的保护能力。

接种后低应激
Medivac ILT 接种后的应激反应低，并且在接种后 9 天将消失。

疫苗接种计划
该程序为建议指南， 可做修改以适合各别农场条件。

肉鸡:
- 2-3 周龄

蛋鸡和种鸡:
- 低风险区： 10-16 周龄接种
- 高风险区： 6-7 周龄接种； 16-17 周龄补强接种

PeterLabs 职员们的出游记 – Thistle Hotel Port Dickson

PeterLabs Holding Berhad 于 2018 年 6 月 22-24 日举办了公司职员出游记，到距离公司 65 公里处的 Thistle Hotel Port Dickson。职员们所参与的活动包括了一些团体游戏，烧烤会以及到一些附近的景点参观。

该项活动的宗旨主要为了提升职员的领导能力以及加强团队的合作精神。全体职员在风光名眉的沙滩上完成了全天候十分有趣的活动。在晚间的烧烤会上，随着知名乐队的伴奏，大家都沉醉在其中。此外，各种余兴节目穿插着幸运抽奖，更把晚宴带直另一个高潮。

此番的出游记在大家鼎立的支持下圆满的结束。大家都满怀期待着下一届的年度活动。