

FEED & LIVESTOCK

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- Inflammation: Causes, mechanisms and counteraction
- Are you managing your endotoxin risk?
- Boosting immunity transfer from gestating sows to piglets: The importance of colostrum quality

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เรียนท่านผู้อ่าน

Thailand's hog industry asks FDA to delay possible halquinol ban

SWINE INDUSTRY STAKEHOLDERS, including feed producers and veterinarians, are warning that chaos may result if halquinol is banned in March of this year.

Thailand's Food and Drug Administration has announced that halquinol's registration will be withdrawn due to incomplete data on the antibiotic's MRL in livers and kidneys, and added that it needs to further assess in vivo mutagenicity and potential carcinogenicity.

Halquinol is more commonly used now that colistin has been reserved for use on a treatment-only basis, and there are no alternative drugs with high efficacy.

Ampicillin, chloramphenicol, ciprofloxacin, gentamicin, streptomycin, sulfamethoxazole, and tetracycline all result in swiftly acquired *E. coli* resistance, leaving colistin and halquinol as the only antibiotics left that veterinarians can use when combating scours in piglets caused by *E. coli* and *Streptococcus suis*.

Swine producers have agreed to use colistin for treatments only when there are no other choices. However, they argue that halquinol, unlike colistin, is only used in food animals and then only in piglets within a 2-3 week span during the weaning period to manage scours.

The producers are calling on the FDA to retain the drug until a Joint FAO/WHO export committee on food additives (JECFA) releases its risk assessment report at the end of 2019.

An abrupt ban, they argue, will lead to hoarding and smuggling of illegal and substandard halquinol which could jeopardize food chain integrity.

Whatever the outcome, animal production models that rely on medication are not sustainable. The reality is that consumers and regulatory authorities are forcing food animal producers to use less antibiotics. The European Union, for example, will soon enforce stricter limits on antibiotic use to below 5mg/PCU.

A study in Thailand revealed that after banning colistin in broilers in the central provinces for 12 months, sensitivity to colistin staged a remarkable comeback. It is important to remember that plasmid-mediated colistin resistance gene mcr-1 has evolved all the way to mcr-7, while Thailand's DLD lab is only able to detect mcr-3. The shocking pace of microbial resistance makes it abundantly clear why colistin should be reserved as the last line of defense.

In other livestock health news, Ratchaburi Livestock Cooperative plans to invest in the country's first privately-owned FMD vaccine production facility, with work on the site to begin in 2019. The vaccine will be used domestically and exported. Construction site and project cost have not been disclosed. The cooperative has received a 31.5-million-baht grant from the Agricultural Research Development Agency to research FMD vaccine manufacturing.

The cooperative is also urging regulatory bodies to support the construction of an autogenous vaccine facility to supply the domestic market with alternatives to antibiotics applicable to bacterial infections such as Glasser's disease and *Streptococcus suis*. ■



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NEWS

CP Vietnam surges ahead in Vietnam's booming agriculture sector

CP VIETNAM CORPORATION, which recently celebrated 25 years of robust growth in Vietnam, is encouraging a new generation of employees to achieve even greater success by investing in improving all-around worker competencies, according to Montri Suwanposri, president of CP Vietnam.

CP Group started with a representative office in Vietnam in 1988 right after the Vietnamese government embraced a free market economy, and opened its first feed mill in Dong Nai in 1993. Ever since then, Vietnam has been one of CP's top foreign investment locations, with roughly US\$1 billion so far invested in feed mills, farms and food processing facilities across the country.



Montri Suwanposri มณตรี สุวรรณโพธิ์ศรี

Vietnam is highly attractive to international investors due to privileges granted for foreign direct investment, its political stability and robust economic growth which has held steady at around 7% over the past three decades, said Mr Montri.

ซีพี เวียดนาม เติบโตต่อเนื่องในอุตสาหกรรมเกษตรที่กำลังเฟื่องฟูของเวียดนาม

ซีพี เวียดนาม คอร์ปอเรชั่น ซึ่งเพิ่งฉลองครบรอบ 25 ปีของการเติบโต

อย่างแข็งแกร่งในเวียดนามเมื่อเร็วๆ นี้ มุ่งส่งเสริมให้พนักงานรุ่นใหม่ประสบความสำเร็จยิ่งขึ้นโดยลงทุนพัฒนาความสามารถและทักษะของพนักงานในทุกด้าน มณตรี สุวรรณโพธิ์ศรี กรรมการผู้จัดการ ซีพี เวียดนาม (CPV) กล่าว

ซีพี กรุ๊ป เริ่มต้นธุรกิจด้วยการตั้งสำนักงานตัวแทนในเวียดนามในปี 2531 หลังจากจากรัฐบาลเวียดนามเริ่มใช้กลไกเศรษฐกิจในรูปแบบตลาดเสรี บริษัทเปิดโรงงานผลิตอาหารสัตว์แห่งแรกที่ดองนাইในปี 2536 นับแต่นั้นเป็นต้นมา เวียดนามกลายเป็นหนึ่งในประเทศที่ CP มีการลงทุนสูงสุด โดยได้ลงทุนไปแล้วประมาณ 1 พันล้านเหรียญสหรัฐในการสร้างโรงงานอาหารสัตว์ ฟาร์ม และโรงงานแปรรูปอาหารทั่วประเทศ

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(9th left) Wanlop Chiararanont, (8th left) Prasert Poongkumarn, (7th left) Suksant Jiumjaiswanglerg, chief executive officer, and (3rd left) Montri Suwanposri, accompanied by CPF's senior management team and former presidents of CP Vietnam

(ที่ 9 จากซ้าย) วรลภ จีวรณนท์, (ที่ 8 จากซ้าย) ประเสริฐ พงษ์กumar, (ที่ 7 จากซ้าย) สุขสันต์ เจียมใจสว่างฤกษ์ ประธานคณะผู้บริหารธุรกิจเกษตรอุตสาหกรรม และกรรมการผู้จัดการใหญ่ (ร่วม) (ที่ 3 จากซ้าย) มณเฑียร สุวรรณโพธิ์ศรี พร้อมด้วยคณะผู้บริหารระดับสูงของซีพีเอฟและอดีตผู้บริหารซีพี เวียดนาม

Vietnam has also been actively involved in multiple international trade agreements. Settled and pending deals with the European Union, ASEAN and Asia Pacific countries, including the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), make Vietnam an ideal site for exporters.

Millennials, with an average age of 31, make up the majority of the population. This helps make Vietnam both a vibrant market and a manufacturing powerhouse in Asia.

เวียดนามมีเสน่ห์อย่างมากในสายตานักลงทุนต่างชาติเนื่องจากสิทธิพิเศษที่รัฐบาลให้สำหรับการลงทุนโดยตรงจากต่างประเทศ การเมืองที่มีเสถียรภาพและการเติบโตทางเศรษฐกิจที่แข็งแกร่งซึ่งโดยประมาณที่ประมาณ 7% ในช่วงสามทศวรรษที่ผ่านมา คุณมนตรี กล่าว

เวียดนามได้เข้าร่วมในข้อตกลงการค้าระหว่างประเทศหลายข้อตกลง โดยมีทั้งที่ลงนามแล้วและอยู่ระหว่างเจรจากับอาเซียน สหภาพยุโรป และประเทศในแถบเอเชียแปซิฟิก รวมถึงข้อตกลงการค้าเสรี CPTPP เป็นต้น ทำให้เวียดนามเป็นประเทศที่น่าลงทุนที่สุดในสายตาผู้ผลิตเพื่อส่งออก

เวียดนามมีกลุ่มมิลเลนเนียลซึ่งมีอายุเฉลี่ย 31 ปีเป็นประชากรส่วนใหญ่ ทำให้เวียดนามเป็นตลาดที่กำลังเติบโต และเป็นศูนย์กลางการผลิตในเอเชีย

ตลาดต่างประเทศ

ซีพี เวียดนาม มีแผนที่จะเพิ่มการผลิตสัตว์ปีกและกุ้งเพื่อการส่งออก

ศูนย์ผลิตสัตว์ปีกแห่งใหม่ในบิ่นห์เฟือก (Binh Phuoc) ใกล้กับเมืองโฮจิมินห์ มูลค่า 196 ล้านดอลลาร์สหรัฐ อยู่ระหว่างก่อสร้างและจะเปิดดำเนินการในปี 2563 ศูนย์แห่งนี้ประกอบด้วยฟาร์มพ่อแม่พันธุ์ โรงฟัก โรงเรือนไก่เนื้อ โรงงานผลิตอาหารสัตว์ โรงฆ่าสัตว์ และโรงงานอาหารแปรรูป

International markets

CPV plans to increase poultry and shrimp production.

A new poultry complex in Binh Phuoc, near Ho Chi Minh city, worth US\$196 million is under construction and will be operable in 2020. The complex consists of parent stock farms, hatcheries, broiler farms, a feed mill, a slaughterhouse and a further processing facility.

The Binh Phuoc complex will supply 54 million birds/year. The feed mill is designed to produce 300,000

ศูนย์ผลิตที่บิ่นห์เฟือก (Binh Phuoc) จะผลิตไก่ 54 ล้านตัวต่อปี โรงงานอาหารสัตว์ถูกออกแบบมาเพื่อผลิต 300,000 ตัน/ปี ฟาร์มพ่อแม่พันธุ์ และโรงฟักจะผลิตไข่ 64 ล้านฟองต่อปี โรงฆ่าและจะผลิตเนื้อไก่ 116,000 ตัน/ปี ในขณะที่โรงงานอาหารแปรรูปและปรุงสุกจะผลิตสินค้าปรุงสุกมากถึง 36,000 ตัน/ปี

CPV ลงทุนในโรงฆ่าและสุกรที่ทันสมัยมูลค่า 20 ล้านดอลลาร์สหรัฐในกรุงฮานอยจะเปิดในปี 2563 และจะสร้างโรงงานผลิตอาหารสัตว์อีกหลายแห่งเพื่อให้สอดคล้องกับการเติบโตของธุรกิจในอนาคต คุณมนตรี กล่าว

เวียดนามเริ่มส่งออกสัตว์ปีกและเนื้อสุกรไม่นานมานี้ และในปริมาณไม่มากนัก ตรงกันข้ามกับการประมงซึ่งเป็นสินค้าส่งออกหลักของประเทศมายาวนาน

เวียดนามเริ่มส่งออกกุ้งแช่แข็งในปี 2550 และมียอดขายเติบโตอย่างต่อเนื่อง ตลาดที่สำคัญคือ สหภาพยุโรป สหรัฐอเมริกา ญี่ปุ่น เม็กซิโก รัสเซีย อียิปต์ และออสเตรเลีย การส่งออกกุ้งในปี 2560 มีมูลค่า 3.8 พันล้านดอลลาร์สหรัฐ ปลาสดมีสัดส่วนประมาณ 30% ของการส่งออกประมงทั้งหมดของประเทศและมียอดขาย 1.8 พันล้านเหรียญสหรัฐในปี 2560

อดิศักดิ์ ต่อสกุล รองกรรมการผู้จัดการบริหาร ธุรกิจสัตว์น้ำ ให้ความเห็นว่าเวียดนามซึ่งปัจจุบันเป็นผู้ส่งออกกุ้งรายใหญ่อันดับ 3 ของโลกมุ่งมั่นที่จะเป็นผู้ส่ง



CP Vietnam's Hai Duong feed mill showcases state-of-the-art, fully automated technology and a robotic pallet stacking system. With capacity of 720,000 tonnes/year, it serves customers in North Vietnam.

โรงงานผลิตอาหารสัตว์ Hai Duong ของเวียดนามใช้ระบบอัตโนมัติ ปฏิบัติงานเต็มรูปแบบและใช้แขนกลวางเรียงถุงอาหาร โรงงานมีกำลังการผลิต 720,000 ตันต่อปีให้บริการลูกค้าทางตอนเหนือ

tonnes/year, while breeder farms and hatcheries will crank out 64 million eggs/year. The slaughterhouse will supply 116,000 tonnes of fresh meat, and the further processing facility up to 36,000 tonnes of cooked products/year.

CPV is set to invest in a modern hog slaughterhouse worth US\$20 million in Hanoi that will open in 2020. More live-stock feed mills will be built to match the pace of future business growth, said Mr Montri.

ออกกุ้งรายใหญ่ที่สุดของโลกภายในปี 2568 โดยตั้งเป้าจะผลิตกุ้ง 1 ล้านตันต่อปี ปัจจุบัน ผลิตประมาณ 600,000 ตันต่อปี

CPV ปรับปรุงประสิทธิภาพการผลิตโดยปรับปรุงสูตรอาหาร คุณภาพสัตว์ และการจัดการ การบริหาร “รูปแบบผสมผสานของซีพีเอฟ” ถูกนำไปใช้อย่างแพร่หลายในเวียดนามซึ่งทำให้สามารถผลิตกุ้งในฟาร์มขนาดเล็กได้ผลดี มีอัตราการตายต่ำแม้ในฟาร์มที่มีพื้นที่น้อยกว่าครึ่งเฮกตาร์

CPV มั่นใจว่าบริษัทจะสามารถเพิ่มปริมาณการส่งออกกุ้งให้ได้ 500,000 ตันภายในปี 2568 และเพื่อให้บรรลุเป้าหมายนี้ บริษัทจะต้องเพิ่มกำลังการเพาะลูกกุ้งให้ได้ 50,000 ล้านตัวต่อปี และเพิ่มการผลิตอาหารกุ้งอีก 200,000 ตันต่อปี โดยจะสร้างโรงงานผลิตอาหารสัตว์น้ำแบบเดียวกับที่กำลังสร้างขึ้นใน Camau ในพื้นที่สามเหลี่ยมปากแม่น้ำโขง

ธุรกิจอาหาร

นายสุพัฒน์ ศรีธาร รองกรรมการผู้จัดการบริหาร ธุรกิจอาหารแปรรูปครบวงจร กล่าวว่า CPV มีแผนจะเปิดตัวผลิตภัณฑ์ใหม่ 50 รายการในเวียดนามในปี 2562 และปรับปรุงการตรวจสอบย้อนกลับสำหรับผลิตภัณฑ์อาหาร CP ทั้งหมด

ต้มยำ ซุชิ และอาหารพร้อมรับประทานอื่นๆ เป็นส่วนหนึ่งของสินค้าใหม่ 35 ผลิตภัณฑ์

Poultry and pork exports have recently begun, but only in small volumes. This is in contrast to Vietnam's fishery, which has long been one of the country's leading sources of export goods.

Vietnam debuted frozen shrimp exports in 2007 and sales have grown steadily ever since. Major markets are the EU, the US, Japan, Mexico, Russia, Egypt and Australia. Shrimp exports in 2017 were worth US\$3.8 billion. Pangasius accounts for around 30% of the country's total fisheries exports, and in 2017, sales hit US\$1.8 billion.

Adisak Torsakul, executive vice-president, pointed out that Vietnam, which currently ranks as the world's 3rd largest shrimp exporter, is determined to become the world's top exporter by 2025. Vietnam targets annual shrimp production of one million tonnes/year, overtaking India, which currently supplies around 600,000 tonnes/year.

CPV has improved productivity by improving feed formulation, brood stock quality and management. Its "CPF combined model" has been widely adopted in the country where small-scale shrimp production can be viable with low mortality even on farms of less than half a hectare.



(left) Suphat Srithanatorn and Prapoj Choakpichitchai

(ซ้าย) สุพัฒน์ ศรีธนาธรและ ประพจน์ โชคพิชิตชัย

By 2025, CPV is confident its own operations will account for around 500,000 tonnes of Vietnam's total shrimp exports. To meet this goal, it will raise annual hatchery capacity to 50 billion fry and add another 200,000 tonnes of shrimp feed per annum by building new aqua feed mills like the one currently being built in Camau, in the Mekhong Delta area.

Food business

Suphat Srithanatorn, executive vice-president of food products, said CP

ซึ่งบริษัทวางแผนที่จะผลิตมากกว่า 1,500 ตันต่อเดือนจากโรงงานที่จะเปิดเร็วๆนี้ใน Bin Phuoc ส่วนที่เหลือเป็นเนื้อหมักและผลิตภัณฑ์มูลค่าเพิ่มอื่นๆ เช่น เนื้อตัดแต่ง และ แฮม CP Vietnam เปิดตัวสินค้าใหม่อย่างน้อย 30-40 รายการต่อปี

บริษัท มีส่วนแบ่งตลาดเนื้อไก่สด 32% ไส้กรอก 25% บริษัทผลิตไส้กรอกได้ 20,000 ตันต่อปีจากโรงงานที่ตั้งอยู่ในภาคเหนือและภาคใต้ของประเทศ

CPV วางแผนที่จะขยายตลาดเนื้อไก่เป็น 40% และไส้กรอกเป็น 30% ในปี 2562 ควบคู่ไปกับการขยายสาขาร้านไก่หัวดาวเป็น 800 แห่ง และ CP Freshmart เป็น 18 สาขา CP Freshmart แต่ละสาขาต้องใช้เวลาลงทุนประมาณ 25,000 ดอลลาร์สหรัฐ และโดยปกติแต่ละสาขาจะขายได้มากกว่า 900 ดอลลาร์สหรัฐ/วัน

การก่อสร้างโรงงานแห่งใหม่สำหรับผลิตไส้กรอกในเมือง Cu Chi ทางตอนใต้ของประเทศได้เสร็จสิ้นลงเมื่อไม่นานมานี้ ทำให้บริษัทมีกำลังผลิตไส้กรอกได้ 6,000 ตันต่อเดือน

ปัจจุบัน บริษัทดำเนินกิจการโรงงานแปรรูปอาหารในกรุงฮานอย ดองโน เบ็งเตอ และกุชี

การเติบโตอย่างยั่งยืน

คุณมนตรี กล่าวว่า CPV รักษาการเติบโตทางธุรกิจได้อย่างต่อเนื่อง จากการยึดกฎ "สามประโยชน์"

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Sausage production at CPV's Ha Noi Food Processing Factory
การผลิตไส้กรอกที่โรงงานแปรรูปของ CPV ในฮานอย

Vietnam plans to debut 50 new products in 2019 and revamp traceability for all CP food products.

Dim sum, sushi, and other ready-to-eat meals will account for some 35 of the new products which the company plans to produce in excess of 1,500 tonnes/month from its soon-to-open plant in Bin Phuoc. The rest will be marinated meat and other value-added products such as cold cuts and ham. CP Vietnam launches at least 30-40 new items annually.

The company maintains 32% of the market for fresh chicken meat and 25% for sausage. It supplies 20,000 tonnes/year of sausages from plants that it owns in the north and south.

CPV plans to grow its broiler meat share to 40% and sausages to 30% in 2019 in parallel with the expansion of Five Star chicken outlets to 800, and CP Freshmart to 18 stores. Each CP Freshmart store requires an investment around US\$25,000/store and typically earns over US\$900 in sales/day/store.

A new facility in Cu Chi, south Vietnam, for producing retort sausages was recently completed, enabling the company to supply 6,000 tonnes/month.

At present, the company operates food processing plants in Hanoi, Dong Nai, Ben Tre and Cu Chi.

Sustaining growth

ประโยชน์แรก การลงทุนและการดำเนินธุรกิจทั้งหมดจะต้องเป็นผลประโยชน์ของสาธารณชนในประเทศที่เข้าไปลงทุน ประโยชน์ต่อบริษัทมาเป็นอันดับสอง ประโยชน์ที่สาม คือการดำเนินธุรกิจภายใต้ค่านิยมองค์กรในเรื่องของศักดิ์ศรี ความซื่อสัตย์ ความฉับไว คุณภาพ และนวัตกรรม

พนักงานชาวเวียดนามที่มีความสามารถได้รับการส่งเสริมให้มีส่วนร่วมมากขึ้นในการกำหนดแนวทางการดำเนินธุรกิจ

การบริหารทรัพยากรมนุษย์ (HR) เป็นหนึ่งในความสำเร็จที่สำคัญของ CPV เจ้าหน้าที่ฝ่ายทรัพยากรบุคคลกำหนดเส้นทางความก้าวหน้าในสายอาชีพ ฝึกอบรมพัฒนาทักษะผู้นำให้กับพนักงานที่มีศักยภาพซึ่งทำงานกับ CPV มาเป็นเวลา 5-7 ปี

บริษัทส่งเสริมให้พนักงานเป็นคนดี มีความรู้รอบ มีความยินดีที่จะแบ่งปัน เพื่อส่งเสริมความเห็นอกเห็นใจและจิตวิญญาณของทีมที่แข็งแกร่ง พนักงาน

CPV ได้ร่วมกันจัดตั้งกองทุนสำหรับทำกิจกรรมเพื่อสังคม และจัดกิจกรรมให้พนักงานบริจาคโลหิตให้กับสภาขาชาตเวียดนาม

กลุ่มซีพีได้ฝึกอบรมทักษะผู้นำให้กับพนักงานมากกว่า 600,000 คนจากทั่วโลกที่สถาบันผู้นำของซีพีซึ่งตั้งอยู่ที่เขาใหญ่

ในเวียดนาม CPV จัดฝึกอบรมภายใน และเปิดศูนย์การเรียนรู้สัตว์ปีกและสุกรเพื่อเพิ่มพูนความรู้และทักษะของพนักงาน อีกทั้งสร้างความสัมพันธ์ที่ดีกับมหาวิทยาลัยโดยจัดฝึกอบรมและให้ทุนการศึกษาแก่นักศึกษาระดับปริญญาตรี

CPV ได้รับการจัดอันดับให้เป็นหนึ่งใน 100 บริษัทที่น่าทำงานที่สุดในเวียดนาม บริษัทให้ความสำคัญกับการรับผิดชอบและดูแลความเป็นอยู่ของพนักงาน หัวหน้างานไปเยี่ยมบ้านของผู้ใต้บังคับบัญชาเป็นครั้งคราวเพื่อทราบถึงปัญหา ช่วยแก้ไข และให้ความช่วยเหลือ

Mr Montri said that CPV has sustained business growth by following its own “three benefits” rule: First, all investments and business operations must be in the public interest of the countries where they take place, and the company’s own interests come second. Thirdly, corporate values of integrity and honesty, swiftness, quality and innovation must govern all business conduct.

Talented Vietnamese employees are promoted and invited to be more involved in setting the course of business.

Human resources (HR) management is one of CPV’s key successes. HR staff create career paths and train potential leaders who have been working with CPV for 5-7 years so that they are well equipped with leadership skills.

Employees are encouraged to be good people who are well-informed and comfortable with sharing. To promote compassion and a strong team spirit, CPV workers voluntarily formed a Donation Fund for undertaking social activities, and employees regularly donate blood to the Vietnamese Red Cross Society.

CP Group has trained more than 600,000 CP employees from around the world in leadership skills at their Leadership Institute in Khao Yai.

In Vietnam, CPV provides on-the-job training and runs poultry and swine learning centres to refresh employee knowledge and skills. The learning centres also foster good relationships with universities by offering training courses

ทั้งหมดนี้ ทำให้พนักงานของ CPV มีแรงจูงใจ มีความกระตือรือร้นที่จะทำงานให้สมฤทธิ์ผลสูงสุด

ปัจจุบัน CPV มีพนักงาน 20,000 คน พนักงานท้องถิ่นจะมีบทบาทมากขึ้นในการดำเนินธุรกิจในอนาคต

CPV ดำเนินธุรกิจทั้งด้านปศุสัตว์และประมง โดยธุรกิจปศุสัตว์คิดเป็น 81% ของรายได้ทั้งหมด ส่วนที่เหลือมาจากธุรกิจประมง ในส่วนของธุรกิจปศุสัตว์นั้น รายได้จากการขายสัตว์มีชีวิต และพ่อแม่พันธุ์คิดเป็น 60% ธุรกิจอาหารสัตว์ 33% และจากธุรกิจอาหาร 7%

บริษัทมีรายได้ 1.9 พันล้านดอลลาร์สหรัฐในปี 2560 ลดลงอย่างมากจาก 2.2 พันล้านดอลลาร์สหรัฐเมื่อเทียบกับปีก่อนเนื่องจากวิกฤตอุปทานสัตว์ลาดส่งผลกระทบต่อยอดขาย รายได้ 3 ไตรมาสแรกของปี 2561 อยู่ที่ 1.8 พันล้านเหรียญสหรัฐเพิ่มขึ้น 31% จากช่วงเดียวกันของปีก่อน CPV คาดว่ารายได้จะโต 12% ในปี 2561 ■

and scholarships to undergraduate students.

CPV has been ranked as one of the top 100 most favorable companies to work for in Vietnam. Its employee social responsibility program oversees the wellbeing of employees, and supervisors sometimes visit the homes of their subordinates to learn about their problems and offer help in trying to solve them.

All of these efforts have made CPV employees highly motivated, achievement-oriented and enthusiastic workers.

CPV currently has 20,000 employees. In the future, local recruits will play a more active role in running the businesses.

CP Vietnam operates both livestock and aquaculture operations, with the livestock business accounting for 81% of total revenue and the rest aquaculture. On the livestock side which includes sales of live animals, breeding stock sales account for 60% of revenue, feed 33% and food 7%.

The company reported US\$1.9 billion in turnover in 2017, a sharp decline from US\$2.2 billion y-o-y due to a hog over-supply crisis that affected prices. CPV's Q3 revenue in 2018 was US\$1.8 billion, up 31% q-o-q. It forecasts revenue growth of 12% for 2018. ■

CP Vietnam's annual capacity (2018)

Livestock feed capacity: 4.05 million tonnes (Bau Xeo 288,000, Dong Nai 576,000, Binh Dinh 456,000, Hai Duong 720,000, Tien Giang 540,000, Binh Duong 750,000, Nghe An, Hanoi 720,000)

- Swine: 65 million head
- Broilers: 66 million birds
- Eggs: 750 million

■ Aquaculture

Aqua feed: 400,000 tonnes (Ben Tre 105,000, Can Tho 132,000, Dong Nai 163,400)

- Shrimp: 6,500 tonnes
- Dory fish fillets: 45,800 tonnes
- Shrimp fry: 11.2 billion

■ Food

Dong Nai

- Sausages: 7,200 tonnes
- Retort sausages: 6,000 tonnes
- Pork cuts: 72,000 tonnes
- Marinated: 3,960 tonnes

■ Slaughtering services

Hanoi

- Poultry slaughter: 18 million birds
- Sausages: 10,800 tonnes
- Marinated: 3,360 tonnes
- Pork dressing: 36,000 head

Cu Chi

- Sausages: 7,200 tonnes
- Retort sausages: 6,000 tonnes

กำลังการผลิตต่อปี (2018)

กำลังการผลิตอาหารสัตว์: 4.05 ล้านตัน

■ Bau Xeo 288,000, Dong Nai 576,000, Binh Dinh 456,000, Hai Duong 720,000, Tien Giang 540,000, Binh Duong 750,000, Nghe An, Hanoi 720,000

สุกร : 65 ล้านตัว ไก่เนื้อ : 66 ล้านตัว

ไข่ : 750 ล้านฟอง

ธุรกิจประมง

อาหารสัตว์น้ำ: 400,000 ตัน (Ben Tre 105,000, Can Tho 132,000, Dong Nai 163,400)

กุ้ง : 6,500 ตัน เนื้อปลาฉวี : 45,800 ตัน

ลูกกุ้ง : 11.2 พันล้านตัว

อาหาร

ดองไน

ไส้กรอก : 7,200 ตัน

ไส้กรอกบรรจุถุง : 6,000 ตัน

เนื้อสุกแช่แข็ง : 72,000 ตัน

เนื้อหมัก : 3,960 ตัน

บริการฆ่าและสุก

ฮานอย

โรงฆ่าและสัตว์ปีก : 18 ล้านตัว

ไส้กรอก : 10,800 ตัน

เนื้อหมัก : 3,360 ตัน

แช่แข็งซากสุก : 36,000 ตัว

กูจี

ไส้กรอก : 7,200 ตัน

ไส้กรอกบรรจุถุง : 6,000 ตัน

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RAW MATERIAL TRENDS

January - February 2019

By Lee Feed Mill analysts

Corn

Prices edged up in November as feed millers and traders continued to build stocks. December prices declined thinly due to shrinking demand from feed millers. Average price in November was 10.14 baht/kg before dipping to 10.07 baht/kg in December.

Broken rice

Prices at the year end were on the rise, driven by export and feed miller demand. The average price in November was 10.39 baht/kg and 10.50 baht/kg in December.

Prices for January-February will rise as farmers hold off sales. With access to farmer assistance soft loans, and strong

สถานการณ์และแนวโน้มราคาวัตถุดิบอาหารสัตว์ที่สำคัญ

มกราคม ถึง กุมภาพันธ์ 2562

ข้าวโพด

ภาวะราคาลดในช่วงเดือนพฤศจิกายน-ธันวาคม 2561 ราคาปรับตัวสูงขึ้นในเดือนพฤศจิกายน เนื่องจากโรงงานอาหารสัตว์และพ่อค้าเร่งซื้อเพื่อทำสต็อก และเมื่อเข้าสู่เดือนธันวาคม ราคาปรับตัวอ่อนลงเล็กน้อยจากปัจจัยความต้องการของโรงงานอาหารสัตว์ที่ชะลอตัวลงรวมถึงวัตถุดิบแทนเข้าสู่ตลาด โดยราคาเฉลี่ยเดือนพฤศจิกายน อยู่ที่ 10.14 บาท/กก. และเดือนธันวาคม อยู่ที่ 10.07 บาท/กก.

แนวโน้มราคาข้าวโพดเลี้ยงสัตว์ในเดือนมกราคม-กุมภาพันธ์ 2562 คาดการณ์ว่าราคามีแนวโน้มทรงตัว เนื่องจากความต้องการจากโรงงานอาหารสัตว์ยังคงสูงอยู่ ผลผลิตข้าวโพดหลังนา จะเริ่มเข้าสู่ตลาดช่วงปลายเดือนกุมภาพันธ์ ประกอบกับผลผลิตข้าวโพดเพื่อนบ้านที่จะเริ่มออกสู่ตลาดช่วงเดือนกุมภาพันธ์เช่นกัน

ปลายข้าว

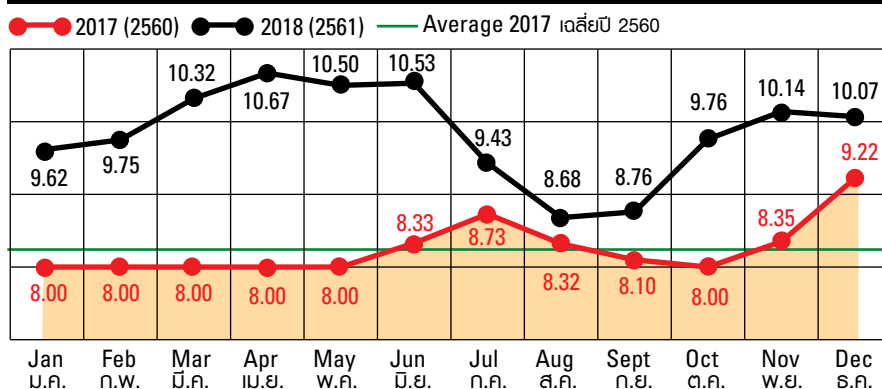
ภาวะราคาลดในช่วงเดือนพฤศจิกายน-ธันวาคม 2561 ราคาปรับตัวสูงขึ้น เนื่องจากความต้องการของผู้ส่งออกมีมากขึ้นในช่วงเทศกาลคริสต์มาสและปีใหม่ ขณะที่โรงงานอาหารสัตว์มีความต้องการมากขึ้นเช่นกัน โดยราคาเดือนพฤศจิกายน อยู่ที่ 10.39 บาท/กก. และเดือนธันวาคม อยู่ที่ 10.50 บาท/กก.

แนวโน้มราคาปลายข้าวในเดือนมกราคม-กุมภาพันธ์ 2562 คาดการณ์ว่าราคามีแนวโน้มทรงตัว เนื่องจากนโยบายสินเชื่อช่วยเหลือเกษตรกร โดยชะลอการขายข้าวเปลือกนาปี รวมถึงความต้องการโดยรวมยังมีต่อเนื่อง

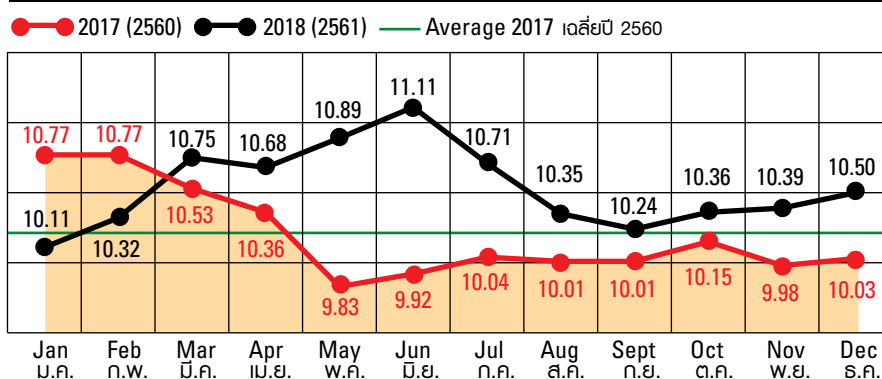
ปลาป่น

ภาวะราคาลดในช่วงเดือนพฤศจิกายน-ธันวาคม 2561 ราคาอ่อนตัวลง ตามทิศทางตลาดต่างประเทศเนื่องจากประเทศเปรูประกาศให้จับปลาปริมาณ 2.10 ล้านตัน ในช่วงเดือนพฤศจิกายน-มกราคม และเป็นปลายฤดูการเลี้ยงสัตว์น้ำ ความต้องการเลี้ยงสัตว์น้ำลดลง โดยราคา

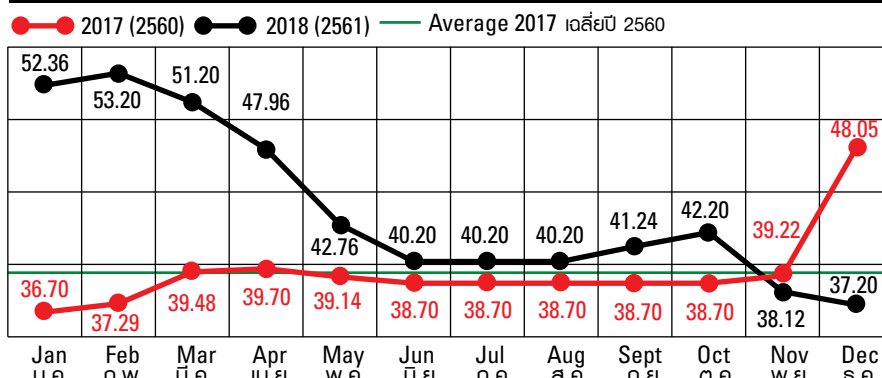
Corn price 2017/2018 ราคาข้าวโพด 2560/2561



Broken rice price 2017/2018 ราคาปลายข้าว 2560/2561



Fishmeal price 2017/2018 ราคาปลาป่น 2560/2561



Source: Thai Feedmill Association ที่มา: สมาคมผู้ผลิตอาหารสัตว์ไทย Price (baht/kg)ราคา (บาท/กก.)

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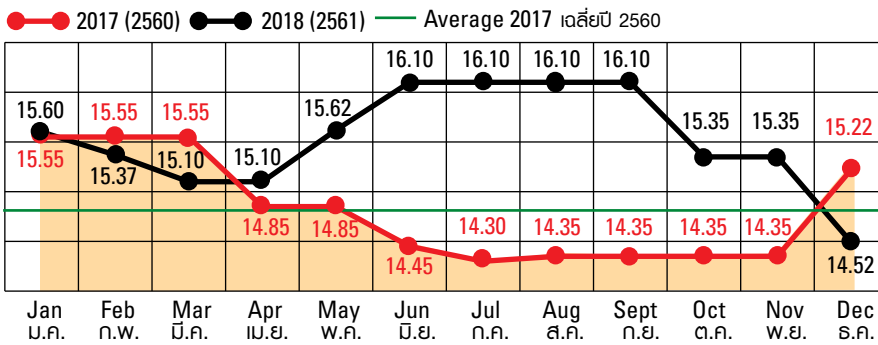
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RAW MATERIAL TRENDS

Soybean meal price (2017/18) ราคากากถั่วเหลืองเมล็ดนอก (2560/61)



Source: Thai Feedmill Association ที่มา: สมาคมผู้ผลิตอาหารสัตว์ไทย Price (baht/kg) ราคา (บาท/ก.ก.)

demand apparent, they can afford to wait for attractive prices.

Fish meal

Prices edged down after Peru announced in the middle of the aquaculture off-season that it will harvest 2.10 million tonnes in November-January 2019. Average price in November was 38.12 baht/kg and 37.20 baht in December.

Prices are unlikely to change in January and February due to the Peruvian fishery harvest. The lacklustre market is being further aggravated by slack demand from aquaculture.

Soybean meal

Prices declined at the end of 2018 due to cheaper prices for newly harvested US soybeans and the strong Thai baht which meant that traders could offer discounts. Average price in November was 15.22 baht/kg and 14.25 baht/kg in December.

Prices in January-February look set to be stable or slightly lower. Demand for live-stock feed in the domestic market is soft. Demand in China is likely to drop below 70 million tonnes due to the African swine fever outbreak. ■

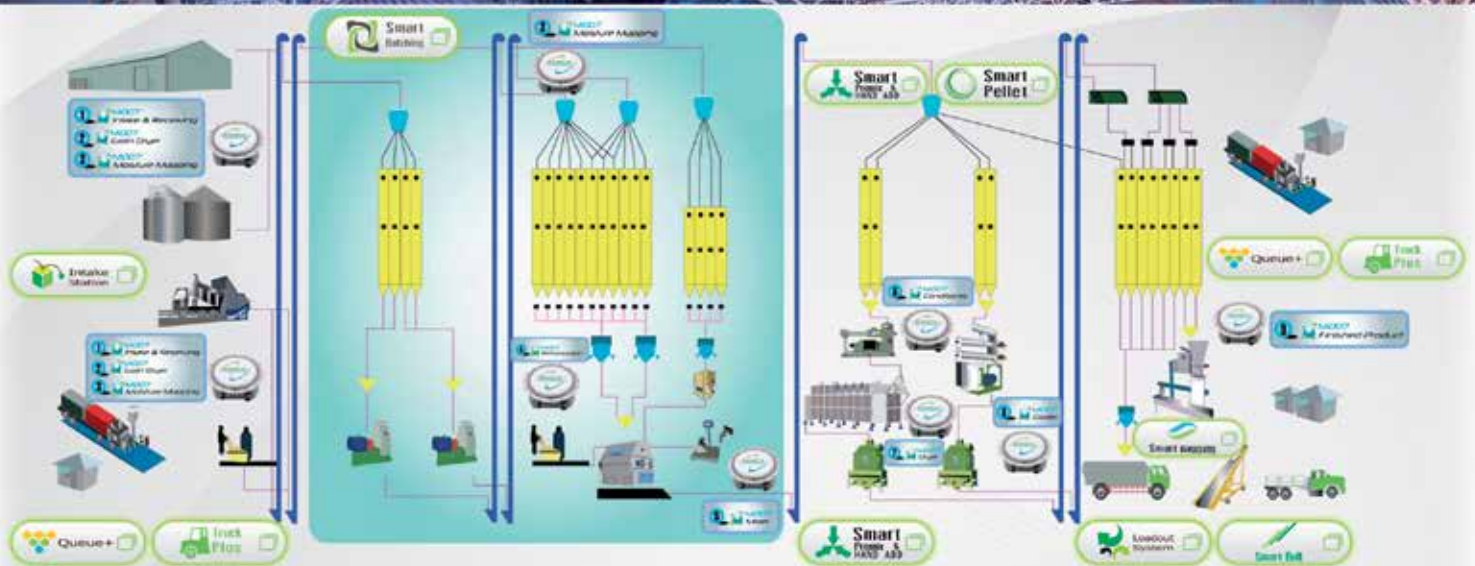
เฉลี่ยเดือนพฤศจิกายน อยู่ที่ 38.12 บาท/กก. และเดือนธันวาคม อยู่ที่ 37.20 บาท/กก.

แนวโน้มราคาปลาป่นในเดือนมกราคม - กุมภาพันธ์ 2562 คาดการณ์ว่าราคาดังกล่าวจะทรงตัว ตามตลาดต่างประเทศ เนื่องจากประเทศเปรูจับปลาได้ตามเป้าหมาย และความต้องการสัตว์น้ำยังมีไม่มาก

กากถั่วเหลืองเมล็ดนอก

ภาวะราคาตลาดในช่วงเดือนพฤศจิกายน - ธันวาคม 2561 ปรับตัวลดลง เนื่องจากในช่วงเดือนธันวาคมเป็นสินค้าที่ผลิตจากเมล็ดถั่วอเมริกาฤดูปลูกใหม่ซึ่งต้นทุนถูกลง ประกอบกับค่าเงินบาทที่แข็งค่าขึ้นต่อเนื่อง ส่งผลให้ผู้ผลิตสามารถเสนอใหม่ได้ต่ำลง โดยราคาเฉลี่ยเดือนพฤศจิกายน อยู่ที่ 15.22 บาท/กก. และเดือนธันวาคม อยู่ที่ 14.52 บาท/กก. ตามลำดับ

แนวโน้มราคากากถั่วเหลืองเมล็ดนอกในเดือนมกราคม - กุมภาพันธ์ 2562 คาดว่าราคาจะยังคงทรงตัว หรืออาจอ่อนตัวลงได้เล็กน้อย หากความต้องการใช้ภายในประเทศลดลงจากการเปลี่ยนคู่สัตว์ที่ค่อนข้างเงียบ ทั้งนี้ยังคงต้องจับตาผู้บริโภคภายในประเทศจีน ซึ่งมีแนวโน้มว่าความต้องการบริโภคกากถั่วเหลืองจะลดลงต่ำกว่า 70 ล้านตันเนื่องจากปัญหาการระบาดของโรค African Swine Fever ■



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Thailand steps up vigilance against African swine fever risk

THAILAND'S DEPARTMENT OF LIVESTOCK DEVELOPMENT (DLD) has declared keeping ASF out of the country as one of its most urgent national priorities, said Dr Soravit Thaneeto, director general.

The DLD has allocated 53 million baht to strengthen defensive measures against

the virus and promote public awareness of the hog disease that could devastate Thailand's 22-million-head hog herd.

The need for vigilance at all border entry points was made clear in December after samples of salami and sausages taken from a Chinese tourist traveling from



Dr Soravit Thaneeto นส.พ. สรวิทย์ ธามิติ

ประเทศไทยเพิ่มการเฝ้าระวังโรคอหิวาต์แอฟริกาในสุกร

นส.พ. สรวิทย์ ธามิติ อธิบดีกรมปศุสัตว์ ประกาศเพิ่มการเฝ้าระวังโรคอหิวาต์แอฟริกาในสุกร ASF อย่างเข้มข้น และเสนอเป็นเรื่องด่วนที่ต้องบรรจุเป็นวาระแห่งชาติ

กรมปศุสัตว์ได้จัดสรรงบ 53 ล้านบาทเพื่อเสริมมาตรการป้องกันไวรัสและกระตุ้นให้เกิดการรับรู้ของประชาชนต่อภัยของ โรค ASF ที่อาจทำลายอุตสาหกรรมสุกรของประเทศ

การเฝ้าระวังอย่างเข้มข้นที่จุดผ่านแดนจำเป็นอย่างยิ่งนับตั้งแต่เดือนธันวาคมที่ผ่านมาพบตัวอย่างซาลามีและไส้กรอกปนเปื้อนเชื้อไวรัส ASF จากนักท่องเที่ยวจีนที่เดินทางจากเฉิงตูมายังภูเก็ตจนถึงขณะนี้ พบผลิตภัณฑ์เนื้อสัตว์ที่ปนเปื้อนเชื้อไวรัส ASF ถึง 3 กรณี ที่สนามบินในเชียงใหม่และภูเก็ต น.ส.พ. สรวิทย์ กล่าว

งบประมาณจะถูกนำไปใช้เพื่อให้ความรู้แก่ผู้เลี้ยงสุกรและประชาชนเกี่ยวกับการป้องกัน ASF และความสำคัญของการรักษาความปลอดภัยทางชีวภาพ

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Chengdu to Phuket were found to be ASF positive. So far, the country has reported three cases of meat products tainted with ASF DNA at airports in Chiang Rai and Phuket, said Dr Soravit.

The funds will be used for educating hog producers and the public on ASF prevention and the importance of good biosecurity practices.

The DLD is preparing to increase the number of detection dogs deployed at airports across the country, and tighten hygiene and disinfection programs for animal transportation trucks when they return from delivering live animals to Myanmar, Cambodia and Laos.

Upon returning, the trucks will be cleaned and disinfected at five checkpoints deployed at major border entry points. The DLD is also increasing surveillance activities and dispatching inspection officers to cold storage operations across the country to detect and confiscate illegal pork imports.

The DLD has designated eight labs for ASF testing.

Dr Soravit expressed concerned over the estimated 3,000 small-scale hog farmers who primarily rely on swill feed, which has been blamed as one of the main

causes of the widespread outbreaks of ASF in China. Unlike many other live-stock pathogens, the ASF virus is highly robust and can survive for long periods outside the host.

The DLD recommends that producers cook swill feed at 70C for at least 30 minutes before feeding it to hogs. Backyard farms are being encouraged to raise production standards to comply with good farming practices.

New rules forbid hotels from giving away food waste to hog farmers and the DLD has assigned inspectors to prevent contaminated meat from entering the hog feed chain.

Dr Soravit added that bringing meat products into the Kingdom is a criminal offense. Visitors are being asked to hand over meat products to DLD quarantine officers upon arrival at airport customs entry gates.

If an ASF outbreak occurs in Thailand, hogs on infected farms will be culled. Also, farms located within a 1-km radius will be under close surveillance and have blood samples tested. Animals will be culled if the tests confirm they are ASF positive or display clinical signs. Animal and meat movements in the infected area

will be banned within a five-km radius of the infected areas for two weeks.

The DLD offers compensation to producers for culled livestock at a rate of 75% of the market price at that time. To be eligible for compensation, the producers must neither sell nor move their animals to other locations and inform DLD officers in the area within 12 hours.

Porcine meal imports from ASF-free countries are still allowed. Manufacturing plants must be good manufacturing practice (GMP) accredited and subject to audits by the DLD.

The National Institute of Animal Health is working closely with the Animal Feed and Veterinary Product Control Department to screen imported protein meal. The test verifies if the DNA of the goods matches the declaration on the import document and is free of ruminant byproducts. It also detects the presence of microbes such as *salmonella* and foreign materials such as melamine in the shipment.

The DLD has extended the import ban on pork products from China and countries in Europe that have reported ASF outbreaks for another 90 days, ending in March. ■

กรมปศุสัตว์ เตรียมเพิ่มจำนวนสุนัขดมกลิ่นสำหรับใช้งานในสนามบินทั่วประเทศและเพิ่มความเข้มข้นของการฆ่าเชื้อสำหรับรถบรรทุกขนย้ายสัตว์เมื่อกลับเข้ามาในประเทศภายหลังจากส่งสัตว์มีชีวิตไปเมียนมาร์กัมพูชาและลาวให้รัดกุมยิ่งขึ้น

เมื่อกลับเข้าประเทศ รถบรรทุกจะต้องล้าง ทำความสะอาดและฆ่าเชื้อที่จุดผ่านแดนทั้งห้าแห่ง กรมปศุสัตว์ กำลังเพิ่ม การเฝ้าระวังและส่งเจ้าหน้าที่ตรวจสอบไปยังห้องเย็นทั่วประเทศเพื่อตรวจจับและยึดเนื้อสุกรที่นำเข้าอย่างผิดกฎหมาย

กรมปศุสัตว์มีห้องปฏิบัติการ 8 แห่งทั่วประเทศ สำหรับการตรวจเชื้อไวรัส ASF

นส.พ. สรวิทย์แสดงความกังวลต่อเกษตรกรผู้เลี้ยงสุกรรายย่อยประมาณ 3,000 รายที่เลี้ยงสุกรโดยใช้เศษอาหาร ซึ่งเป็นหนึ่งในสาเหตุหลักของการระบาดอย่างกว้างขวางในประเทศจีน ไวรัส ASF มีความคงทนและสามารถอยู่รอดได้เป็นระยะเวลานานภายนอกตัวสัตว์ซึ่งแตกต่างจากเชื้อโรคอื่น ๆ

กรมปศุสัตว์แนะนำให้ผู้เลี้ยงสุกรที่ใช้เศษอาหารให้ต้มที่อาหารที่อุณหภูมิ 70 องศาเซลเซียสนานอย่างน้อย 30 นาทีก่อนนำมาเลี้ยงสุกร ฟาร์ม ผู้เลี้ยงราย

ย่อย ควรยกระดับมาตรฐานการเลี้ยงให้สอดคล้องกับแนวทางการทำฟาร์มที่ดี

ระเบียบใหม่ห้ามโรงแรมให้เศษอาหารกับผู้เลี้ยงสุกร กรมปศุสัตว์ได้มอบหมายให้เจ้าหน้าที่ตรวจสอบเพื่อป้องกันเนื้อที่ปนเปื้อนกลับเข้าสู่ห่วงโซ่ของอาหารสุกร

นส.พ. สรวิทย์กล่าวเพิ่มเติมว่าการนำผลิตภัณฑ์เนื้อสัตว์เข้ามาในประเทศถือเป็นความผิดทางอาญา บุคคลเดินทางเข้ามาในประเทศจะต้องมอบผลิตภัณฑ์เนื้อสัตว์ให้กับเจ้าหน้าที่

หากเกิดการระบาดของโรค ASF ขึ้นในประเทศไทย สุกรที่ติดเชื้อในฟาร์มจะถูกทำลาย นอกจากนี้ฟาร์มที่ตั้งอยู่ภายในรัศมี 1 กม. จะอยู่ภายใต้การเฝ้าระวังอย่างเข้มงวดและมีการตรวจตัวอย่างเลือด สัตว์จะถูกทำลายหากการทดสอบยืนยันว่าติดเชื้อ ASF หรือแสดงอาการของโรค ห้ามการเคลื่อนย้ายสัตว์และเนื้อสัตว์ในรัศมีห้ากม ในพื้นที่ที่ประกาศเป็นเขตโรคระบาดเป็นเวลาสองสัปดาห์

ผู้เลี้ยงสุกรต้องแจ้งกรมปศุสัตว์ทันทีหากพบการตายอย่างผิดปกติในฟาร์ม สำหรับฟาร์มขนาดใหญ่ อัตราการตายควรสูงกว่า 5% ต่อเนื่องภายในสองวัน สำหรับฟาร์มขนาดเล็กเมื่อมีการตายต่อเนื่องสองตัวต่อวันภายในหนึ่งสัปดาห์

กรมปศุสัตว์ขอเชิญให้กับผู้เลี้ยงสัตว์ในกรณีที่สัตว์ต้องถูกทำลายในอัตรา 75% ของราคาตลาด ณ เวลานั้น ทั้งนี้ผู้ที่มิสิทธิได้รับค่าตอบแทน จะต้องไม่ขายหรือย้ายสัตว์ไปสถานที่อื่นและแจ้งเจ้าหน้าที่กรมปศุสัตว์ในพื้นที่ภายใน 12 ชั่วโมง

การนำเข้าเนื้อสุกรปนจากประเทศที่ปลอด ASF ยังคงทำได้ โรงงานที่ผลิตจะต้องผ่านการรับรองระบบการผลิตที่ดี (GMP) ซึ่งต้องผ่านการตรวจสอบโดยเจ้าหน้าที่กรมปศุสัตว์

สถาบันสุขภาพสัตว์แห่งชาติกำลังทำงานอย่างใกล้ชิดกับกองควบคุมอาหารและยาสัตว์เพื่อคัดกรองวัตถุดิบที่นำเข้า การทดสอบจะตรวจสอบว่า DNA ของสินค้าตรงกับที่ระบุในเอกสารนำเข้าและไม่ปนเปื้อนเนื้อและกระดูกปนจากสัตว์เคี้ยวเอื้อง นอกจากนี้ยังตรวจเชื้อจุลินทรีย์เช่นซัลโมเนลลาและเมลามีนที่อาจปลอมปนเข้ามา

กรมปศุสัตว์ได้ขยายเวลาห้ามนำเข้าผลิตภัณฑ์เนื้อหมูจากประเทศจีนและประเทศในยุโรปที่มีรายงานการระบาดของ ASF ต่อไปอีก 90 วันสิ้นสุดในเดือนมีนาคม ■



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Vietnam's Mavin Group embraces precision management

MAVIN AUSTFEE has invested US\$5 million in an enterprise resource planning (ERP) system to improve accuracy and give management access to real-time production data.

Dao Manh Luong, CEO of Mavin Group, said the ERP investment is part of an overall effort aimed at modernizing its farm, feed and food businesses. At the same time, the company continues to rev up production capacity to improve cost competitiveness.

ERP will complement traceability, improve data integration and ultimately support the management team in making decisions. Introduction of the ERP system will begin in 2019 and eventually involve all business units by 2021 when it is fully implemented.

The company plans to export overseas the first shipment of processed meat products from its facility at Dong Van II Industrial Estate, Ha Nam province, by the end of 2019.

Additional equipment will be installed at the Dong Van II facility, bringing total processed meat capacity to 10,000 tonnes/year, up from 6,000 tonnes/year.

Swine

Mavin is preparing to build new nucleus farms in Nghe An province that will house 2,500 great grand parents (GGPs). Work will commence in 2019, and the project will be completed in 2021.

The new GGP farms are a strategic move aimed at supporting operations 10 years down the road. Mavin will supply 400,000 finishers in 2019, and 500,000 finishers in 2020.

The target is achievable because breeding capacity, finishing farms and distribution networks are already firmly in place. The company is now in a position to become leaner by trimming operating costs and improving genetics, management and nutrition, said Mr Luong.

In 2019, Vietnam's hog industry is



Dao Manh Luong Dao Manh Luong

expected to rebound from an oversupply crisis that began in 2017. Nevertheless, African swine fever poses a major threat to Vietnam and producers across Southeast Asia. With this in mind, Mavin has already beefed up biosecurity practices.

The company prefers to be in control of the breeding side of hog production and operates its own GGP and GP units. For parent stock units, some of the farms are leased. Grower-finisher units are totally run by contract growers.

Finisher weaning age is 21-24 days at 4-7 kg bodyweight. The piglets are then sent to nursery units until they are 60 days of age and weigh 15-20 kg. Final vaccinations are given at the nursery level.

Mavin Austfeed เน้นการใช้ข้อมูล เสริมความแม่นยำของการบริหาร

Mavin Austfeed ลงทุน 5 ล้านเหรียญสหรัฐ ในการวางระบบซอฟต์แวร์ การวางแผนทรัพยากร องค์กร (ERP) เพื่อปรับปรุงความแม่นยำและให้ผู้บริหารเข้าถึงข้อมูลการผลิตแบบเรียลไทม์

ดาว มั่น ลวง ประธานผู้บริหาร ของ Mavin Austfeed กล่าวว่าการลงทุน ERP เป็นส่วนหนึ่งของความพยายามที่มุ่งเน้นการปรับปรุงธุรกิจฟาร์ม อาหารสัตว์ และอาหารให้ทันสมัย ในขณะเดียวกัน บริษัทยังคงขยายกำลังการผลิตเพื่อปรับปรุงความสามารถในการแข่งขันด้านต้นทุน

ERP จะเสริมการตรวจสอบย้อนกลับ ปรับปรุงการรวมข้อมูล และสนับสนุนทีมผู้บริหารในการตัดสินใจ บริษัทเริ่มนำระบบ ERP มาใช้ในปี 2562 และจะใช้กับทุกหน่วยธุรกิจภายในปี 2564

บริษัท วางแผนที่จะส่งออกผลิตภัณฑ์เนื้อสัตว์แปรรูปเป็นครั้งแรกจากโรงงานที่นิคมอุตสาหกรรม Dong Van II จังหวัดฮานามไปยังญี่ปุ่นภายในปลายปี 2562

จะมีการติดตั้งอุปกรณ์เพิ่มเติมที่โรงงาน Dong Van

II ซึ่งจะทำให้กำลังการผลิตเนื้อสัตว์แปรรูปรวมเป็น 10,000 ตัน/ปี เพิ่มขึ้นจาก 6,000 ตัน/ปี มร.ลวง กล่าว

สุกร

Mavin กำลังเตรียมที่จะสร้างฟาร์มนิวเคลียสใหม่ในจังหวัด Nghe An ซึ่งจะมีตัวพันธุ์ 2,500 ตัว โดยจะเริ่มก่อสร้างในปี 2562 และจะแล้วเสร็จในปี 2564 ฟาร์มตัวพันธุ์ใหม่เป็นก้าวที่สำคัญที่จะหนุนการดำเนินงานต่อไปในอีก 10 ปีข้างหน้า Marvin พร้อมที่จะผลิตสุกรขุน 400,000 ตัวในปี 2562 และ 500,000 ตัวในปี 2563

บริษัทจะบรรลุเป้าหมายนี้ได้ เนื่องจากความสามารถในการขยายจำนวนสุกร ฟาร์ม และเครือข่ายการกระจายสินค้าที่วางไว้อย่างมั่นคง ปัจจุบันบริษัทกำลังปรับกระบวนการทำธุรกิจและลดต้นทุนการดำเนินงาน โดย ปรับปรุงพันธุ์สุกร การจัดการ และโภชนาการ มร.ลวง กล่าว

ในปี 2562 อุตสาหกรรมสุกรของเวียดนาม มีแนวโน้มจะฟื้นตัวจากวิกฤตการณ์ตลาดที่เกิดขึ้นในปี 2560 อย่างไรก็ตามโรคคอหิวด์แอฟริกาในสุกรเป็นภัยคุกคามที่สำคัญต่อเวียดนามและผู้ผลิตทั่วเอเชีย

ตะวันออกเฉียงใต้ ด้วยเหตุนี้ Mavin Austfeed จึงได้ปรับ แนวปฏิบัติด้านความปลอดภัยทางชีวภาพให้เข้มงวดยิ่งขึ้น

บริษัท เลือกที่จะดำเนินการ สุกรพันธุ์ ฟาร์มทวดพันธุ์ ฟาร์มปู่ย่าพันธุ์ เองทั้งหมด และ เช่าฟาร์มพ่อแม่พันธุ์บางส่วนเพื่อดำเนินการเอง ในส่วนของสุกรรุ่น สุกรขุน เกษตรกรในโครงการเกษตรพันธสัญญา เป็นผู้ดำเนินการ

ลูกสุกรหย่านเมื่ออายุ 21-24 วัน น้ำหนัก 4-7 กิโลกรัม จากนั้นลูกสุกรจะถูกส่งไปยังโรงเรือนอนุบาลเพื่อเลี้ยงต่อจนลูกสุกรอายุ 60 วันและมีน้ำหนัก 15-20 กิโลกรัม และทำวัคซีนครั้งสุดท้ายก็จะทำในช่วงอนุบาล

Mavin มีโรงฆ่าและสุกรมีกำลังการผลิต 400 ตัว/วันในภาคเหนือ และส่งออกเนื้อสุกรจำนวนเล็กน้อยไปยังเมียนมาร์ โรงงานแปรรูปสุกรขนาดใหญ่จะเริ่มก่อสร้างขึ้นในปี 2565 เพื่อให้ทันกับการเติบโตที่เพิ่มขึ้นตามความมุ่งมั่นของบริษัทที่จะเติบโตไปในห่วงโซ่อุปทาน

ธุรกิจใหม่

นอกเหนือจากสุกรแล้ว เป็ดเนื้อ และไก่สั ยังเป็นตัวขับเคลื่อนการเติบโตใหม่ของบริษัท

มาวินได้ลงทุนในฟาร์มพ่อแม่พันธุ์เป็ด 3 ฟาร์ม

Mavin operates a slaughterhouse with a capacity of 400 head/day in the north and exports a small amount of pork to Myanmar. A large-scale hog processing plant will be built in 2022 to keep up with the growing operation and its aspirations for moving further up the production chain.

New businesses

Apart from swine, meat-type ducks and colored birds are the company's new growth drivers.

Mavin has invested in three duck breeder farms, two of which are located in Hung Yen and designated for serving customers in the North. The third, in Phu Tho, Dong Thap province, is under construction and will serve the south.

Mavin is working on a colored bird breeding program and plans to increase the number of colored or native birds sold on the market. A sire line is being selected, while the dam line will be procured from genetics companies.

It plans to produce 7 million native bird DOCs per year.

Offshore feed business

Mavin's total feed production capacity stands at around 1.2 million tonnes/year, with some 500,000 tonnes sold on the open market. It is developing livestock and aqua feed for Laos and Cambodia.

The company positions itself as a solutions provider, supporting customers in nutrition, meat quality and veterinary products.

A new 2,000-sq-m warehouse is being built in Phnom Penh to support its feed business there. Although competition in the Cambodian market is very intense, it sees potential for feed sales of up to 30,000 tonnes/year.

Mavin plans to offer feed, veterinary and feed additive services to livestock producers in Cambodia and Laos. Long-term, it plans to invest in feed mills offshore and execute a vertically integrated business model. ■

ฟาร์ม 2 แห่งตั้งอยู่ที่ฮันเยน ให้บริการลูกค้าในภาคเหนือแห่งที่ 3 ในฟุโธ จังหวัดดงทัพบ อยู่ระหว่างก่อสร้างและจะให้บริการลูกค้าในภาคใต้

Mavin อยู่ระหว่างการปรับปรุงพันธุ์ไก่พื้นเมือง และวางแผนที่จะเพิ่มปริมาณการจำหน่ายไก่พื้นเมืองในตลาด บริษัททำการคัดเลือกสายพันธุ์เอง ในขณะที่จัดซื้อสายพันธุ์จากบริษัทพัฒนาพันธุ์กรรม

บริษัทมีแผนจะผลิตลูกไก่พื้นเมือง 7 ล้านตัวต่อปี

ธุรกิจอาหารสัตว์ในต่างประเทศ

กำลังการผลิตอาหารสัตว์ของ Mavin อยู่ที่ 1.2 ล้านตันต่อปีโดยมียอดขาย 500,000 ตันในตลาด บริษัทกำลังพัฒนาธุรกิจอาหารสัตว์บกและอาหารสัตว์น้ำสำหรับประเทศลาว และกัมพูชา

บริษัทวางตำแหน่งตัวเองในฐานะผู้ให้บริการลูกค้าอย่างครบวงจรไม่ว่า ทางด้านโภชนาการ คุณภาพเนื้อสัตว์และผลิตภัณฑ์สุขภาพสัตว์

คลังสินค้าใหม่ขนาด 2,000 ตารางเมตรนั้นถูกสร้างขึ้นที่พนมเปญเพื่อรองรับธุรกิจอาหารสัตว์ ในประเทศกัมพูชา แม้ว่าในตลาดกัมพูชามีการแข่งขันอย่างรุนแรง แต่ตลาดก็มีศักยภาพพอที่จะขายอาหารสัตว์ได้สูงถึง 30,000 ตันต่อปี

Mavin เตรียมให้บริการอาหารสัตว์และสารเสริม ให้คำปรึกษาด้านสุขภาพสัตว์ แก่ผู้ทำธุรกิจปศุสัตว์ในประเทศกัมพูชาและลาว ในระยะยาว บริษัทมีแผนที่จะลงทุนในโรงงานอาหารสัตว์ในต่างประเทศและดำเนินการในรูปแบบธุรกิจครบวงจร ■



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Mavin Austfeed brings tilapia farming to the next level

MAVIN AUSTFEED has invested heavily in improving the quality and wholesomeness of its aquaculture operation as it targets becoming the country's top producer of premium quality tilapia in 2023, according to Nguyen Anh Tuan, deputy general-director.

The company took up tilapia farming in 2017 and has already invested over US\$5 million in a cage culturing system. The fish are reared at the Hoa Binh hydroelectric reservoir which has good water quality that prevents off-flavour problems.

The culturing system is regulated to ensure that the reservoir is not over farmed and producers comply with environmental regulations.

Dr Ngo Phu Thoa, deputy director of Mavin Aquaculture, said the company is working with universities and Penang-based nonprofit research organization WorldFish Organization to select tilapia that are highly productive and meet customer preferences. Its immediate genetic selection goals are to improve growth, livability and fillet yield.

Tilapia farming can be done year round in the reservoir, with each crop taking 120-135 days to complete. The fingerlings weighing 30 g are released and then harvested at 800 g, stocking density 50,000 fish/cage.

It is using a caging system from Norway. Currently, 48 cages are deployed. That figure will be raised to 100 by the end of 2019, said Mr Tuan.

The company uses a closed-loop supply chain. It enforces stringent quality con-



Nguyen Anh Tuan and Dr Ngo Phu Thoa เหงียน อัน ตวน และ ดร. เจอ พู ทัว



Norwegian cage systems are 20 m in diameter, yielding 30-40 tonnes/cage
ระบบกระชังจากนอร์เวย์ กว้าง 20 เมตร ให้ผลผลิต 30-40 ตัน/กระชัง

trol and traceability in its breeding and selection program, hatchery, feed manufacturing, grow out, processing, logistics, distribution and marketing.

It currently supplies around 6,000 tonnes/year. It plans to introduce new species such as common carp and begin exporting tilapia fillets after it raises pro-

duction to 10,000 tonnes by the end of 2019.

It is looking at the possibility of replicating the cage culturing model at other potential reservoirs in North Vietnam. Sustainable and environmental friendly operations are the keys to Mavin's long-term success, said Mr Tuan. ■

Mavin Austfeed ยกกระดานมาตรฐานการเลี้ยงปลาไนไปอีกขั้น

Mavin Austfeedทุ่มทุนมหาศาลในการปรับปรุงคุณภาพและความปลอดภัยของสินค้าสัตว์น้ำ เพื่อให้บรรลุเป้าหมายที่จะเป็นผู้ผลิตปลาไนคุณภาพเยี่ยมของประเทศในปี 2566 Nguyen Anh Tuan รองกรรมการผู้จัดการใหญ่กล่าว

บริษัท เริ่มเลี้ยงปลาไนในปี 2560 และลงทุนไปกว่า 5 ล้านบาทขุดลอกและสร้างระบบกระชัง ปลาถูกเลี้ยงที่อ่างเก็บน้ำที่ Hoa Binh ซึ่งเป็นแหล่งน้ำเพื่อการผลิตไฟฟ้า ซึ่งน้ำมีคุณภาพดี อันเป็นปัจจัยสำคัญที่ช่วยป้องกันปัญหากลิ่นโคลนในเนื้อปลา

มีระเบียบควบคุมเพื่อไม่ให้เกิดการเลี้ยงจนหนาแน่นเกินไป และผู้ดำเนินการต้องปฏิบัติตามกฎระเบียบด้านสิ่งแวดล้อมอย่างเคร่งครัด

ดร. โจ พู ถัว รองกรรมการผู้จัดการ Mavin

Aquaculture กล่าวว่า บริษัท ร่วมมือกับมหาวิทยาลัยหลายแห่งและองค์กรวิจัยที่ไม่หวังผลกำไร WorldFish Organization ในปีนี้ เพื่อคัดเลือกปลาไนที่มีประสิทธิภาพสูง และตอบสนองความต้องการของลูกค้า เป้าหมายลำดับแรกๆ ของการคัดเลือกพันธุ์ คือการปรับปรุงการเจริญเติบโต อัตราความอยู่รอด และปริมาณเนื้อ

การเลี้ยงปลาไนสามารถทำได้ตลอดทั้งปีในอ่างเก็บน้ำ การเลี้ยงแต่ละรุ่นใช้เวลา 120-135 วัน โดยเริ่มจากปล่อยลูกปลาที่มีน้ำหนัก 30 กรัมแล้วจับเมื่อน้ำหนัก 800 กรัมความหนาแน่นในการเลี้ยง 50,000 ตัวต่อกระชัง

บริษัทใช้ระบบกระชังจากนอร์เวย์ มีอยู่ 48 กระชังในปัจจุบัน และจะขยายเป็น 100 กระชังภายในสิ้นปี 2562 มร. ตวน กล่าว

บริษัท ใช้ห่วงโซ่อุปทานแบบปิด ซึ่งมีการควบคุมคุณภาพและตรวจสอบย้อนกลับอย่างเข้มข้นตั้งแต่กระบวนการการคัดเลือกพ่อแม่พันธุ์ การเพาะพันธุ์ โรงฟัก การผลิตอาหารสัตว์ การเติบโต การแปรรูป การขนส่ง การกระจาย ตลอดจนการตลาด

ปัจจุบันบริษัทมีการผลิตประมาณ 6,000 ตันต่อปี มีแผนที่จะแนะนำสายพันธุ์ใหม่ เช่น ปลาคาร์พ และจะเริ่มส่งออกเนื้อปลาไนหลังจากที่เพิ่มกำลังการผลิตเป็น 10,000 ตันภายในสิ้นปี 2562

บริษัทกำลังศึกษาความเป็นไปได้ที่จะขยายผลนาระบบกระชังเลี้ยงปลาในอ่างเก็บน้ำไปยังแหล่งน้ำอื่นๆที่มีศักยภาพ ในภาคเหนือของเวียดนาม การดำเนินงานที่เป็นมิตรกับสิ่งแวดล้อมและยั่งยืนเป็นกุญแจสำคัญสู่ความสำเร็จในระยะยาวของ Mavin มร. ตวนกล่าว ■



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Mavin Austfeed's 5th feed mill targets ASEAN markets



(4th left) Truong Thanh Liem together with production team (ที่ 4 จากซ้าย) เจียง ตัน เลียม กับทีมงาน



Mill process control ห้องควบคุมการปฏิบัติงาน

MAVIN AUSTFEED'S latest feed mill in Dong Thap, South Vietnam, has a lot of advantages. Besides being designed to produce top-notch feed, it is located in a prime location that is close to many customers and export markets that can be served by both trucks and river barges.

The plant in Cai Tau Ha Industrial Complex, Chau Thanh District, Dong Thap province, about 140 km southwest of Ho Chi Minh City, has a total area of 50,000 sq m. It is accessible by both road networks and barges via the Mekong river. Having two options for shipping makes the Dong Thap plant logistically competitive because feed can be exported to Cambodia and Myanmar via the Mekong river.

Its wharf can accommodate 5,000-tonne ships and has a loading capacity of more than 300 tonnes/hour.

In the first phase, the plant produces

400,000 tonnes/year for domestic and overseas markets. In the second phase, due around 2022, production capacity will be increased further. Presently, it is using 30% of its designed capacity.

Dong Thap will serve as a one-stop hub in the south for broiler, layer and duck feed, as well as swine genetics, food products and veterinary drugs.

Operating processes

Truong Thanh Liem, plant manager, said the plant is GMP accredited. Its design and workflow is geared towards wholesome feed and efficient operations.

Raw materials are randomly tested for quality and nutrient profiles. Tested raw materials are stored in bunker and metal silos. The plant has total storage capacity of 35,000 tonnes. Additional metal silos with a stocking capacity of 9,000 tonnes are to be installed.

Mavin Austfeed พร้อมส่งอาหารสัตว์จากโรงงานใหม่ โรงที่ 5 รุกตลาดอาเซียน

โรงงานอาหารสัตว์แห่งล่าสุดของ Mavin Austfeed ในดองต๊อบ ทางตอนใต้ของเวียดนาม มีข้อได้เปรียบมากมาย นอกจากถูกออกแบบเพื่อผลิตอาหารสัตว์คุณภาพสูงแล้ว ยังตั้งอยู่ในทำเลที่ยอดเยี่ยมซึ่งอยู่ใกล้กับลูกค้าและตลาดส่งออก สามารถขนส่งสินค้าได้ทั้งทางรถและทางเรือ

โรงงานซึ่งตั้งอยู่ในเขตอุตสาหกรรม Cai Tau Ha อำเภอ Chau Thanh จังหวัดดองต๊อบ ประมาณ 140 กม. ทางตะวันตกเฉียงใต้ของนครโฮจิมินห์ มีพื้นที่ทั้งหมด 50,000 ตารางเมตร สามารถเข้าถึงได้ทั้งทางรถและเรือบรรทุกสินค้าผ่านทางแม่น้ำโขง การมีสองตัวเลือกในการขนส่งทำให้โรงงานดองต๊อบมีข้อได้เปรียบด้านลอจิสติกส์เนื่องจากสามารถส่งออกไปยังกัมพูชาและพม่าได้อย่างสะดวกผ่านแม่น้ำโขง

ท่าเทียบเรือของโรงงานสามารถรับเรือที่มีระวาง 5,000 ตัน และขนถ่ายสินค้าได้มากกว่า 300 ตัน/ชั่วโมง

การผลิตในระยะแรกอยู่ที่ 400,000 ตัน/ปีสำหรับตลาดในประเทศและต่างประเทศ การเพิ่มกำลังการผลิตในระยะที่สองจะเริ่มประมาณปี 2565 ปัจจุบันใช้กำลังผลิตเพียง 30%

ดองต๊อบจะเป็นศูนย์กลางครบวงจรในภาคใต้สำหรับอาหารไก่เนื้อ ไก่ไข่ และเป็ด พันธุกรรมสุกร ผลิตภัณฑ์อาหาร และเวชภัณฑ์สัตว์

กระบวนการทำงาน

เจียง ตัน เลียม ผู้จัดการโรงงาน กล่าวว่า โรงงานได้รับการรับรองมาตรฐาน GMP การออกแบบและขั้นตอนการทำงาน มุ่งเน้นไปสู่การผลิตอาหารสัตว์คุณภาพและการดำเนินงานที่มีประสิทธิภาพ

วัตถุดิบจะถูกสุ่มทดสอบคุณภาพและค่าโภชนา วัตถุดิบที่ผ่านการทดสอบจะถูกเก็บกองในโกดังและในไซโล ความจุวัตถุดิบทั้งหมด 35,000 ตัน บริษัทจะสร้างไซโลที่มีความจุ 9,000 ตันเพิ่มขึ้นอีก

โรงงานแห่งนี้ มีเครื่องอัดเม็ดขนาด 15-25 ตันต่อชั่วโมง 4 ตัว ทำให้มีกำลังการผลิตรวม 85 ตันต่อชั่วโมง เครื่องอัดเม็ดถูกควบคุมโดยระบบอัตโนมัติ ผู้ปฏิบัติงานเพียงแต่ตั้งอุณหภูมิการอัดเม็ดเท่านั้น ซอฟต์แวร์จะปรับค่าพารามิเตอร์

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A robot packing line. Two more robot arms are to be installed in Q1, 2019. แผนกลขนถุงอาหารการติดตั้งแขนกลอีก 2 ตัวจะแล้วเสร็จในปี 2562

The plant has five, 15-25 tonnes/hour pellet mills, giving a total production capacity of 85 tonnes/hour. The pellet machines are automatically controlled and operators are needed only to set the pelleting temperature. The software adjusts other parameters to achieve optimal pelleting conditions. This minimizes rework and fines.

Shrink loss is below 0.3% and operating cost per kg is 311 VND. Its next challenge is to reduce the production cost to below 250 VND/kg by reducing fuel costs, rework and maintenance expenses, he said.

Piglet feed is made from full fat corn and full fat soybeans with a single-screw extruder that can produce around 4-7 tonnes/hour.

Poultry pre-starter feed is presented in crumble form. After pelleting, the feed passes through crumble rolls to break it into smaller particles. The crumbled particles pass through a sieve to remove undersized particles and fines which are pelleted again.

Die hole sizes are 2.5, 3 and 4 mm. The compression ratio for poultry feed ranges from 11.7-15 and hog grower finisher 13-16. Average pellet hardness is 97-98%.

Hog grower/finisher feed is highly gelatinized by undergoing a conditioning temperature above 90°C, retention time 65 seconds, steam pressure 2.5 bar. The gelatinization process also makes the pellets highly durable.

The mixer is large, with a batch size of five tonnes, mixing CV 2.53%. Ground grains, minor and major ingredients are stored in bins. Three macro ingredient scales operate simultaneously, each with a loading capacity of 500 kg.



High speed 5-tonne, twin-shaft paddle mixer, mixing time 3 minutes, CV below 5% เครื่องผสมแบบ 2 แกน ความจุ 5 ตัน รอบการผสม 3 นาที ค่า CV ต่ำกว่า 5%

Smaller scales are used for minor ingredients which weigh assigned ingredients independently within the mixer's cycle time. The batching system is accurate and synchronized with mixing cycles.

Of the total production 96% is pellets, with the rest mash and crumble feed.

Procurement of process control system software for premixes is underway. The premix operation will be fully operable sometime in 2019, said Mr Liem.

A robot arm handles the 25-40 kg feed bags at a rate of 20 tonnes/hour. Installation of two more robot arms is to be completed in 2019.

Bulk trucks will be used to service its own farms in the near future in order to reduce the number of bags used.

Mavin Austfeed operates five feed mills in Hung Yen, Ha Nam, Nghe An, Binh Dinh and Dong Thap with combined capacity of over 1 million tons/year. It has invested in a Research and Development Center in Cao Lanh district, Dong Thap province to undertake nutritional, genetic and animal health research. ■

อื่นๆ เพื่อให้ได้สภาวะการอัดเม็ดที่ดีที่สุดช่วยลดการผลิตซ้ำและฝุ่น

การสูญเสียน้ำหนักต่ำกว่า 0.3% และต้นทุนการดำเนินการต่อกิโลกรัมคือ 311 VND ความท้าทายต่อไปคือการลดต้นทุนการผลิตให้ต่ำกว่า 250 VND/kg โดยการลดต้นทุนเชื้อเพลิง ค่าใช้จ่ายในการผลิตซ้ำและค่าบำรุงรักษา

อาหารลูกสุกรทำจากข้าวโพดไขมันเต็มและถั่วเหลืองไขมันเต็ม ด้วยเครื่องอัดรีดสุกรเดี่ยว กำลังผลิต 4-7 ตัน/ชั่วโมง

อาหารลูกไก่ จะเริ่มจากการขบให้มีขนาดเล็กลง หลังจากการอัดเม็ด ลดอุณหภูมิ และไล่ความชื้น อาหารเม็ดนี้จะถูกร้อนเพื่อให้เกร็ดขนาดเล็กและผงละเอียดร่วงลงมา เพื่อรวบรวมนำไปอัดเม็ดซ้ำ

ขนาดเส้นผ่านศูนย์กลางของรูของเครื่องอัดคือ 2.5, 3 และ 4 มม. อัตราส่วนการอัดสำหรับอาหารสัตว์ปีกอยู่ในช่วงตั้งแต่ 11.7-15 และอาหารสุกรรุ่นสุกรขุนใช้อัตราส่วนการอัด 13-16 ค่าความแข็งของเม็ดอาหารเฉลี่ยที่ 97-98%

อาหารสุกรรุ่น สุกรขุน ผ่านการปรับสภาพซึ่งแบ่งถูกทำให้ร้อนที่อุณหภูมิสูงกว่า 90°C เป็นเวลา 65 วินาที แรงดันไอน้ำ 2.5 บาร์ การเกิดเจลลาตินในเซชันทำให้เม็ดแข็งไม่แตกหักง่าย

เครื่องผสมมีขนาดใหญ่ ผสมได้ครั้งละ 5 ตัน เจ้าหน้าที่จะเป็นคนเติมพรีมิกซ์ ธัญพืชขบ ส่วนผสมของวัตถุดิบรองและส่วนประกอบอื่นๆเก็บอยู่ในถัง เครื่องซึ่งวัตถุดิบหลักขนาดใหญ่ 3 เครื่องทำงานพร้อมกัน เครื่องซึ่งแต่ละตัวรับน้ำหนัก 500 กิโลกรัม

เครื่องซึ่งขนาดเล็กนั้นใช้สำหรับวัตถุดิบรอง ซึ่งจะซึ่งส่วนผสมอย่างอิสระภายในระยะเวลาของเครื่องผสม ระบบรวบรวมและซึ่ง มีความแม่นยำและสอดคล้องกับวงจรการผสม

อาหารที่ผลิตทั้งหมดแบ่งเป็นอาหารเม็ด 96% ที่เหลือเป็นอาหารผงและอาหารชนิดเม็ดบี

บริษัทกำลังจัดหาซอฟต์แวร์ระบบควบคุมกระบวนการผลิตพรีมิกซ์ โดยการผลิพรีมิกซ์จะทำได้อย่างสมบูรณ์ในปี 2562 มร.เลียม กล่าว

แผนกลขนถุงอาหารขนาด 25-40 กิโลกรัมได้ 20 ตัน/ชั่วโมง การติดตั้งแขนกลอีก 2 ตัวจะแล้วเสร็จในปี 2562

ในอนาคตอันใกล้นี้ จะใช้รถบรรทุกขนอาหารไปยังฟาร์มของบริษัทเองเพื่อลดการใช้ถุง

Mavin Austfeed มีโรงงานผลิตอาหารสัตว์ 5 แห่งในเมืองฮึงเจียน, ฮานัม, หึง อัน, บินห์ ดินห์ และดองทาบ โดยมีกำลังการผลิตรวมกันกว่า 1 ล้านตันต่อปี บริษัทได้ลงทุนในศูนย์วิจัยและพัฒนาในเขต Cao Lanh จังหวัดดองทาบ เพื่อทำวิจัยด้านโภชนาการ พันธุกรรม และสุขภาพสัตว์ ■



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Inflammation: Causes, mechanisms and counteraction

Cause and basic mechanisms

Inflammation is an important defense mechanism of the innate immune system. Inflammation is defined as the “normal, protective, and usually temporary response of the innate immune system to pathogens or injury” (Gessner et al., 2018). It is established within minutes after infection. It is meant to supply further effecting molecules and cells to support primary active macrophages and act as a physical barrier to separate local pathogen-invaded tissue from healthy parts. Body barriers such as dermal skin, the intestinal mucosa, or respiratory tissue are confronted with direct contact to the environment and thus with various antigens throughout the day. Inflammation can be caused indirectly via stress or directly through tissue damage or through pathogens including viruses, bacteria, and parasites. But also other foreign substances such as feed ingredients can be pro-inflammatory factors. For the intestinal tract, Niewold (2012) mentions metabolic inflammation as a normal post-prandial action. The immune system has constantly to “decide,” if invading organisms are tolerated or fought against. This makes the environmental contact areas less sensitive than other parts of the body, but also puts some particular importance to them by serving as the first defense line. In general it becomes clear that with a (sub-) inflammatory process running constantly, the immune system is activated and requires tight regulation. Unfortunately, this cannot always be realized and an overreaction of inflammatory mechanisms may occur.

At the site of infection, inflammation is initiated by the response of macrophages to pathogens or tissue damage (oxidized arachidonic acid). Cytokines are secreted by macrophages and contribute as messenger molecules in order to direct further cells to the infected area. The accumulation of neutrophils and release of enzymes and oxygen radicals (ROS) enhances the inflammatory reaction. Basic symptoms, which are usually dedicated to inflammation, are pain, heat, redness, swelling and loss of function. The described symptoms can be explained by widened blood

vessels and thus increased blood flow, activated endothelial cells lining the blood vessel to express adhesion molecules that promote the binding of circulating leukocytes, increased vascular permeability and local accumulation of fluids and proteins in tissue (edema) (Janeway, Travers and Walport, 2001).

Consequences

Even though inflammation at the first glance is a positive intention of the body to defend itself, it initiates destructive mechanisms, which can also lead to permanent tissue damage. Necrosis on the intestinal wall can reduce the function of cells and also local integrity and absorption mechanisms. But, even before non-reversible effects occur, inflammatory processes cause performance loss, which can be explained by cytokine mediated activities such as muscle catabolism, hypothalamus regulated anorexia and fever, acute phase protein (APP) production in the liver, leucocyte production in bone marrow and accelerated turnover of the intestinal tissue. Several studies provide data of the energy and nutrient demand of immune mechanisms. As summarized by Lochmiller and Deerenberg (2000), sepsis or inflammation can require up to 30% of the bodies available energy. Also, vaccination or an endotoxin challenge can cause similar increased energy demands. As stated by Klasing (1988), protein and trace minerals demand clearly is increased and altered in phases of inflammation. This is the reason for worsened feed conversion ratios and poor growth development in livestock animals.

Not only does intestinal inflammation cause changes in the host's metabolism,



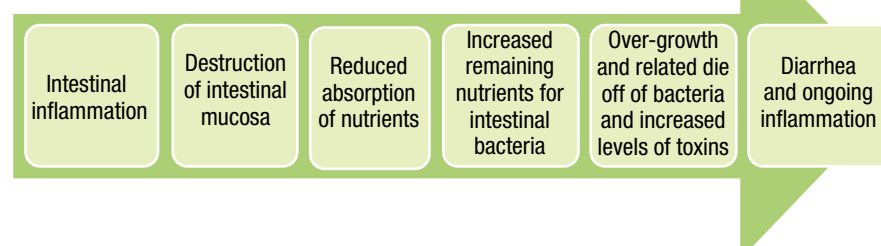
Anja Pastor



Julia Schmitt

but also may alter the intestinal environment. Due to the lowered nutrient absorption capacity of the intestine and rising blood flow in inflamed damaged tissue, the level of nutrients for bacteria increases and changes the microbiota to a dysbiotic condition, which may cause increased toxin production and favors the growth of specific pathogens, which benefit from inflammation such as *Salmonella*, for example. This in turn can cause diarrhea and reduced intestinal integrity with widened tight junctions between cells and accelerates the downward spiral to decreased performance like a vicious circle. (Fig. 1)

Figure 1:





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Fighting strategies

There are several strategies in fighting inflammation. One common group are the non-steroidal anti-inflammatory drugs (NSAIDs). As many of those compounds inhibit important enzymes of the inflammatory cascade in a non-specific way (Cox1 + Cox2 inhibition), they often have negative side effects when used too often. One of the most well known products of this group is acetylsalicylic acid. Specific herbal compounds being used as feed additives are known for their anti-inflammatory effects, too, and are one of the 21st century's "new" or "revitalized" approaches in fighting inflammation.

Isoquinoline alkaloids and their effects on inflammation

Isoquinoline alkaloids (IQs) from the plant *Macleaya cordata* are well-known anti-inflammatory compounds and have been used as a feed additive for food producing animals for decades.

Effect on NF- κ B activation

IQs are known to inhibit NF- κ B activation (Chaturverdi et al., 1997). NF- κ B is a transcription factor and plays a crucial role in the inflammatory response as its activation induces the transcription of pro-inflammatory genes encoding pro-inflammatory cytokines and chemokines (Tak and Firestein, 2001). Consequently, if the NF- κ B activation is minimized by

IQs, less pro-inflammatory cytokines are synthesized and set free.

Effect on cytokines

Acetylsalicylic acid, a known NSAID with an anti-inflammatory effect was compared to IQs (Soler et al., 2016) using the intestinal cell line IPEC-J2. *E. coli* was used to trigger inflammation. Acetylsalicylic acid and IQs decreased the relative abundance of pro-inflammatory cytokines compared to an untreated control. For the cytokines TNF- α and IL-1 β no differences were found between acetylsalicylic acid and IQs, suggesting that IQs show indeed anti-inflammatory properties, also on the cytokine expression level. (Fig. 2).

Effect on macrophage activity

A study (Khadem et al., 2014) investigated the effect of IQs on macrophage activity. Macrophages can take up an infectious agent. This process, known as phagocytosis, requires that macrophages produce radical oxygen species, lysozyme, proteolytic enzymes, or nitric oxide (NO). If macrophages are activated by cytokines, they set free high amounts of NO. (Sharma et al., 2017) stated that NO is involved in the pathogenesis of inflammatory disorders of the gut, joints, and lungs. NO is metabolized from the amino acid L-arginine by the enzyme inducible nitric oxide synthase (iNOS).

By measuring iNOS levels, macrophage activity can be evaluated. Khadem et al (2014) investigated the effect of IQs supplementation on the iNOS expression in broiler chickens. Birds were either supplemented with oxytetracycline or IQs. When birds were 35 days of age, the jejunal gene expression of iNOS was measured. IQs reduced iNOS expression in a dose-dependent manner. The effects on feed conversion ratio reflected the iNOS results – a dose-dependent effect was observed when IQs were given to broiler chickens. It can be hypothesized that a decrease in inflammation was mirrored in a better feed conversion ratio.

Effect on acute phase proteins

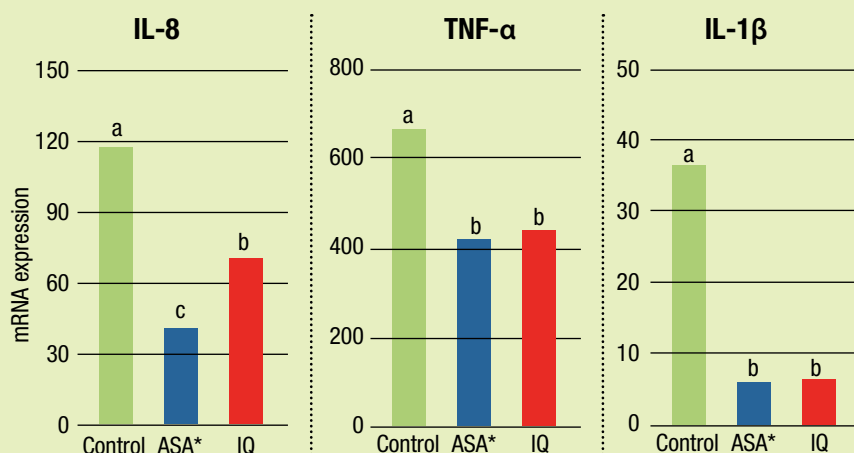
Acute phase proteins are produced as part of the unspecific immune response and are triggered by pro-inflammatory cytokines. Cytokines reach the liver and promote – in the presence of cortisol – the synthesis of acute phase proteins. While the plasma levels of positive acute phase proteins will increase during an acute inflammation (e.g. C-reactive protein, serum amyloid A, haptoglobin), the levels of negative acute phase proteins will decrease (e.g. transferrin, albumin). The effect of IQs on acute phase protein levels in weaned piglets was investigated by Kantas et al. (2015). Weaning is a very stressful event for piglets, due to social, immunological, infectious, metabolic and nutritional changes. As a consequence, intestinal inflammation occurs, leading to an increase in cytokines and acute phase proteins which in turn leads to an impaired intestinal barrier function, negatively affecting absorptive capacity and increasing the risk for bacterial infections (Pié et al., 2004; Al-Sadi et al., 2010). The results obtained by Kantas et al. (2015) showed that IQs supplementation decreased haptoglobin and serum amyloid A levels significantly after 7 and 14 days of supplementation. Again, a dose-dependent effect was seen. In addition, average daily weight gain and feed conversion ratio was significantly improved in IQs supplemented piglets. This indicates that IQs reduced the stress-associated impaired gut integrity, improving performance.

Effect on tight junction proteins

Tight junction proteins are junctional complexes between enterocytes. One of their functions is to prevent paracellular leakage of big molecules (including pathogens). Some pathogens and cytokines are known to interact with tight junction proteins, possibly leading to a

Figure 2:

The response of IPEC-J2 cells to a challenge with an enterotoxigenic *E. coli* strain in the presence or absence of anti-inflammatory compounds. Control = PBS; ASA = acetylsalicylic acid, IQ = isoquinoline alkaloids. Experiments were done in triplicate (n=3). Treatments not sharing letters are significantly different (P<0.05).



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Optimizing animal wellbeing and gut health are the main interests in Phytobiotics' product development and research. We would like to share our vision to **support a sustainable industry** and therefore we would have the opportunity to introduce our new global research platform, the Animal Production Inflammation Centre (APIC).

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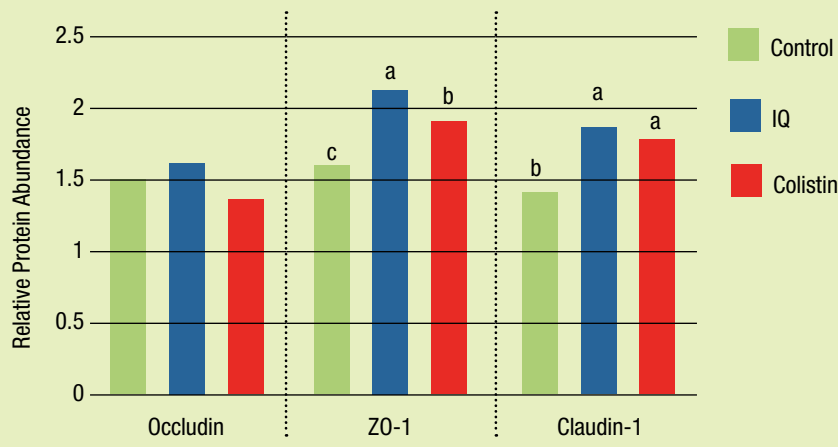
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Figure 3:

Relative protein abundance of tight junction proteins in the jejunal mucosa of pigs (n = 6). Different letters indicate a significant difference (P < 0.05).



disruption of the gut barrier function. Liu et al. (2016) evaluated the effect of a IQs supplementation in growing pigs on tight junction protein expression. Following IQs supplementation, the expression of the tight junction proteins zonulin-1 and claudin-1 was increased. This indicated an improved barrier function. (Fig. 3).

Effect on cortisol levels

To evaluate stress, cortisol can be used a marker. Artuso-Ponte et al. (2015) studied the effect of IQs supplementa-

tion on salivary cortisol levels in pigs before and after transportation to the slaughterhouse. Before the transportation to the slaughterhouse, no differences in cortisol content was seen between pigs in the negative control and IQs supplemented pigs. After transportation though, only pigs of the negative control showed a significant increase in cortisol levels, while no significant effect was seen in the IQs fed pigs. The results indicated that IQs might have an effect on regulating stress response.

Effect on animals' performance

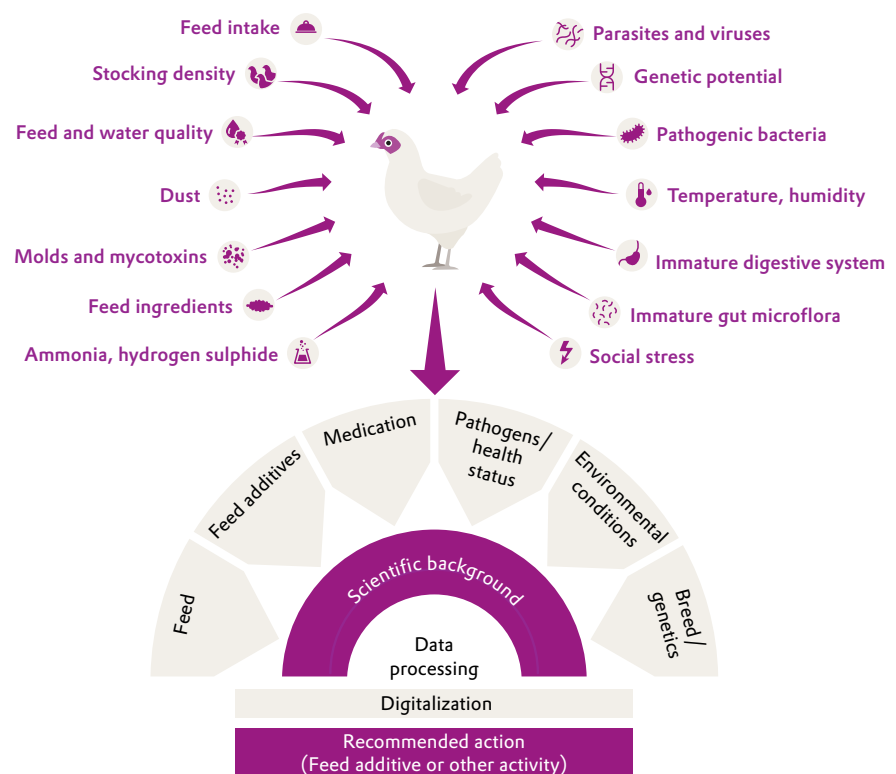
Due to their anti-inflammatory mode of action, IQs support gut health by promoting homeostasis of intestinal inflammation. As a result of improved gut integrity, better nutrient digestibility is achieved in IQs fed animals (Boroojeni et al., 2018). This is correlated with a better feed conversion and weight gain (Kantas et al., 2015; Khadem et al., 2014). This is underlined by a meta-analysis of more than 20 broiler trials conducted worldwide (Pastor and Kraieski, 2018). On average, feed conversion was improved by 3.1%, if IQs were fed to broiler chickens compared to a negative control, while body weight gain was improved by 4.0%, if IQs were supplemented.

In conclusion, inflammation is a double-edged sword. While it is a normal, protective and necessary process on hand, it can minimize performance in food-producing animals if the physiological inflammation homeostasis is disturbed. Phytogetic feed additives offer a tool to improve gut health and therefore performance by controlling inflammatory processes. Plant-based Isoquinoline alkaloids are anti-inflammatory compounds that are able to affect the inflammation cascade in several steps, therefore contributing to gut health, and a sustainable animal production. ■

The Internet of Chickens

Evonik pursues a holistic, data and knowledge-based approach to optimizing health, animal well-being, and productivity on the poultry farm. To this end, the company is now linking its competency in animal nutrition with modern digital technologies.

The chicken farm of the future is fully digitized. It uses intelligent sensors and integrated systems to generate optimal climate conditions. Animal health is continuously monitored: What does the clucking say about the mood in the barn? Is the flock's body temperature at a normal level? Are the animals eating and drinking enough? Sensors and microphones provide information, while specialized software analyzes the collected data. In the event of questions and problems, a support system comprising self-



learning artificial intelligence components can help. Consumers get access to data as well: A wealth of important information creates transparency about animal farming, breeding, and slaughtering.

It will most likely take some more time to establish these conditions, but the researchers and developers of Evonik have already started to work on the Precision Livestock Farming (PLF) system for poultry. The term stands for the use of digital technologies to gather knowledge and data in order to develop effective recommendations with verifiable benefits. Based on its analytical services for amino acids, Evonik already has many years of experience with digital business models in agriculture.

“We are now linking our competency and innovation capacity in animal nutrition with modern digital technologies to create added value for customers and consumers,” says Prof Stefan Pelzer, head of the Gut Health & Diagnostics innovation unit at Evonik. To this end, the company plans to dig deep into data—its own, those of scientific studies, and those of customers.

Detecting changes in real time

The vision is this: The Evonik PLF system will give meat producers precise information about the current condition of the animals in a flock and their development. The necessary data will be recorded and evaluated automatically, with results conveniently available via an app on a smart phone, tablet or laptop. The system detects changes in important parameters in real time and the program provides daily recommendations for

feeding and livestock management, with a primary focus on improving meat quality. “The combination of digital technologies and product innovations enables increased productivity. At the same time, it substantially reduces the use of antibiotic growth promoters, which still are frequently being mixed into the feed,” says Prof Pelzer. “Our goal is to keep animals healthy and raise them without any unnecessary drugs.”

Animal health is a top priority for Evonik in product innovations. Evonik’s scientists consider the chicken gut a decisive element. This is the location where feed is digested and where important immune functions are situated—many infectious diseases have their origin in the gut. To better understand the complex processes in the digestive system, Evonik has been working to develop a gut simulation model since late 2015 within the scope of the “Good Bacteria and Bioactives in Industry” innovation alliance, which is funded by Germany’s Federal Ministry of Education and Research. The model is intended to reflect the interactions between feed, the immune system, and intestinal flora and will enable the testing of feed additives such as probiotics.

Probiotics are living natural microorganisms that unfold their effect in the intestines. Their metabolic products have a positive impact on the composition of bacteria in the digestive system, strengthen the immune system, and boost the resilience and health of animals. The Evonik portfolio already includes a number of probiotics for animals such as Ecobiol, which was specifically developed for use with poultry.



Feeding studies involving Ecobiol® on chicken farms confirmed the performance of the product. “That could make our probiotic an alternative to the prophylactic use of feed antibiotics,” says Prof Pelzer. This is an important point, because the World Health Organization sees a link between antibiotic growth promoters and the occurrence of increasingly resistant pathogens in humans.

Evonik researchers are also working to develop quick and simple test systems which will allow chicken farm managers to make assessments of poultry health. Evonik’s goal is to warn poultry producers when an infection is about to arise based on these new tests so they can take suitable countermeasures at an early stage.

Making use of data and knowledge

The productivity of a chicken farm is influenced by many factors, and the relevant factors must be understood and made measurable. From the data obtained and existing knowledge, software can then be used to derive recommendations for optimizing the conditions in which the animals are kept.

Big data on chicken farms:

Evonik plans to contribute to improved health and productivity in chicken farming by means of systematic data collection and evaluation and with custom-tailored feed additives. ■

Scio+

USING BIG DATA AND ANALYTICS TO



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BY INVITATION

Data science at Scio+ drives animal production towards the future

Mikkel Boel



Mikkel Boel is a data scientist at Scio+ R&D working on future applications. He is a trained biologist with a background in the field of functional ecology and behavioral physiology. He has previously worked with quantifying animal behaviors using sensor data to identify factors related to ecology, physiology, and production. Throughout his career, he has worked with developing predictive algorithms for decision support and reduce costs of labor.

About Scio+

Scio+ is a Danish data-driven company developing solutions for the food production sector. These solutions provide farm production insights by applying data science techniques to production and behavioral data to create production value. Insights from this analysis is provided to customers via easy-to-use interfaces. As a company the focus is on accuracy and data security.

Scio+ is collaborating with broiler experts at Big Dutchman, SKOV and DOL Sensors as well as with leading experts (e.g. animal producers, companies, researchers) around the world, to create data driven insights to optimize the entire production chain.

Data Collection

R&D at Scio+ focus on the next generation data solutions for the food production industry. The approach is to identify, combine and utilize data-derived knowledge from existing and new sensor technologies. Key information on production, animal behaviors and the rearing environment are collected. The focus is primarily on multi applicable and non-invasive sensors, resulting in minimal disturbances to the production.

Scio+ aim to directly and indirectly detect deviations and abnormalities in the biological processes that influence the production value. This is based on algorithms embedded in systems that process real-time sensor data to provide decision support for meaningful actions to optimize production or manage suboptimal situations. Additionally, data from existing farm equipment is used, such as climate information (e.g. temperature, humidity and air quality (CO₂ and NH₃)) and feed/water consumption. This data is combined with advanced analyses of water quality, audio, image and video data.

Scio+ work to identify key parameters influencing production and create timely alarms and prediction of future events. Integration of predictions as well as

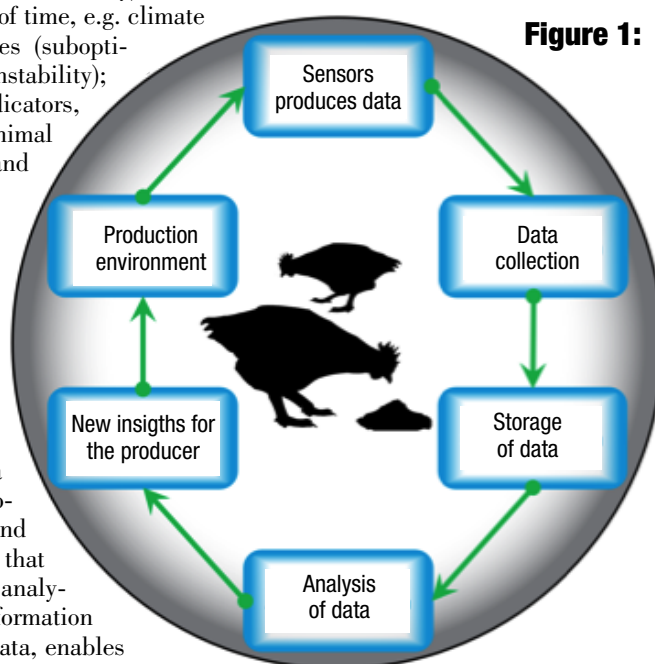
access to real-time decision support in a feedback loop to the producer generates high value in production (see Figure 1). With respect to obtaining a product that must live up to specific requirements, e.g. weight forecasting (to meet a target weight with a certain uniformity); identifying issues ahead of time, e.g. climate and feed/water issues (suboptimal/toxic levels or instability); and behavioral indicators, e.g. indication of animal wellbeing, disease and stress.

Issues in both the growing environment and how animals thrive are reflected in the animal behavior. Hence, looking at both climate data and behavior data from the birds, provide both direct and indirect information that can be utilized in analyses. Linking such information to actual slaughter data, enables

us to identify issues that has the highest value and influence on the final product.

Scio+ are creating novel solutions that visualize animal status and identify factors that influences both animal welfare and production. These new solutions will

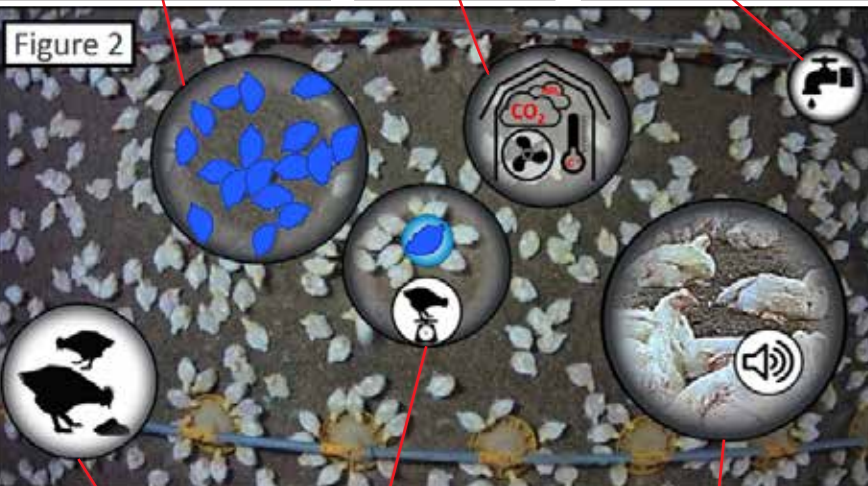
Figure 1:



Camera technology: Weighing, uniformity, growth and behavior

House climate: Trends and stability

Water: Consumption, growth and quality



Feed: Consumption and growth

Bird weigher: Weighing, animal size and growth

Audio: Behavior and welfare (disease, stress)

provide farmers with valuable insights and support their decision making with regards to evaluation and improvement of their production (see examples in Figure 2).

Scio+ strive to develop and bring next-generation technology into the food pro-

duction industry through a science driven approach. The goal is to deliver intelligent data-driven tools that will address critical issues; consequently, increasing precision in achieving production goals and profit. ■

Scio+ and Mikkel Boel will exhibit at VIV Asia from March 13-15, 2019 Bangkok, Thailand – booth H099.3560

Mikkel Boel mikkel.boel@scioplus.com
Visit us at <http://www.scioplus.com>

Are you managing your endotoxin risk?

**Siyeong Choi - Regional
Technical Sales Manager
Swine and Michele
Muccio - Product Manager
Mycofix®**

ENDOTOXINS ARE RELEASED DURING THE replication or lysis of bacteria. In healthy animals, the gut acts as a barrier to endotoxins entering the blood. Yet in times of environmental, nutritional or metabolic stress, gut permeability can increase, allowing endotoxins to enter the blood stream, weakening the immune system and impairing animal performance. Mycofix® included in the diet can combat the negative impact of endotoxins.



Siyeong Choi



Michele Muccio

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*Authorized by EU Regulations No 1115/2014, 1060/2013, 1016/2013, 2017/913 and 2017/930 for the reduction of contamination with fumonisins, aflatoxins and trichothecenes.

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Endotoxins and negative effects in swine

Lipopolysaccharides (LPSs) are cell wall components of Gram-negative bacteria such as *E. coli* and *Salmonella*. They are also called endotoxins and are released during bacterial replication or death (lysis). LPSs vary depending on the originating bacteria, being more or less aggressive or pathogenic according to the variability of the O-specific polysaccharide chain. They also serve as a potential entry barrier to antimicrobials on the outer membrane of Gram-negative bacteria. Pigs are continuously exposed to LPSs throughout their lives. While the main route for swine LPS exposure is via the gastrointestinal tract, the concentration of endotoxins in the air and dust should not be overlooked: endotoxins are a major component of biological dust. In healthy animals, the intestinal and other epithelia such as the skin or lungs represent an effective barrier preventing the passage of LPSs into the bloodstream. However, if they do gain entry, endotoxins can elicit strong immune responses, weakening immune systems and impairing performance. In swine species, endotoxins cause an inflammatory cascade that increases a pig's maintenance requirements due to fever. This, coupled with reduced feed intake, leaves less energy available for growth. Moreover, a severely pronounced immune response can lead to septic shock.

Endotoxins and feed efficiency

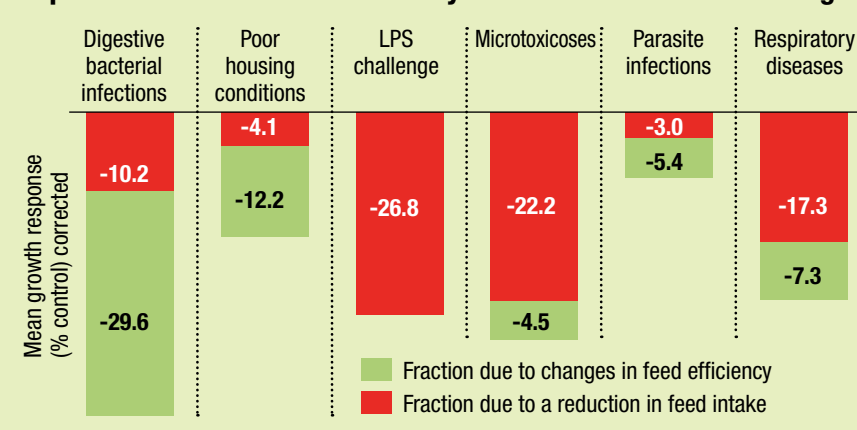
Endotoxins also impair feed efficiency. A recent study of common challenges in pig farms reported a decrease in growth response due to decreased feed intake for a number of reasons as listed in Table 1.

Table 1. Percentage decrease in feed intake associated with various reasons

Reason for decrease in feed intake	Percentage decrease
• Parasite infections	3%
• Poor housing conditions	4.1%
• Digestive bacterial infections	10.2%
• Respiratory diseases	17.3%
• Mycotoxins (mycotoxin-induced diseases)	25.2%
• Lipopolysaccharides (LPSs)	26.8%

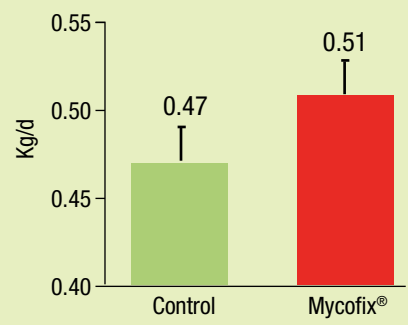
The results are also displayed along with feed efficiency differences in Figure 1.

Figure 1. Metabolic consequences expressed in negative growth response of an activated immune system due to different challenges



Prevention and management of endotoxin risk

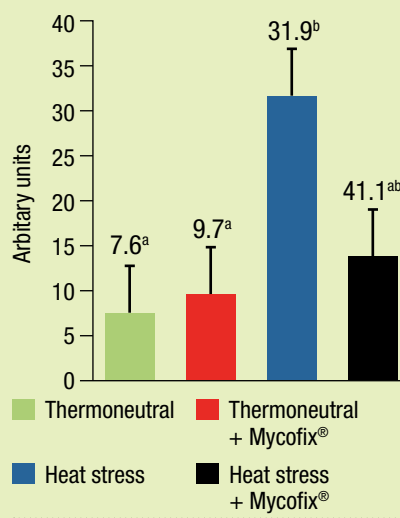
Figure 2. Average daily weight gain in pigs over 28 days of age receiving either the control diet or the Mycofix®-treated feed before heat stress (p=0.26). Bars represent pooled standard error of the mean.



Source: Biomin

In recent years, new concerns have emerged about nutritional, environmental, and social factors that may disrupt the gut barrier function and/or increase exposure to LPSs. The gut is the first line of defense against endotoxins and, if compromised with anti-nutritional, stress or metabolic factors, e.g. in times of heat stress, mycotoxin contamination or inflammation, endotoxin transport can increase. In several livestock species, it is commonly accepted that a 1- 2°C increase in body temperature causes the intestinal tight junction proteins to be affected, increasing intestinal permeability and allowing more LPSs to enter the blood stream. High calorific and high fat diets increase serum endotoxin concentrations and induce acute low-grade inflammation. Starvation depresses the expression and function of intestinal alkaline phosphatase (IAP), a brush-border enzyme that detoxifies LPSs.

Figure 3. Effect of different conditions (thermoneutral vs heat stress) on gilts fed the control diet or the Mycofix®-treated feed on ileal endotoxin permeability. Bars represent pooled standard error of the mean.



*Superscripts indicate statistically significant differences

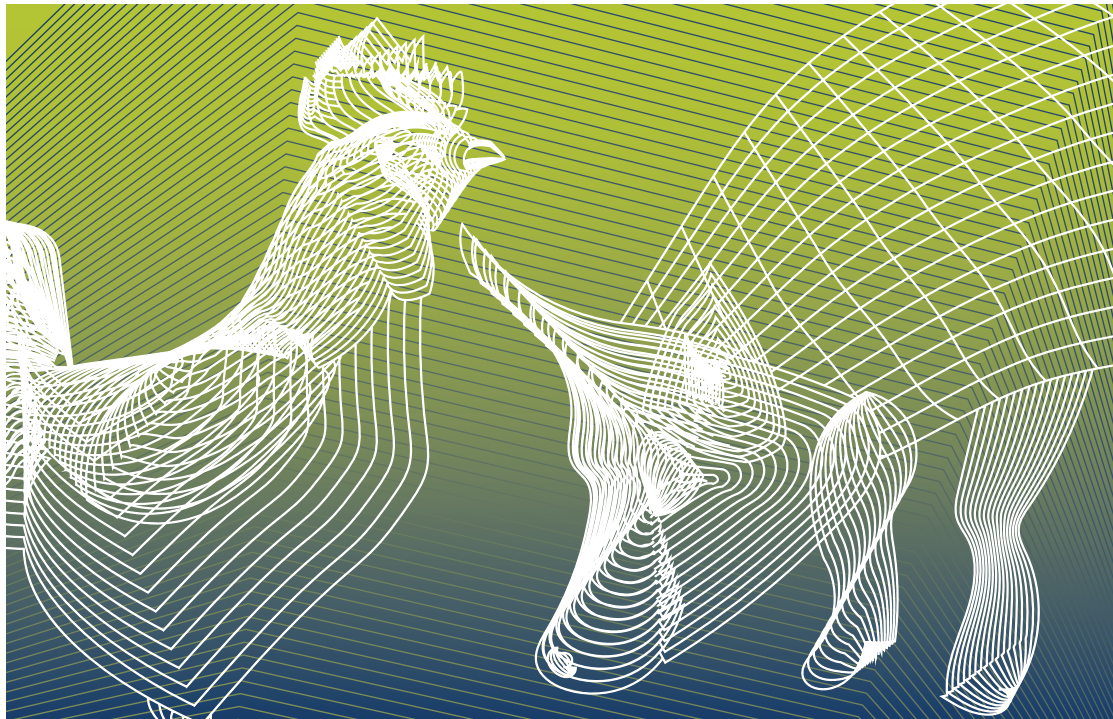
Source: Biomin

A BIOMIN solution for the management of endotoxins

Mycofix® is a state-of-the-art, market-leading product for the deactivation of mycotoxins, which utilizes the three strategies of adsorption, biotransformation and bioprotection to provide 360° mycotoxin counteraction. The product has also demonstrated effectiveness against of feed was included in the diet. The duration of the trial was 28 days. Several parameters were evaluated including average daily weight gain and ileal endotoxin permeability (Figures 2 and 3).

In the second trial conducted at CAN, 36

Selacid® Green Growth



Selacid Green Growth:

- Improves zootechnical performance
- Supports a normal faecal consistency
- May contribute to maintain a stable intestinal microbiota

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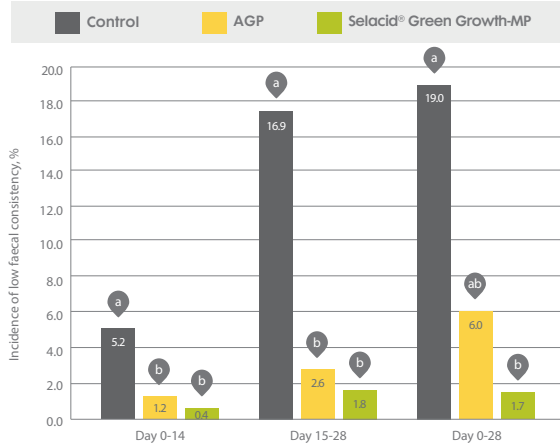


Figure 4. Incidence of poor faecal consistency in the first and second phase and the overall study for the different treatment groups. Results with different superscripts differ significantly ($p < 0.05$).

In this study, no differences in FCR and ADG between the AGP group and Selacid® Green Growth-MP group were found. These results show that the addition of Selacid Green Growth-MP to the diet safeguards the zootechnical performance of weaned piglets raised in an AGP-free environment. The incidence of poor faecal consistency in the Selacid Green Growth-MP group was also clearly reduced compared to the control group. In addition, the Selacid Green Growth-MP group did not differ significantly from the AGP group, which also indicates that the incidence of poor faecal consistency was safeguarded when animals received an AGP-free diet.

The reduced incidence of poor faecal consistency and numerically reduced faecal *Escherichia coli* counts may reflect that the addition of Selacid Green Growth-MP to the diet of weaned piglets may contribute to an improved microbial balance.



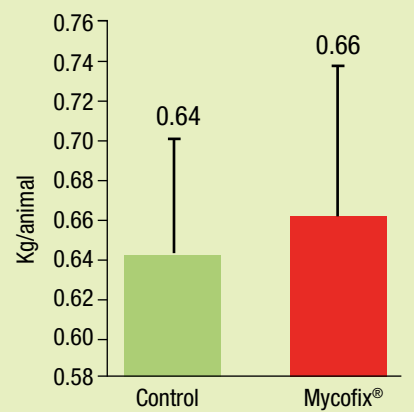
Figure 3. Feed conversion ratio (FCR) in the first and second phase and the overall study for the different treatment groups. Results with different superscripts differ significantly ($p < 0.05$).

Treatment table

Treatment group	Control group	AGP-mix group	Selacid® Green Growth-MP group
Phase 1 (day 0-14)	--	10 ppm zinc bacitracin 5 ppm Colistin sulphate 5 ppm Olaquinox	3 kg/t
Phase 2 (day 15-28)	--	10 ppm zinc bacitracin 5 ppm Colistin sulphate 5 ppm Olaquinox	3 kg/t

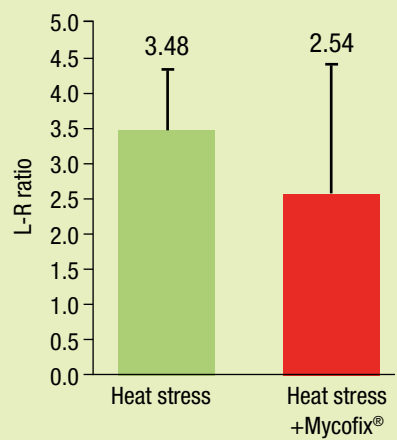
AGP Mix*: containing 100 ppm of 10 % zinc bacitracin premix (to provide 10 ppm zinc bacitracin), 50 ppm of 10 % Colistin sulphate premix (to provide 5 ppm of Colistin sulphate), and 100 ppm of 5 % Olaquinox (to provide 5 ppm of Olaquinox)

Figure 4.
Average daily weight gain in pigs between 36 and 56 days of age receiving either the control diet or the Mycofix®-treated feed before heat stress ($p=0.197$). Bars represent pooled standard error of the mean.



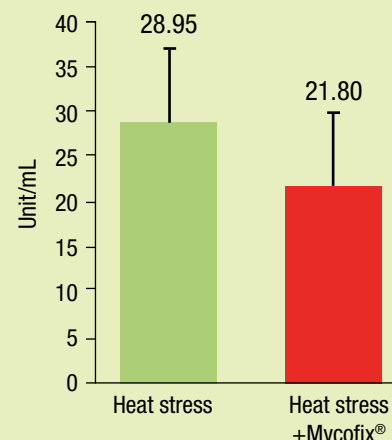
Source: Biomin

Figure 5.
Sugar permeability testing, measured as L-R ratio, of pigs receiving either the control diet or the Mycofix®-treated feed on the second day of heat stress. Bars represent standard deviation.



Source: Biomin

Figure 6.
Endotoxin concentration in serum of pigs receiving either the control diet or the Mycofix®-treated feed on the first day of heat stress. Bars represent standard deviation.



Source: Biomin

piglets (at 21 days of age) were assigned to two treatment groups: a control group or a group fed a diet containing 2.5 kg of Mycofix® per ton of feed. The duration of the trial was 56 days. Several parameters were evaluated and included performance (average daily weight gain in kg/d) over the whole feeding period, gut permeability during heat stress measured via the sugar permeability assay (lactulose:

rhannose (L:R) ratio), and endotoxin concentration (Units/mL) in the blood during heat stress (Figures 4, 5 and 6).

The results of both trials demonstrate that Mycofix®, at a concentration of 2.5 kg per ton of finished feed, is able to:

- counteract the negative effects of increased intestinal permeability induced by heat stress in weaning pigs

- decrease endotoxin concentration in the blood

All the results suggest that when Mycofix® is used, a counteraction of the triggering effects of endotoxins is observed, which leads to an improvement in performance during times of heat stress. ■

Boosting immunity transfer from gestating sows to piglets: The importance of Colostrum quality

By Jennifer Maurin, Business Development Manager for Bioactives, and Dr. Sígfrid López, Technical Manager

The consumption of colostrum by piglets is crucial to their survival during the lactation period, from the moment they are born until they are weaned. The animal's survival chances during this critical period are hindered by inadequate colostrum production by the sow or due to its insufficient consumption by the piglet. Colostrum is not only the main source of energy, but also of immunity for piglets partly immunocompetent at birth. Traditionally, the immune system efficiency has been more evaluated by farm veterinarians than by nutritionists. Nevertheless, recent publications identifying dietary ingredients which modulate the defence functions has revealed new perspectives for nutritional strategies.



Jennifer Maurin



Dr. Sígfrid López

Hy-Line International is looking for a **Southeast Asia Technical Services Manager**. Candidates interested in applying for this position should send a resume and cover letter to Human Resource Department at the address below or e-mail to: humanresources@hyline.com

The description for this position is as follows:

Position Title: Southeast Asia Technical Services Manager
Department: Technical Services
Reports to: Southeast Asia Commercial Director and Technical Director
Location: Southeast Asia

■ **Primary Function:**

Assess performance of Hy-Line commercial layer varieties in the field and work to assist customers to realize the genetic potential of Hy-Line layers in the region, including but not limited to Thailand, Malaysia, Viet Nam, Indonesia, Taiwan, Korea, Philippines, Myanmar, China and other countries as needed.

■ **Responsibilities/Duties:**

- Assist Hy-Line distributors with veterinary, hatchery, and management advice relating to the general management, nutrition, vaccination programs and techniques, lighting programs, growing pullets to attain ideal body weights, and assisting customers in the Southeast Asia region to realize the genetic potential of Hy-Line layers.
- Report feedback of bird performance in the region at the parent stock and commercial level predominantly to the Regional Sales Director and the Technical Services Director responsible for the region.
- Visit key commercial account customers to verify Hy-Line performance and assist to improve performance to reach the birds' genetic potential.
- Retrieve performance data on commercial and parent layer flocks and establish benchmarking data for performance.
- Make presentations on technical issues and general management to producers and at technical meetings.
- Comply with OSHA, bio-security, and welfare regulations.
- Other related duties and responsibilities as needed.

■ **Special knowledge, Skills, Licenses, Certification:**

- Veterinary degree or animal husbandry degree at the university level or equivalent in-field experience.
- High proficiency of spoken and written English language skills. Thai, Bahasa and/or Chinese language skills are a strong plus.
- Customer-service driven individual with pleasant telephone and in-person manner and voice.
- Highly organized individual with the ability to streamline and continue to pursue to improve processes.
- Demonstrated technical presentation and communication skills.
- High level of computer skills in Microsoft Office. (Word, Excel, Access and Adobe systems)
- Maintain the integrity of confidential information both written and oral.
- Ability to travel 60% or more.

Hy-Line International provides equal employment opportunities (EEO) to all employees and applicants for employment without regard to race, color, religion, sex, national origin, age, disability or genetics. In addition to federal law requirements, Hy-Line International complies with applicable state and local laws governing nondiscrimination in employment in every location in which the company has facilities. This policy applies to all terms and conditions of employment, including recruiting, hiring, placement, promotion, termination, layoff, recall, and transfer, leaves of absence, compensation and training.

Piglets are partially immunocompetent at birth

Piglets are partly immunocompetent from the moment they are born and more exactly from the day 70 of gestation. But this ability is not yet fully developed & appears immature to practical effects both during birth and afterwards. The complete piglet protection is therefore ensured by 2 ways:

- Piglets exposure, after birth, to high levels of pathogens, forcing their immune system to mature and become fully competent in a very short period of time.
- Mother passive transfer of antibodies, through the colostrum, thanks to the action of specific hormones during peri-birth.

This transmission of maternal antibodies is crucial, as the type of placenta in sows (epitheliochorial) is radically different to the placenta of humans or primates. It doesn't allow for the transmission of any type of immunoglobulins.

Nevertheless, piglets already have antibodies in their bloodstream at birth; they generate these antibodies themselves after having been in contact with antigens during the final month of gestation. These antibodies generated by the foetus are not enough to adequately protect it after birth. This has led to a range of different vaccination strategies for sows in order to boost the generation and transmission of antibodies via the colostrum, which will then be consumed by piglet after birth. The piglet is highly dependent on the colostrum for protection, and piglets that die during peri-birth, have a lower serum level of antibodies.

which provides systemic protection. The absorption of these IgG by piglets is not selective and they are present in the piglets plasma 2 hours after colostrum ingestion and peaks at 12 hours. The colostrum immunoglobulin profile is dependent on the antigens that the mother is exposed to.

During lactation, IgG immunoglobulins are progressively replaced by IgA, which functions to protect the intestinal mucus of the piglet. This is especially interesting, given that during this period, the intestine is the main target organ for many pathogens, such as *Escherichia coli*.

Given the enormous complexity of the factors which influence the generation and assimilation of colostrum, the pig farming sector has implemented a series of strategies. One such strategy is immunoadaptation in sows. This is achieved by the controlled exposure of sows during their development towards becoming future mothers in order they become capable of recognising the antigens, responding to them by producing antibodies, then transferred in colostrum. Vaccinations are given to first-time mothers in order to acclimate the sows to the bio-system of the farm. This acclimatisation continues with further vaccinations during the period of gestation, with the goal of stimulating the generation of antibodies that will be passed on to the new-borns through the colostrum.

Sows vaccination objectives: passing a maximum of antibodies

Whilst *E. coli* is the main problem encountered on farms with reproductive

piglets will also need to be vaccinated, even though there may be relative competition (the so-called "Inference by the Mother's Immunity") between maternal passive immunity and that generated by the piglet itself.

The immunity generated by the new-born piglet may be partially inhibited by the presence of maternal antibodies from the colostrum, or it may only develop later, or its development may be altered. This situation creates a dilemma for veterinarians: how far should we go with colostrum protection? Precisely because of this dilemma, the evaluation of the serum content of antibodies in the early life of piglets, along with an estimation of the rate at which these antibodies disappear, can help correctly identify the most appropriate moment for the first vaccination.

The main vaccinations for reproductive sows

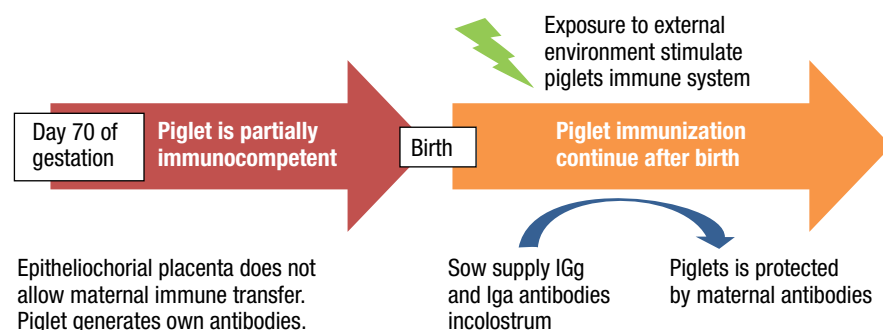
- **Aujeszky** (Herpes virus): 20-30 days before birth
- **Atrophic rhinitis** (Bordetella bronchiseptica, Pasteurella multocida): 15-20 days before birth
- **Colibacillosis** (*E coli*): 40 days before birth with an additional vaccination 25 days before birth
- **PRRSV**: mid-way through gestation, strain depends on the presence at the farm
- **Mycoplasma** (*Mycoplasma hyopneumoniae*): according to the infective pressure of PRRSV: at 70 and 100 days of gestation, in first-time mothers + piglets also vaccinated later.

However, the ultimate objective is clear: increasing the number of plasma antibodies in the sow's blood and transmitting them to the colostrum is vital. The level of antibodies in the piglet is proportionate to the level in the colostrum, and the survival of the piglet is directly related to it. This is the only way to maximise the protection of the animal when it is exposed to pathogens.

Boosting the Immune System with Nutrition

Traditionally, the immune system has been more evaluated by farm veterinarians than by nutritionists. Nevertheless, recent publications identifying dietary ingredients which modulate the immune system has revealed new perspectives for nutritional strategies to boost the generation of antibodies in gestating sows and to accompany vaccination program.

Different published studies in various



Colostrum: the richest immunity source for piglets

The colostrum contains a battery of defence cells to help the piglet survive. The level of immunoglobulins in the colostrum is 60 times higher than in the milk. Around 65-90% of these immunoglobulins consist of the IgG type,

sows, this is not the only pathogen which piglets must be protected from. The main vaccination programmes depend on the type of pathogen and the capacity of the antibody generated to reach the target tissue of the piglet, where the pathogen is acting. Therefore, depending on the situation, sows may require a double or even a triple vaccination, and the

animal species highlighted the interest of supplementing low dose phytonutrients to modulate animal immune system. Among the identified promising micro-ingredients, two of them are of particular importance and revealed a synergy when used in combination. The first, Curcumin (contained in turmeric oleoresin) is used for centuries in Indian and Chinese medicine. It improves and fasters the antigens recognition by the host and is therefore responsible for the correct antibodies production. But Curcumin naturally suffer from a lack of bioavailability and this parameter can be successfully improved by the addition of a second dietary ingredient: capsaicin. Good quality and sufficient quantity of Capsaicin can be provided to animal feed thanks to the use of Chilli pepper Oleoresin. In addition to its potential of making Curcumin more available, this ingredient is also known to be a strong anti-inflammatory. Being highly irritant and difficult to handle, it finally needs to be micro- encapsulated with the first into an adequate matrix.

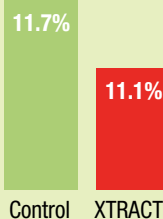
The interest of the addition of such additive made of both Turmeric and Chilli pepper Oleoresins (XT-XTRACT Nature) in feed and on top of vaccination program was first evaluated by the USDA Animal Parasitic Diseases Laboratory in 2011 (refer to: Lee et al., 2011; Veterinary Parasitology). Results in poultry have demonstrated a boosting effect of the cocci-vaccination and an increase of the pool of antibodies produced. More than having only a local effect, the additive positive benefits became systemic and provided a global animal protection against coccidiosis (parameters were measured in spleen and peripheral blood). These results provided the foundation for further studies. Application and development of such strategies in other animal species than poultry relied on the use of the basics of comparative physiology between species.

A more recent field study aimed to extend this research program in swine and to check if the dietary additive could enrich gestating sow serum antibodies during vaccination and if these antibodies could be passed through colostrum & milk; finality being of course to impact piglets immunity and survival at

weaning. In that context, a large trial was held in Spain (Tampore, Aragon) in collaboration with Avena Nutrition, a leading Spanish company in animal nutrition. The trial was organized in 3 consecutive phases. The additive was supplied in the 2nd phase (gathering a total of 673 gestating sows, divided in 2 groups) and was supplemented at a dose of 200 g/t, on top of sow vaccination program (Colibacillosis vaccination at day 80) from day 80 of gestation and for 30 days long. Positive effect of the supplementation were first observed through the percentage of piglets born alive (+ 1.9%; P value = 0.002), before piglet even start to ingest sows enriched colostrum. Colostrum quality was assessed and resulted in higher total proteins content, being constituted of both increased albumin and sum of globulin concentrations. (Refer to table)

Piglets from supplemented sows received a better quality colostrum from their first days of life and consequently suffered less mortality during suckling period. This effect was particularly visible and interesting on sows having their 2 first parities.

Mortality during suckling



Immunity and performance: colostrum at the cross road!

Immunity is generally mainly evaluated by veterinarians and is a key factor to farmers' profitability. When strategies of sows acclimatisation have already proven their beneficial effects on providing a better colostrum profile to piglets, new strategy recently arose. Some option can be now directly handled by nutritionists and can accompany the work of the veterinarians. They consist in supplementing low dose of defined phytonutrient combination in order to boost gestating sows' blood antibodies, which will be correctly transferred to colostrum. Piglets will receive an immune-boost from their first day of life that will guarantee a smooth transition to their next productive phase. This strategy already demonstrated its effect in various animal species ■

Table: Effect of XT supplementation on colostrum quality (673 gestating sows)

	Negative control	Supplemented control	P-value
• Total protein (%)	26.2	27.5	0.042
• Albumin (%)	4.4	4.7	0.552
• Sum of globulin (%)	21.8	22.9	0.084

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Intestinal PGN may be chipping away at animal performance

By N.E. Ward and A. Cowieson

Peptidoglycans, necessary for the survival of bacteria, can reduce animal performance and profitability.

Efficient animal production faces relentless challenges, some being more obscure and overlooked than others. In a traditional sense, the intestinal commensal bacteria - bacteria that live together - fit this narrative.

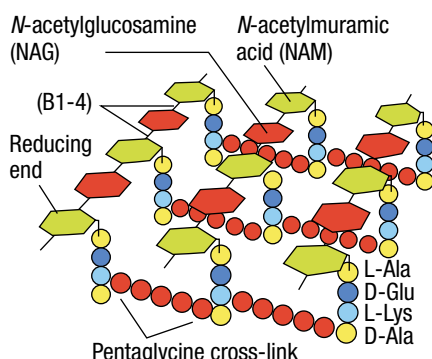
Cell walls of Gram-negative (G-) bacteria are predominantly lipopolysaccharides (Reitz and Whitfield, 2002), while peptidoglycans (PGN), or murein, are primary components in Gram-positive (G+) bacteria (Alcorlo et al., 2017). In normal intestinal bacteria, neither class is particularly associated with disease, but the presence of their cell wall fragments as "intestinal rubbish" can pressure performance downward (Mani et al., 2012).

More so than lipopolysaccharides, PGN is the thread that unites bacteria of virtually all types, regardless of species, type or any other classification. Although necessary for the survival of bacteria, these components can chip away at animal performance and profits, obscure and unobserved.

PGN chemistry

PGN is a massive polymer of amino acids (e.g., peptido-) and sugars (e.g., -glycan) unique to bacterial cell walls (Alcorlo et al., 2017). The carbohydrate or sugar constituents are alternating residues of B-(1,4)-linked N-acetylglucosamine and N-acetylmuramic acid crosslinked by short peptides (Figure 1). Amino acids

1. Structure of peptidoglycan polymer



meld into a two- or three-dimensional lattice similar to a chain-link fence with overlapping sheets. Across bacterial species, the amino acid composition and peptide length can vary considerably, giving rise to an assortment of chemically defined subunits of PGN.

PGN makes up about 90% of the dry weight in G+ bacteria but accounts for 9 only about 10% in G- bacteria and provides the bacteria with 40-80 layers of structural support against osmotic pressure (Malanovic and Lohner, 2016). PGN is dynamic and undergoes constant remodeling during bacterial division and growth (Reith and Mayer, 2012). The abundance of PGN is the basis for the Gram stain (Hogan, 2010).

PGN presence

The constant re-synthesis of PGN coincides with growth and division in a manner similar to bone reconstruction in animals. As much as 50% turnover of PGN occurs within one generation, depending on the bacterial species and stage of growth (Reith and Mayer, 2012). A considerable amount of PGN remains in the spent growth media (Alcorlo et al., 2017) and probably mimics a comparable phenomenon in the intestinal lumen (Lichtman et al., 1991).

For the most part, G+ bacteria predominate in the intestinal tract. In a cultivation-based study of the turkey microbiome, 77% of the microbes were G+ rods, while 14% were G- and 9% were G+ cocci (Bedbury and Duke, 1983). In a healthy swine colon, 71% of microbes were G+ (Robinson et al., 1984). Thus, G+ bacteria exist at a disproportionately higher level in the intestinal tract.

Natural bacterial cell death stands to be an abundant source of PGN in the intestinal contents. In one study, as much as 34% of total fresh fecal bacteria were classified as dead (Apajalahti et al., 2003). In another, 31.7% of fresh fecal bacteria were "dead," while an additional 19.7% were "injured" (Ben-Amor et al., 2005).

Although G+ lactococci are resistant to gastric acidity (90-98% survival), only 10-30% survived in the duodenum



N.E. Ward



A. Cowieson

(Drouault et al., 1999). There appears to be no such statistic for poultry or swine.

Airborne PGN in animal production facilities and grain processing plants is yet another source (Poole et al., 2010; Gora et al., 2009). PGN transported on dust particles can be prevalent in swine farrowing and nursery production units (Jolie et al., 1999). Repetitive exposure to organic dust particles is concerning because Nebraska research has found that aerial PGN is particularly debilitating to lung function in mice (Dusad et al., 2013).

Intestinal rubbish

The systematic removal of antibiotics from poultry feeds can lead to a denser bacterial population in the intestinal tract (Dibner and Richards, 2005; Collier et al., 2003). With more bacteria, it makes sense that more cell wall fragments and PGN would be present.

In rats, surgically created, self-filling jejunal loops are a method for increasing intestinal bacteria (Lichtman et al., 1991). This method was associated with a 30-fold increase in anti-PGN antibodies in jejunal blind loops, clearly demonstrating that an elevation in the bacterial population leads to more PGN (Lichtman et al., 1991).

Airborne sources are added to the G+ bacteria in the intestinal tract, where 90% of the cell wall is PGN for nearly 75% of the population. With nearly 30-35% of cells being dead, host exposure to this cellular rubbish is quite high, especially since as much as 60% of the mass of feces is comprised of bacteria.

Leaky gut

“Leaky gut” syndrome is characterized by the destabilization of normal digestive and absorptive processes (Applegate, 2017). Tight junctions seal the paracellular space between adjacent epithelial cells. They regulate the permeability of the intestinal barrier and restrict the diffusion of microorganisms and antigens.

Recurring irritation by cell wall fragments (from dead cells, for example) can disrupt the integrity of these junctions (Mani et al., 2012). Higher intestinal permeability allows proteins and other nutrients to be passed from the body into the lumen and, in return, permits larger foreign material to enter the general circulation (Suzuki, 2013; Bures et al., 2010).

Mucin secretion

Increasingly, it is recognized that bacteria and bacterial components particularly PGN and lipopolysaccharides have an important effect on the in-testinal mucus barrier (Sicard et al., 2017).

Mucus contains glycoproteins called mucins that form the viscoelastic layer (Pelaseyed et al., 2014). Intestinal antagonists stimulate mucin synthesis and secretion in response to perceived threats (Smirnov et al., 2004). The bacterial cell wall constituents PGN and lipopolysaccharide are powerful stimulators of mucin secretion and thickness in germ-free and conventional mice (Petersson et al., 2011), as shown in Figure 2.

This increased mucin secretion is analogous to that observed with phytic acid, which is a potent mucin secretagogue (Cowieson et al., 2004). The use of phytase enzyme provides an important

secondary benefit by lowering excretory losses of amino acids because of the loss in mucin (Feedstuffs, Jan. 23, 2006).

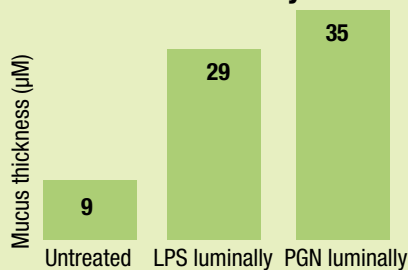
Threonine makes up 30% of the amino acid content of mucin (Neutra and Forstner, 1987). The gastrointestinal requirement accounts for 14-33% of most essential amino acids, whereas for threonine, this is between 55% (Mao et al., 2011) and 61% (Fuller et al., 1994). Insufficient dietary threonine can restrict intestinal mucin secretion (Wang et al., 2010). Threonine is critical, being the second or third-most limiting amino acid in poultry and swine diets.

Mucin secretion represents significant losses of nitrogen from the animal because mucin protein is essentially indigestible to the host (Mao et al., 2011). The refractory nature of mucin limits its recycling; thus, the excessive synthesis and secretion fueled by PGN, phytic acid, etc., is nutritionally costly.

In the end

The greatest threats to efficient and profitable animal performance are those that go unobserved, whether related to management, nutrition or health. Obscurity allows stressors to secretly chip away at normal body processes, diverting nutrients away from growth and efficiency and driving up costs. Cell wall components such as PNG fit this category. ■

2. Mucus thickness of germ-free mice increased by lipopolysaccharide (LPS) and peptidoglycan (PGN) administered orally



Source: Adapted from Petersson et al., 2010

Thai Vegetable Oil upgrades soft oil refinery process

THAI VEGETABLE OIL CO PLC is now using an updated version of “Ice Condensing” technology to improve operational efficiency and uplift product wholesomeness.

TVO is committed to producing products that enhance the quality of life of consumers.

With the goal of becoming one of Asia’s leading vegetable oil manufacturers, TVO’s research team has been refining the company’s production processes to improve product quality for more than 50 years. After careful study and knowledge gained from decades of production experience, TVO has begun using Ice Condensing in its process.

This technology has been in use worldwide for decades, but concerns about ammonia leakage into the product led TVO to abandon it in its early days.

Since then, the technology has improved and the risk of ammonia leakage has been eliminated. Consequently, TVO has adopted Ice Condensing as a way to improve the deodorization process which removes solvent residues and other substances affecting sensory quality, and to protect the oil against oxidation.

Ice Condensing uses a vacuum distillation tower operating at a very low temperature (between -26 C to -50 C) and ammonia as a refrigerant for cooling.

Research has shown that glycidyl fatty acid esters (GE) and 3-monochloropropanediol (3-MCPD) were eliminated through the new deodorization process. Also, trans-fatty acids were reduced drastically.

The oil also contains higher natural Vitamin E, offering an additional benefit for consumers.



These latest innovations show that TVO continues to deliver ever-higher quality soybean oil that meets or exceeds the most rigorous international standards. ■

Further more info please visit: www.tvot-thai.com

PEOPLE & PRODUCTS

Betagro continues to refine rural development models

Betagro is working on various development programs to help rural people run collective social enterprises so that they will be better off socially and economically, according to Jakkirin Taepaisitpong, senior vice-president, Corporate Social Contribution.

Betagro's top management is committed to sustainable development and realizes the need to have a full-time team working to help rural communities develop. Ideally, the windfall of economic development should be enjoyed by all, with no one deprived of the benefits nor left worse off, said Mr Jakkirin.

In 2007, Betagro kicked off community development programs at Chong Sarika, Lopburi, an area nearby by its feed and food complex in collaboration with the local Population and Community Development Association (PDA).

Chong Sarika was the top pick due to possible externalities generated by Betagro's business operations which could potentially cause discomfort for the residents in 13 villages nearby, he said.

Quick-fix projects aimed at alleviating hardship and poverty-related problems last only a short time, he noted. Instead, Betagro is looking for approaches that create sustainable social and economic development that are equitable, long-lasting, and that offer an enduring impact, he said.

To this end, Betagro's development team is developing balanced and long-term sustainable development models where health, social development, the environment, and education are all improved at the same time. The assistance must be accessible to at least 80% of the community. No-frills community development programs are targeted from the bottom-up and arranged as needed.

Prior to goal setting and determining priorities, field workers collect data in the communities such as the number of households, income, occupations, health conditions, etc. This information is analyzed for planning, allocating resources

and manpower to carry the projects through.

More importantly, community leaders, especially from the local administrative organizations should be passionate about taking up the projects and be motivated by a strong desire for success, said Mr Jakkirin.

There are numerous government agencies with resources that are willing to contribute budgets and resources if the program is well structured and has a clear action plan.

In Chong Sarika, most families are farmers who grow corn and cassava and some keep dairy cows. Many suffer from low productivity both in their field crops and milk yield.

Improvement efforts begin with a demonstration farm. Agricultural extension teams take soil samples to analyze soil type and fertility status so that improvements and fertilizers can be correctly applied. The result of the survey also helps in selecting the most suitable cassava varieties that match the soil types.

Betagro plays a facilitator role, pairing farmers with Thailand's Department of Agriculture extension teams to tailor training programs to help farmers to prepare their fields and tend their crops correctly.

A few years after the first demonstration farm was established, cassava yield per rai (1,600 sq m) increased from 4.4 tonnes to 10 tonnes, with a goal of eventually hitting a target of around 13 tonnes/rai.

Similarly, with correct planting techniques and fertilizer rates, corn yields in the area could be potentially boosted to 2.3 tonnes/rai vs 1.7 tonnes using traditional methods. Other crops, such as sugar could reach 19 tonnes vs 10 tonnes, and rice 1.1 tonnes vs 0.68 tonnes. With moderate improvements to their farming methods, villages in Chong Sarika could potentially raise their farming income up to 53.8 million baht/year.

As well, through proper management, a dairy enterprise in the community could



Jakkirin Taepaisitpong

generate an additional 15.5 million baht from productivity improvements.

"There is no free lunch. Farmers have to invest in management improvements. In the end, they will have to decide for themselves if the costs and benefits gained from the changes are worth it," said Mr Jakkirin.

Betagro coordinates with the Department of Livestock Development's Dairy Herd Health Unit to improve both milk quality and yield and develop markets for spent cows. Genetics can be improved by using semen from the DLD's top sire to produce hybrid yearling bulls.

DLD's extension team also recommends that dairy farms produce their own complete ration feed using cassava leaves mixed with other feedstuffs. That means cassava growers in the area would gain an additional marketing alternative for selling cassava and cassava leaves if cassava prices slump.

Farmers are also trained to do accounting to analyze their cash flow and create budgets. This is especially important for those who grow field crops, because they only have income once or twice a year when they sell their crops and regular expenses occur every day.

PEOPLE & PRODUCTS

To solve this problem, community members are encouraged to seek additional income sources such as vegetable growing or raising livestock and fish for their own consumption and for sale. More income streams reduces the dependency on credit throughout the year, and revenues from cash crops can be set aside as savings.

Education is the key to all of these efforts, and Betagro has joined forces with universities to develop relevant curricula for schools in Chong Sarika to help students graduate well equipped with farming and agribusiness skills to take their farms a step ahead.

The company is running rural development programs in 13 provinces across the country covering 27,000 farmers in a 1,200 sq km area. It deploys more than 50 full-time field workers to coordinate with farmer groups and concerned government agencies. In Cambodia, Betagro is working with rice farmers in Ou Ta Kam Muoy village in Battambang province to improve their economic status. ■

Community enterprises: A catalyst for sustainable community development

CHONG SARIKA CO LTD, a community enterprise in Lopburi that helps community members exchange goods and services, is expanding its business scope to supply organic vegetables to schools and hospitals.

Betagro is working with communities in Chong Sarika through the local community enterprise which functions as an intermediary for exchanging agricultural goods produced in the area to generate added value.

Dairy cooperatives in the area meet with cassava and corn growers so that both parties are better able to exchange their goods at fair prices and for mutual benefit. For example, the dairy cooperatives sell cow manure to crop farmers who need fertilizer, and the farmers sell dairy feed ingredients back to the coop. Chong Sarika also helps farmers source equipment to improve efficiency in their operations.



(from left) Vanus Taepaisitphongse, chairman of the executive board, Suthat Suthothon, tangerine orchard owner, and Jakkrin Taepaisitpong, senior vice-president of Corporate Social Contribution



AVIAGEN MANAGEMENT ESSENTIALS



Sukanda Haoharn, Aviagen Asia Technical Services Team

Author biography: Sukanda graduated from the faculty of Veterinary Medicine at Khon-kaen University in Thailand. She has been working with Panusokphand in Thailand in a variety of different practical roles on Parent Stock Farms and Hatcheries. She joined Aviagen Asia Technical Services Team in October 2018.

Author Quote: The process of administering live vaccines through drinking water must be effectively managed to ensure that all birds are vaccinated uniformly and with a high enough amount to stimulate the host's target cells and immune system.

Efficient Methods for Drinking Water Vaccination

Objective: Correct use and administration of live vaccines via drinking water

Key Points:

Before Vaccination

- Store and transport vaccines between 2 and 8 °C (36 and 46 °F) and administer before the expiration date.
- Give vaccines only to healthy flocks.
- Before mixing vaccines, monitor water quality to ensure that it is not contaminated with heavy metals, disinfectants and/or organic matter.
- Mix a stabilizer with water used for vaccination to improve vaccine stability.
- Use a vaccine dye to help monitor vaccine distribution and the flock vaccine uptake.

Vaccine Administration

- Before vaccination, ensure that drinkers and drinker lines are clean and free from biofilm.
- On the day that vaccination is scheduled after feeding the birds, raise drinkers (nipple or bell style) until they are out of the reach of birds and drain any residual water that may remain inside.
- Fill drinkers with vaccine solution, lower them to bird height and allow birds to drink.
- Walk through the flock to encourage vaccine uptake and make sure that vaccine water is flowing to all drinkers.

After Vaccination

- Immediately after vaccination, check birds from at least three different locations in the house to see if they have dye stain on their tongues and oral cavities.
- Ensure that at least 90 percent of birds have a stained tongue, which indicates successful distribution and uptake of the vaccine.



Blue dye vaccine on tongue of vaccinated bird

- Three weeks after vaccination, randomly select birds and take blood samples. Send samples to a local laboratory for analysis to check for the presence of antibodies against that disease.
- Check that antibody titer level is high enough and of a good coefficient of variation (CV) to protect the flock from any local area/farm disease challenge. If antibody titers are too low or CV poor, contact a qualified local veterinarian for further advice.



Kampaoung community enterprise in Roi Et exhibits GAP certified pesticide-free vegetables



Community enterprise members at Chong Sarika blend feedstuffs prepared from corn stalks to feed their cattle

Farmers in Chong Sarika have formed a group that markets pesticide-free vegetables to schools and hospitals.

Profit gained from the enterprises is reserved for paying dividends to shareholders and part of the profits are reserved for reinvestment in other projects.

Chong Sarika Co has proven to have business acumen. Betagro, one of the company's founders and shareholders, will exit once the local leaders are comfortable enough to take over management. The seed money will be given to the communities.

Sustainable agriculture in Nan province

Betagro is working with farmer groups

in Nan province, a hilly province where illegal logging and forest encroachment is rampant.

Betagro has made it clear that it will not buy corn from growers in Nan province who cannot present land ownership certificates. With escalating deforestation in the area, it runs community services in four villages in Nan that promote livestock and field crop integration systems.

The company also helps farmers in other districts in Nan province adopt modern cropping systems that unlike traditional slash-and-burn agriculture do not contribute to soil erosion

Kasem Janejob, a small-scale hog producer in Nan, was facing such poor longan yields that he wanted to cut down all his longan trees and give up.



A dairy farm in Chong Sarika working in tandem with Chong Sarika Co

But after Betagro's extension team suggested that he could improve productivity simply by changing his tree pruning practices, growing longans has turned out to be a profitable enterprise that provides an additional income for his hog farm.

A community development project in Kham Pha-ung, Roi Et, has successfully formed a community enterprise that supplies pesticide-free vegetables to hospitals and schools.

Win-win solutions

A cassava farmer group consisting of 60 households in Ubon Ratchathani, near Sirindhorn Dam, proposed caged tilapia culture as a source of income to supplement their farming activities.

The success of the fish farming enterprise has surprised many, and now the farmer group is financially better off. This also opens up an opportunity for Betagro to develop a new fish feed market.

In the Sarika area, Betagro has worked with two dairy cooperatives to improve milk yield and quality as well as develop beef cattle production. Dairy improvement projects in total involve more than 9,000 cows.

Betagro also teams up with universities to help small and medium-sized enterprises improve productivity, business processes and supply chains. It coaches SMEs on Kaizen techniques so that they can revamp their production processes and hone operating efficiency. ■

Bühler discusses the latest trends in grain management and storage

PETER SCOTT, regional manager of grain storage solutions for Bühler in Southeast Asia, shares his views with *Feed & Livestock* magazine on how to improve grain handling and extend product shelf life and quality.

■ **You meet with feed millers from all over Southeast Asia. Do you see increasing demand for improved grain and raw material solutions?**

Definitely, yes. In recent years, the demand for higher-quality solutions is building up. This is driven by policies, fast rising competition in the grain market and general concerns in regards to food safety, reduction of mycotoxins and brand image.

■ **What drives mold to multiply and how do we contain it?**

It's not only the primary contamination, which is happening on the field, but also the secondary contamination occurring at the grain storage facility. Impurities, excess moisture content and high grain temperatures are the biggest factors leading to mold and development of micro-organisms. Proper cleaning and drying is crucial to reducing its growth. Broken kernels are also a source of high toxin counts and ideally should be removed before storage.

■ **What solutions does Bühler have for grain storage and management to keep grain safe?**

In addition to proper cleaning and drying solutions, modern storage technologies help preserve grain quality. These technologies will prevent hotspots, infestation development, respiration losses, and most importantly containment of toxin build up. Those solutions are not only about safety, there are strong economic benefits to safeguarding your grain and storing it longer.

■ **Does Bühler use grain cooling technology?**

Southeast Asia is mostly a tropical climate: hot and humid. These two factors contribute to grain spoilage if traditional atmospheric aeration is used. Bühler grain and silo cooling solutions will provide conditioned air to keep the grain temperature and moisture in a safe zone, which greatly reduces infestation, mold growth and respiration losses.

■ **How does Bühler make use of technologies in grain management and storage?**

Bühler is at the forefront of technology adoption. We provide plant and product monitoring solutions with intelligent



machines that monitor and adjust themselves to always run at maximum performance. These are fully integrated into the plant automation system which includes features such as remote monitoring from a smartphone app and predictive maintenance solutions. As the "internet of things" and data management grows along the supply chain, we can now start to integrate data from suppliers to the millers, and further on to the end customer: from field to fork. ■

Bühler will be present at VIV Asia 2019 (Bangkok BITEC, March 13-15, 2019), Hall 101 booth 2626. For more insights about grain storage at VIV, visit the conference hosted by Peter Scott at 1pm on March 14, meeting room 213, BITEC Exhibition Center, 2nd Floor.

Upcoming US soybean crop unlikely to be hurt by El Nino

The sheer size and diversity of soybean cultivation areas across the US makes the country's production largely immune to weather jitters, according to Jim Sutter, CEO of the US Soybean Export Council (USSEC).

Prices, rather than the risk of a possible El Nino-caused drought, will have a bigger impact on whether farmers decide to plant soybeans or more drought-resistant crops, he added.

Also, the US is a big country, with diverse geography. That means even a potent weather phenomenon like El Nino can't wipe out more than a fraction of the total crop.



From left Timothy Loh, Jim Sutter, Derek Haigwood and Roger Peeters



Dr Basilisa Reas



Leading Thai soybean traders and users convened in Bangkok for a recent meeting hosted by the US Soybean Export Council.

He admitted, however, that the real effect will be better appraised in April when seeding starts. At any rate, 2018's record-setting crop of 125 million tonnes with good nutrient content will be hard to beat, said Mr Sutter.

Looming large over the meeting in Bangkok recently hosted by the US Soybean Export Council was the fact that US soybean exports to China in 2018 have stalled due to trade issues.

Despite the political rhetoric on both sides, he noted that there are still five million tonnes of soybeans pending for shipment to China. Although that's down from over 30 million tonnes in 2017, other countries are picking up the slack.

Mr Sutter added that the USSEC is working hard to open up new markets in Nigeria, Myanmar and India. Also, demand for US soybeans has grown tremendously in Egypt, Pakistan, Bangladesh and Latin America, he added.

To counter dependence on the huge Chinese market, the USSEC is rethink-

ing traditional markets to foster new relationships and trying to increase market presence.

To boost the attractiveness of the US crop, in 2019 the USSEC will implement a "know what you grow" program to improve the quality and consistency of US soybeans. Growers will be better informed about the soybean varieties they have chosen and practices to improve overall quality.

Although gene-edited beans make up 90% of the US soybean crop, marketers keep gene-edited beans and conventional varieties separate. Non-gene-edited beans are typically bought at a higher price by food makers in South Korea, Thailand and Japan.

Roger Peeters, export trader for Archer Daniels Midland Company, said US soybean meal delivers a better amino acid profile due to higher digestibility, especially for lysine and methionine.

US soy has 2% higher sucrose availability than beans from South America, which

means that it provides up to 15-100 kcal in extra feed energy, he added.

That, along with higher essential amino acid digestibility, means a formulator can save on costs and yet produce the same quality of feed, Mr Peeters added.

Dr Basilisa Reas, technical consultant for USSEC Southeast Asia, added that the quality consistency of US soy saves on costs because it reduces the risks of under or over estimating a formula.

"Crude protein should not be the basis of procurement decisions. Crude protein is all the nitrogen, but that's not the true protein," Dr Reas said, adding that digestible amino acids give a better picture.

US soybeans also have higher linoleic acid content which makes them highly digestible. Linoleic acid is desirable for layer hen rations because it improves egg weight and hen productivity, and it also improves productivity in broiler breeders and sows.

Derek Haigwood, a US soybean farmer from Arkansas, said the USSEC's sustainability goals to be met by 2025 include halting soil erosion and reducing fuel and fertilizer inputs. It makes sense for US soybean farmers to improve efficiency and protect the environment because it ultimately reduces their own production costs, he added.

The US government values sustainability, he said, noting that the US Department of Agriculture will spend US\$57 billion over nine years (2014-2023) to conserve and protect wetlands, erodible land, grasslands and forests.

The US Soy Sustainability Assurance Protocol (SSAP), a certification system audited by third parties, is designed to verify sustainable soybean production on a national scale. Aimed at boosting the comparative advantage of US soybeans, the protocol has been positioned to benchmark against the European Feed Manufacturers' Federation (FEFAC) soybean sourcing guidelines.

Timothy Loh, USSEC regional director for Southeast Asia, said exports of soybeans and soybean meal to the region in 2018 grew 30%. Key markets were Thailand, Vietnam, Indonesia, the Philippines, Malaysia and Myanmar.

He added that US soy has firmly captured the market in the Philippines, where US beans are 80% of total imports. Indonesia is the world's 4th largest importer of US whole beans for processing into food and feed. ■

Precision pig production offers maximum efficiency

A wide range of tools using Nedap's precision farming technology can improve a hog farm's bottom line by maximizing sow and finishing pig performance while at the same time reducing labor and costs, according to Jan Oord, marketing manager.

Nedap offers individual animal identification systems to help managers and personnel make operational and strategic decisions based on a continuous stream of reliable information.

Nedap SowSense solutions, for example, work around the clock to identify each sow, track her feed consumption and weight, monitor estrus and transition her to farrowing.

"The system operates and checks results 24/7. You will get detailed notifications when a sow needs extra attention and individual information allowing you to improve your strategies for your entire herd," said Mr Oord.

Electronic sow feeding

With Nedap Electronic Sow Feeding, a farm can ensure each sow gets the individual feed and care she needs, as well as the benefits of being in a calm gestation group. Nedap can design automated feeding systems for size operation, including new or remodeled buildings.

Nedap Electronic Sow Feeding eliminates feed waste and optimizes whole-

herd feed efficiency. With accurate data, feed plans can be set for each sow and automatically adjusted so that sows stay in optimal body condition.

"The system is designed with the sow's needs in mind. It allows each sow to eat safely, without interruption and walk forward, away from the group, when she's finished," he added.

The uniquely designed group sow gestation pens used with Nedap Electronic Sow Feeding keep sows calm. The design incorporates feed stations with forward exits, which has been proven for decades to minimize sow injury and stress by separating fed and unfed sows.

Weight monitoring

Nedap Weight Monitoring automates collection of sow data for real-time management of individual sow body condition in group gestation housing. Feed costs are saved by not over- or under-feeding sows and supporting optimal sow performance and piglet birth weights. Optimal sow body condition supports productivity and longevity for sustainable sow herd management.

Heat detection

Nedap Automated Heat Detection monitors sows around the clock for increasing interest in the boar, which can be an early sign of heat, with 99% accuracy. It minimizes lost production days, reduces labor, and minimizes stress to people and pigs.



Jan Oord

Farrowing feeding

Nedap Farrowing Feeding encourages the lactating sow to take the feed she needs for milk production. The system automatically delivers portions of diets multiple times per day to encourage optimal feed intake, helping sows produce sufficient milk for robust piglets while maintaining body condition.

Precision in breeding stalls

You can also use Nedap SowSense in breeding stalls to deliver precise rations in the post-weaning transition.

"Feed and manage each sow as an individual in all production phases. It makes sense," added Mr Oord,

Maximize performance

Nedap ProSense gives clear insight into individual pig performance using Nedap Pig Performance Testing. This system accurately and reliably measures and records pig performance indicators including individual weights, feed intake and feed conversion ratio. The data it provides is immediately available for review and has a unique feature allowing a manager to rank individual pigs and groups based on daily performance.

Nedap Pig Performance Testing can collect data for feed trials, genetic selection or in-depth nutrition research for feed formulation. Data can be used to review feed quality or study the effects of different feed compositions.



PEOPLE & PRODUCTS

Nedap Pig Performance Testing has two parts: a trough to measure feed intake and a scale that can be adjusted to pig sizes. It can feed up to 15 pigs at one time. The software dashboard can be accessed from anywhere and at any time.

Perfect finishers

Nedap PorkSense is revolutionizing the pig finishing stage by making production data available in real time so managers can continuously improve feed strategy, health management and logistics planning.

Nedap PorkSense makes it possible to feed pigs based on individual weights to maximize feed efficiency, finish more

consistent groups, manage shipping and save labor costs.

Unlimited farm size

Nedap PorkSense is scalable and perfectly suited for multi-site production systems. Management can be performed at a central location with the Nedap PorkSense software dashboard.

Automated delivery

The Nedap PorkTuner is a smart tool of Nedap PorkSense. The system weighs each pig and directs it to one of two feeding areas with the diet best suited to the pig's weight. Diets can be determined based on daily growth data. Continuous

data collection on growth allows accurate forecasting of weight development, allowing for planning deliveries and transport up to four weeks ahead. When a pig reaches market weight, the Nedap PorkTuner automatically cuts it from the group by directing it to a delivery section.

About Nedap

Nedap is a publicly listed company that employs more than 700 people globally, across 11 locations and eight business units. ■

For more information, please contact Jan Oord, marketing manager at Nedap, +31 544471444 or jan.oord@nedap.com, or visit nedap.com/itmakessense

Thailand's DLD to expand its turkey breeder flock

Growing demand for turkey poults has prompted Thailand's Department of Livestock Development (DLD) to expand its breeder flock, according to Darunee Sopha, senior animal husbandry officer.

DLD operates five turkey breeder units in Nakhon Panom, Saraburi, Mahasarakham, Udon Thani and Krabinburi. Each location has 300 female PS. The breeds are Beltsville small white and American Bronze.

The breeding flocks are tested and selected to improve meat yield and robustness. The breeders are selected primarily for lay persistency and good hatchability. The average female breeder yields 80 hatching eggs throughout its lifespan, hatchability 80%. The day-old poults are sold for 35 baht/apiece.

The department has operated the turkey

breeding program for 50 years to supply poults to small-scale and backyard farmers.

The eggs, viable once the breeding birds reach 8 months, are hatched in incubators. The birds are in service for 24 weeks depending on market conditions before being sold as spent hens.

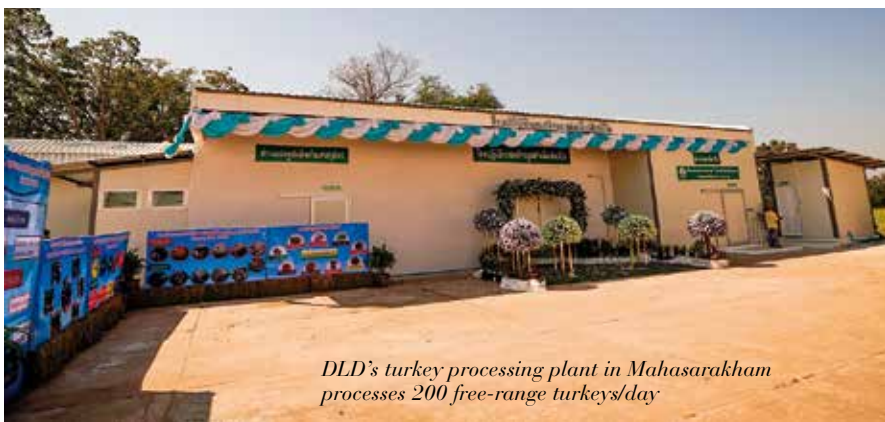
The birds are typically reared for 4-5 months. Toms reach a market weight of 10-14kg, and hens 6.6-7.9 kg.

She said demand for turkey poults would hit 70,000 birds in 2019, up from 30,000 in 2012. The DLD estimates that there are more than 4,600 producers involved in turkey production with a total market value of more than 50 million baht/year.

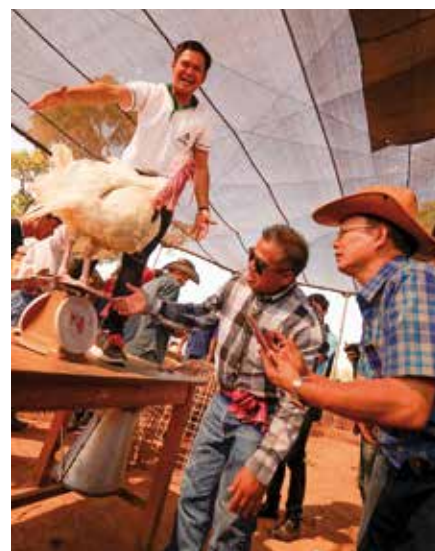
Producers are diversifying from selling fresh whole birds to sausages. Free range turkeys sell for a premium that is triple the price of broilers. Live turkeys fetch 120-130 baht/kg while broilers sell for 30 baht/kg. ■



Darunee Sopha, senior animal husbandry officer



DLD's turkey processing plant in Mahasarakham processes 200 free-range turkeys/day



Turkey judging at the first National Turkey Day

Gut, feed and biosecurity are key defense lines against ASF



Speakers at the recent “3D Approach to African Swine Fever Preparedness” seminar: (from left) Prof Guoqing Shao, Dr Tan Hai Meng, Prof Roongroje Thanawongnuwech, Assist Prof Pariwat Poolperm, Prof Grzegorz Wozniakowski and Dr Khampee Kortheerakul

KEMIN INDUSTRIES recently organized two African swine fever (ASF) preparedness seminars in Bangkok and Ho Chi Minh City, Vietnam.

Based on the “3D Approach,” the seminars were aimed at educating swine farmers about the risk posed by ASF and equipping them with the relevant knowledge and best practices they can use on their farms to prevent outbreaks of the virus.

The talks focused on three core aspects that farmers can use to defend against ASF—the gut, feed and the environment.

Prof Grzegorz Wozniakowski, department head at the National Reference Laboratory for African Swine Fever at PIWet, said that without strict biosecurity procedures and high awareness of ASF, the virus could spread to any so-far-unaffected country.

Due to the continuing spread—presently via wild boars—in affected European countries, the crucial role of hunters and veterinary inspection cannot be overestimated, he said.

Prof Guoqing Shao, from the Institute of

Veterinary Medicine, Jiangsu Academy of Agricultural Sciences, talked about the measures taken to contain ASF in China.

Dr Pariwat Poolperm, an assistant professor from the Department of Farm Resources and Production Medicine at Kasetsart University, told how being equipped with knowledge about ASF and its symptoms can save animals.

Dr Khampee Kortheerakul, a consultant to Kemin Industries in ASEAN, offered advice on how to go one step further in being prepared for ASF.

Dr Tinh Nguyen, regional technical service manager for Kemin Animal Nutrition and Health – Asia Pacific, said that because there is currently no vaccine effective against ASF, it is critical for swine farmers to be aware of the three defensive approaches for limiting spread of the virus.

Dr Nguyen recommended that farmers enhance their animals’ immunity with Aleta™ and protect feed with formaldehyde-based Sal CURB™. ■

Olmix Group debuts Algimun®

OLMIX GROUP has announced the official launch of a novel solution to bolster gut integrity and immune function in animals.

Algimun®, the latest of Olmix’s algae-based innovations to strengthen animal immune defenses for optimized performance, is now part of the company’s portfolio.

Launched at the Breizh Algae Tour 2018 (Berlin) and presented publicly at EuroTier (Hannover), Algimun® is claimed to produce positive results due to its unique properties based on Olmix’s specific algae extracts, MSP® BARRIER and MSP® IMMUNITY.

The company added that research has shown Algimun® functions are based on a synergistic association of biologically active sulfated polysaccharides extracted from marine algae (Olmix’s MSP®).

Algimun® provides long-term protection, and supports the shift between innate and adaptive immunity. Efficacy has been demonstrated in several scientific trials carried out in broilers. ■

Novogen appointment

NOVOGEN has appointed Stéphane Lemoine as deputy director, head of business development.

Mr Lemoine was formerly managing director of Nutrilia and then director of MixScience export within the Avril Group.

NOVOGEN and its technical sales teams will be present at VIV ASIA in Bangkok. ■



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CPF revenue hits Bt 541 billion, up 8% Tyson buys BRF

CHAROEN POKPHAND FOODS PLC (CPF) posted Bt541,937 million in sales revenue in 2018, and Bt15,531 million in net profits.

Sooksunt Jiumjaiswanglerg, chief executive officer for agro-industrial business and co-president of CPF, said that CPF's sales revenue based on local currencies grew 12% year-on-year, and annualized sales revenue should continue growing by 8-10% in 2019.

The company recently teamed up with Taiwan-based HiLai Group to open

Harbour, a seafood buffet restaurant at Iconsiam.

Dr Sujint Thammasart, chief operating officer for aqua-business, said CPF's aquaculture operations are now located in eight countries: Thailand, China, Vietnam, Indian, Malaysia, the Philippines, Brazil and the United States.

In 2018, the aquatic business arm generated Bt74,513 million in sales revenue. Sales revenue is expected to rise by more than 15% in 2019 while net profits should grow accordingly, particularly from operations in Thailand. ■

TYSON FOODS INC has bought the Thai and European operations of BRF SA. The US\$340 million purchase includes four processing facilities in Thailand, one processing facility in the Netherlands and one processing facility in the United Kingdom.

The deal builds on the company's growth strategy to expand offerings of value-added protein in global markets.

Tyson, which bought Keystone Foods late last year, believes some of its biggest growth opportunities are in value-added foods and international markets, said Noel White, president and CEO.

The earlier Keystone acquisition provided Tyson with a scalable production platform in the Asian poultry market. The BRF facilities will complement and strengthen Tyson's presence in Thailand, and provide new capabilities in Europe, he added.

The vertically integrated poultry operations in Thailand include a feed mill, hatchery, breeder farms and contract growing operations supplying live birds for the four poultry processing facilities.

The four plants produce a wide range of fresh and frozen, value-added raw and fully cooked poultry products, including highly specialized cuts for retail and food-service customers throughout Asia and other export markets, including Europe.

The processing locations in the Netherlands and the United Kingdom are supported by in-house innovation capabilities for developing further-processed chicken products for retail and foodservice customers throughout Europe. ■

Hubbard pedigree operation in the US gets upgraded

FOLLOWING THE ACQUISITION OF HUBBARD by the Aviagen Group in February of 2018, US\$10 million will be invested in advancing the research and development base of Hubbard in Walpole, New Hampshire.

The project currently underway will involve adding, expanding and modernizing the pedigree farm base and hatchery with state-of-the-art technology and equipment.

Customers in the US and abroad will benefit from improved performance, health and welfare of Hubbard's conventional male and female broiler breeder lines, the company said in a statement.

The upgrade of the Walpole facilities is slated for completion by the end of 2020, and will enable Hubbard to triple its pedigree program in the US.

To increase the accuracy of genetic selection methods, the Hubbard farms and hatcheries will use the same state-of-the-art technology and techniques used in Aviagen research and development, such as advanced 3D imaging to improve selection for skeletal health, meat yield and quality.

The Walpole facilities will also incorporate Lifetime Feed Conversion Ratio (LFCR) technology – a method that observes FCR and feeding behavior during a bird's lifetime in order to aid selection for birds that are the most efficient in converting feed to body weight. ■

ADM buys Neovia

ARCHER DANIELS MIDLAND COMPANY has bought Neovia for €1.544 billion, creating a global leader in value-added products and solutions for both production and companion animals.

ADM chairman and CEO Juan Luciano said the deal was the company's largest since ADM acquired WILD Flavors in 2014, which kicked off the most extensive portfolio transformation in the company's 115-year history.

The company has made a series of expansions and investments in recent years, including new operations in China and the US, the acquisition of pet treat manufacturer Crosswind Industries, a partnership with China-based Qingdao Vland Biotech Group, and building a cutting-edge research lab in California to develop and commercialize animal feed enzymes.

With the addition of Neovia, ADM Animal Nutrition spans the globe, offering premixes, complete feed, ingredients, pet care solutions, aquaculture, additives and amino acids. ■

Cobb leaders take on new roles

COBB-VANTRESS has announced new roles for several key executives around the world. Three leaders, who together have more than 46 years of combined experience at Cobb, will take on new responsibilities to position the company to better meet growing global demand for Cobb products.

Roy Mutimer has assumed the newly created role of vice-president of operations, overseeing global lab operations, animal welfare and facility management. Mr Mutimer previously served as vice-president of Europe, Middle East and Africa (EMEA) as well as Asia-Pacific (APAC).

Pelayo Casanovas was promoted to vice-president of EMEA and APAC. Mr Casanovas previously worked as the APAC general manager where he established operations in China, New Zealand and the Philippines in the last five years.

Fred Kao was promoted from director of operations for APAC to general manager of the region. He will report to Mr Casanovas and continue to be based in Shanghai.

The announcement comes the same week as the company's grand opening for its newest facility in New Zealand that will supply Cobb genetics to markets like China, Indonesia, Philippines and Thailand. ■



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