



DAFF notice of possible importation of live attenuated salmonellae vaccines for use in chickens and turkeys. Photo: Victor Talashuk

DAFF assessment of application to import live attenuated salmonella vaccines

THIS notice affects stakeholders who have an interest in the possible importation of live attenuated salmonellae vaccines for use in chickens and turkeys.

The application

The Department of Agriculture, Fisheries and Forestry has received a permit application from Elanco Australasia to import the following live attenuated veterinary vaccines:

- AviPro Salmonella Duo
- AviPro Salmonella Vac E
- AviPro Salmonella Vac T.

The application is being assessed against the requirements of Australia's current import policies and guidelines for live veterinary vaccines:

- Australian Quarantine Policy and Requirements for the Importation of Live and Novel Veterinary Bulk and Finished Vaccines, November 1999
- Guidelines for managing the risk of transmitting transmissible spongiform encephal-

opathies via veterinary vaccines and other in vivo veterinary products, October 2012

- Assessment of genetic recombination and reassortment of imported veterinary vaccines, July 2018.

Summary of product information

Vaccines are presented as a lyophilisate for suspension.

AviPro Salmonella Vac E

Live attenuated salmonella enteritidis bacteria, strain Sm24/Rif12/Ssq. AviPro Salmonella Vac T

Live attenuated salmonella typhimurium bacteria, strain Na12/Rif9/Rtt).

AviPro Salmonella Duo

Live attenuated salmonella enteritidis bacteria, strain Sm24/Rif12/Ssq and live attenuated salmonella typhimurium bacteria, strain Na12/Rif9/Rtt).

AviPro Salmonella Duo is a live attenuated vaccine combining the strains of salmonella in AviPro Salmonella Vac E and AviPro Salmonella Vac T.

Target species

Chickens (breeders and layers) and turkeys (breeders and meat production).

Route of administration

For administration after resuspension via the drinking water.

Manufacturer

Lohmann Animal Health GmbH, Heinz-Lohmann Str. 4, 27472 Cuxhaven, Germany.

Indications for use

For active immunisation of healthy and susceptible chickens to reduce faecal excretion and colonisation of internal organs with salmonella enteritidis and s typhimurium field strains and to reduce colonisation of eggs with s enteritidis field strains.

For active immunisation of healthy and susceptible turkeys to reduce colonisation of internal organs with s enteritidis and s typhimurium field strains.

The AviPro Salmonella vaccines contribute to the reduction in the prevalence of

continued P2

Women's empowerment and leadership in agriculture

RECENTLY, I had the honour of serving as a guest speaker at the second International Conference on Women's Empowerment and Leadership in Agriculture, held in Naga City, Philippines.

This two-day event brought together a diverse array of speakers, including trailblazers in agriculture and advocates for women's empowerment in the field.

Through panel discussions, workshops and lively debates participants explored avenues for driving positive change.

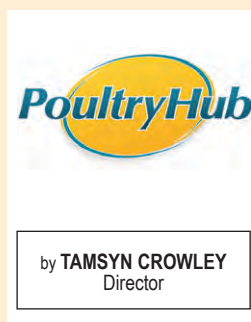
My own presentation centred on the crucial intersection of food security and leadership, highlighting the importance of achieving gender balance within the poultry industry and the broader agricultural sector.

I firmly believe that by expanding the workforce in our industry, we can enhance food security while gaining fresh perspectives to propel our field forward.

Among the standout presentations was one by Bernadette De Los Santos, affectionately known as BidiBidi.

A multifaceted individual, she seamlessly blends roles as an artist, designer, farmer, environmental advocate and social entrepreneur.

Embracing sustainability, she crafts products using upcycled materials, each imbued



with the narrative of women striving to improve their families' lives.

Bernadette's mission extends to empowering out-of-school youth and women – particularly farmers' wives – in her community, providing them with sustainable livelihoods.

The women craft bags and other household materials from the comfort of their own home, working at their own pace.

They are provided with all the necessary resources to bring their designs to life.

Bernadette also aims to preserve the skill of hand embroidery, of which Baao in Camarines Sur was known for in the 1970s.

She designs the bags, but the women decide which colours will bring the caras (faces) to life.



The two-day event brought together a diverse array of speakers, including trailblazers in agriculture and advocates for women's empowerment in the field.

ministered by Gender Equity in Agriculture Research and Development, in partnership with the University of New England Australia and Coffey International – aims to bolster food systems' resilience by empowering women in agricultural science.

Through access to resources, networking opportunities, career support and advocacy for gender equity, the fellowship catalyses institutional progress.

Since 2020, 42 women from Papua New Guinea, Fiji, Cambodia, Laos, Vietnam, Indonesia, the Philippines, Timor-Leste, Nepal, Myanmar, Mongolia, Samoa, Vanuatu, Tonga and the Solomon Islands have been selected for this transformative program.



The author was guest speaker at the second International Conference on Women's Empowerment and Leadership in Agriculture held in Naga City, Philippines.



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The Stockyard Team are looking forward to catching up with all our customers at Food with Purpose 2024 from May 13 to 15.



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Poultry Industry Calendar of Events

2024

MAY 13-15 – Food with Purpose, Gold Coast Queensland. pix.au

MAY 14-17 – 2024 International Avian Respiratory Conference, Athens USA. hotel.uga.edu/events/international-avian-respiratory-disease

MAY 15-16 – Australasian Veterinary Poultry Association Conference, Gold Coast Queensland. avpa.asn.au/event/avpa-may-2024-scientific-meeting

MAY 15-16 – British Pig and Poultry Fair, Birmingham London. pigandpoultry.org.uk

JUN 24-28 – XVIth European Poultry Conference, Valencia Spain. epc2024.com

JUL 12-14 – 14th International Symposium on Marek's Disease and Avian Herpesviruses, St Louis USA. aaap.info/2024-international-symposium-on-marek-s-disease-and-avian-herpesviruses

OCT 2-3 – VIV Africa, Kigali Rwanda. vivafrica.nl

OCT 16-17 – Dutch Pork and Poultry Expo, Evenementenhal Hardenberg Netherlands. www.porkpoultryexpo.nl/

OCT 28-29 – International Conference on Poultry Science, Lisbon Portugal. waset.org/poultry-science-conference-in-october-2024-in-lisbon

NOV 12-15 – 28th Latin American Poultry Congress, Punta del Este Uruguay. ovum2024.uy/en/ovum2024-english/#pll_switcher

NOV 12-15 – EuroTier 2024, Hanover Germany. www.eurotier.com

How to supply event details:

Send all details to National Poultry Newspaper, PO Box 162, Wynnum Qld 4178, call 07 3286 1833 or email ads@collins.media

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New data on egg exports in Australia

AS the national body representing the nation's commercial egg production sector, Egg Farmers of Australia often receives queries from politicians seeking our view on the issue of egg exports and imports, in order for law makers to have a holistic understanding of our complex industry.

EFA represents farmers operating in three key egg production systems – cage, free range and barn laid.

Eggs, of course, remain among the most affordable sources of protein for Aussie families.

In this edition, I want to focus on the export of eggs and egg product.

While this makes up only a very small part of Australia's total egg sales – accounting for \$2-\$11 million in various years – new government data offers an updated insight into these exports.

There are two key types of products that Australian egg producers export.

The first is classified as 'eggs not in shell', these are liquid or powdered eggs.

The second type is classified as 'eggs in shell' and involves the trade of whole eggs.

Some of the countries that Australian 'not in shell' egg products are



Egg Farmers of Australia

by MELINDA HASHIMOTO
CEO



sent to include Fiji, Hong Kong, the Netherlands, Canada, New Caledonia, New Zealand, Papua New Guinea, South Africa, Sri Lanka and the United Arab Emirates.

Whole eggs (or 'eggs in shell'), on the other hand, are exported to Hong Kong, Kiribati, New Zealand, Tonga, Philippines, Taiwan, Vanuatu and the US.

New data of egg exports has been released by Australian Bureau of Agricultural and Resource Economics and Sciences.

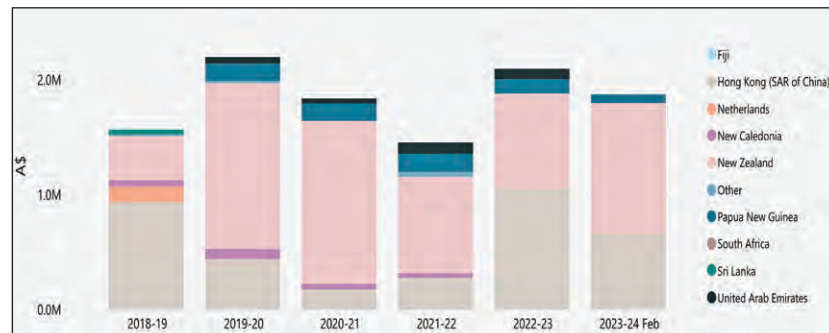
It shows that exports of both 'eggs not in shell' and whole eggs have fallen dramatically in the past year, compared to previous years.

In 2023-24, 'eggs not in shell' dipped below earnings of \$2 million, compared to the previous year which well exceeded the \$2 million mark.

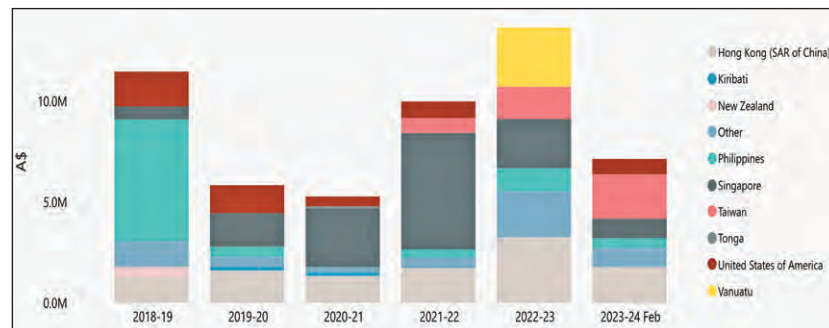
Interestingly, for the first time in five years, none of this product was

exported to the UAE in 2023-24.

This indicates that there was strong demand for domestic eggs here in Australia, resulting in less eggs to use for these products.



Graph 1: The value and countries that have imported Australian egg product 'not in shell' over the past 6 years. Source: ABARES



Graph 2: The value of Australian 'eggs in shell' over the past 6 years. Source: ABARES

Notice of application to import live attenuated salmonella vaccines

from P1 salmonella input into the human food chain via avian products.

Mechanism of attenuation

The vaccine strains are natural metabolic drift mutants, that is they lack or do not express certain metabolic pathways which results in attenuation.

The genetic basis results in defective ribosomal protein S12 affecting polypeptide synthesis (streptomycin resistance), defective gyrase affecting DNA replication (nalidixic acid resistance) and defective RNA polymerase affecting transcription of DNA to RNA (rifampicin resistance).

The vaccine strains also have attenuations that increase the permeability of the cell membrane for harmful agents such as detergents and antibiotics.

This means that the strains have poor survival in the environment and are highly sensitive to fluoroquinolones and unlike field strains are sensi-

tive to erythromycin.

Withdrawal period
Meat, offal and eggs – 21 days.

Endemicity

An analysis of whole genome sequencing of the AviPro vaccine strains confirmed that sequences were homologous to those isolated in Australia from non-travel associated human cases.

Risk of reversion to virulence

It has been determined that the risk of vaccine strains reverting to a virulent state is very low following an assessment of the mechanism of attenuation and associated mutations of the vaccine strains, as well as a review of test reports demonstrating stability of the vaccine strains.

There are also a variety of independent published reports with a satisfactory view on the likelihood of reversion to virulence.

The applicant has provided data on the volume of international vaccine sales in markets with animal disease reporting systems equivalent

to those in Australia.

This data demonstrates a safe history of use of the vaccine over a significant timeframe.

Risks of genetic recombination and reassortment

The importation and use of live bacterial vaccines may be associated with a risk of genetic recombination between vaccine strains and other strains already circulating in Australia.

This can lead to disease events caused by strains of the agent that demonstrate increased pathogenicity through the introduction of mutations or virulence factors that currently do not exist in Australia.

While the likelihood of this occurring is low, it has been confirmed in published research that recombination involving live veterinary vaccines has occurred under Australian field conditions.

DAFF has done an assessment of the risk of inter-genomic recombination of the salmonella vaccine strains as well as between vaccine strains and indigenous strains

Likewise, there has been a dramatic fall in whole egg exports.

In 2022-23, this 'eggs in shell' category earned above \$11 million.

However, in 2023-24, this figure fell to between \$7-\$8 million.

Again, this reflects a higher demand for eggs in the Australian food market.

This trend mirrors a rise in egg consumption in Australia over several years.

Last financial year, Australians ate on average 263 eggs each over the 12-month period.

In the next edition, EFA will focus on egg imports into Australia.

For many years, powdered egg has been imported into Australia and used in bakery mixes.

EFA believes that any imports of egg product should meet Australian standards.

We should not import egg products that are of a lower standard or from countries that have less meticulous animal welfare rules than Australia.

This would disadvantage our Aussie egg farmers.



If a permit were issued to import these vaccines, DAFF has assessed the level of risk to Australia's trade in avian products to be very low. Photo: Finn Mund

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Formidable females flourish in welfare

WHEN visiting the RSPCA website recently – as I regularly do – I was again reminded of how important the role of women in agriculture and, in particular, animal welfare is.

I read various newsfeeds on March 8, when International Women's Day was rightly celebrated, yet perhaps I failed to delve deep enough to really mull over its significance.

I now know that International Women's Day is a global day recognising and celebrating the social, economic, cultural and political achievements of women.

How this event could ever have been labelled a cause celebre or bone of contention is beyond me.

It also marks, I understand, a call to action for speeding up women's equality.

That the spinning wheels of sexual equality should even need to be sped up is rather damning – sorry to say this to you 'backward folks' out there.

International Women's Day has been happening for more than a century, with the first gathering in 1911 supported by more than one million people.

Today, it belongs to everyone everywhere and is not country, group or organisation specific.

So, back to RSPCA.

Here's how it rightly supported International Women's Day on its website...

This International Women's Day, we're celebrating the milestones of women working in agriculture toward a future of higher-welfare farming.

Pushing for a better quality of life for the millions of animals farmed in Australia each year, through their resilience, innovation and dedication, these women are also raising the bar for gender equality in what has traditionally been a male-dominated field.

Women today work in many essential roles across the agricultural sector, thanks to years of advocacy for equal representation – from farm hands and managers through to policy-makers and suppliers, and of course, here at the RSPCA Approved Farming Scheme.

While we recognise the collective force of all women and those with diverse backgrounds, it's important to highlight those working toward the common goal of higher-welfare farming.

Cant Comment

by BRENDON CANT



This means improving practices on the ground and advocating for change within industry, with incremental efforts helping to raise the bar for a better quality of life for farmed animals.

Today we celebrate some of the women who work at RSPCA Approved, along with dedicated producers and innovative specialists, all working to champion improvements in higher-welfare farming.

RSPCA then profiled some of its welfare-oriented female staff and collaborators, beginning appropriately with Melina Tensen, who I've long worked with and admired for her forthright, practical, nuanced and science-based expressions on animal welfare matters.

RSPCA Australia senior scientific officer (farm animals) Melina Tensen

Hailing from the Netherlands, where she had been working in agricultural aid, Melina began a Bachelor of Science in the United Kingdom and increasingly developed an interest in farm animal welfare.

While establishing herself in Canberra, Melina completed a degree in agricultural sciences specialising in animal production and a graduate certificate in animal welfare, all while working full time in an agricultural aid organisation.

"Change in practice, as well as attitude, towards farm animals and their welfare relies on ongoing animal welfare research," she said.

"Animal welfare organisations have a key role in communicating the outcomes of that research to raise awareness and encourage consumers to seek products from animals raised to higher-welfare standards."

Melina's role with RSPCA Australia focuses on providing science-based information, commentary and advice on farm animal welfare issues at industry, government and consumer level, including the development and review of RSPCA policies and the RSPCA Approved Farming Scheme standards.

Hazeldenes general manager risk and compliance Tracey Ling

Hazeldenes has a strong track record for improving meat chicken welfare.

In 2014, they helped pave the way for Coles to launch their own brand of fresh RSPCA Approved chicken.

Tracey has been part of the industry as it pivoted towards a stronger focus on animal welfare.

Having worked at Hazeldenes since 2000 and diving into quality management in 2005, she knows the importance of animal welfare and continuous improvement, as well as the importance of diversity in the agricultural field.

"Don't be put off by what have been typically male-dominated industries," she said.

"If you work in a good organisation that respects the contribution made regardless of gender, embraces diversity and has the foundation for leadership and talent development, then the opportunities are endless and very rewarding."

Inghams general manager farming Sheridan Alfirevich

Sheridan has a strong background in animal welfare.

After practising as a veterinarian in regional Western Australia, she accepted a Poultry CRC sponsored veterinary internship as a result of her interest in avian medicine.

"I'd love to see more women involved in agriculture and specifically in the poultry industry," she said.

"The poultry industry is growing rapidly and

is dynamic, fast-paced and provides plenty of opportunity for career development and progression."

After joining Inghams as general manager of farming in 2022, Sheridan now leads an experienced and dedicated team of more than 600 people responsible for managing Inghams farms and hatcheries nationally.

She has also been actively involved in many animal welfare projects at Inghams to support their animal welfare strategy, including benchmarking key welfare indicator targets and provision of enrichment on farms.

RSPCA Australia certification body co-ordinator Kate Owers

Certification co-ordinator Kate has tailored credentials for her role with the RSPCA Australia certification body.

With a degree in animal science, along with experience in processing agri-environmental schemes for an international government organisation and working on the ground in rural supplies, Kate has developed a keen interest in animal health and nutrition.

Kate's experience has solidified her interest in working with producers to implement improvements in rearing animals for food and fibre, as well as throughout the supply chain.

Working in RSPCA's certification body has developed her knowledge of higher welfare farming and given her the opportunity to work directly with industry.

"It's important that we work with industry to implement evidence-based welfare gains and I am grateful that I am part of a team that achieves this," she said.

"I value that we can see the tangible impacts of how industry has worked to improve welfare and provide higher welfare options for consumers."

Let's support all females to, if necessary, smash the glass ceiling. 🐔



RSPCA Australia senior scientific officer (farm animals) Melina Tensen.

Hatching off farm could prepare day-old chicks for future layer hen housing change

DAY-old chicks at commercial hatteries are typically sexed, vaccinated and transported without food, water or litter to rearing farms.

These stressors can be viewed as positive under an 'environmental matching' hypothesis where they shape chicks' individual phenotypes to make them more adaptable to similar conditions later in life.

Alternatively, under the 'silver-spoon' hypothesis, reduced stressors or abundant nutrition may enable hens to cope better when faced with stressors later in life.

The aim of this research was to compare the health, behaviour and laying performance of hens hatched on-farm to those transported as day-old chicks to determine if the results supported either theory.

Dekalb white chicks were used in the Switzerland-based study that included two replicates of the two treatment groups (n = 40 in each replicate pen).

After the initial early life treatment of being raised on litter, at 17-weeks of age the

hens were raised in pens simulating commercial conditions (multi-tier aviary) while their health and behaviour was monitored.

No differences were found in hen mortality or number of eggs produced, but the farm-hatched hens had more severe keel bone fractures than those transferred to the farm at one-day old.

For the first three months after their transfer into the laying barn, the farm-hatched hens averaged less transitions between the aviary's tiers and spent less time on the littered floor.

After that time, the behaviour of the hens was similar across the treatment groups.

The researchers

concluded that their results supported the 'environmental matching' theory and proposed that hatching on-farm rather than in commercial hatchery could create a mismatch that is detrimental to animal welfare.

They also recommended that further research was needed to determine if conventional husbandry practices should be modified to better suit hens hatched on farm.

The study, 'Commercial hatchery practices have long-lasting effects on laying hens' spatial behaviour and health' can be viewed in its entirety at journals.plos.org/plosone/article?id=10.1371/journal.pone.0295560



Under an 'environmental matching' hypothesis early stressors shape chicks' individual phenotypes to make them more adaptable to similar conditions later in life.

Stockyard Industries welcomes Mark and Niel

STOCKYARD Industries is excited to announce the appointments of Mark Manchip as its new project manager and Niel Snyman as technical sales representative.

Both staff have migrated to Australia from South Africa with their respective young families and will be based out of the Bendigo Victoria head office.

With a rich background in construction and project management, Mark brings to the team a wealth of knowledge and a proven track record of success.

His expertise spans across a diverse range of projects, including the construction of shopping centres, cold storage facilities and, of course, pig farms.

Mark's notable accomplishments include the development of a comprehensive turnkey pig farm project – encompassing breeder sites, weaner sites and finisher sheds, as well as constructing housing villages, dams and offices.

Mark's role at Stockyard Industries will involve travelling to project sites, liaising with builders and equipment installers regarding time schedules, monitoring work

progression, managing cost control and communicating with the end customer, sales team and administration staff, with the aim of delivering a quality smoothly run project completed on time and within budget.

Stockyard Industries is confident that Mark's leadership, project management and overseeing the planning, coordination and implementation of building and equipment installation will result in benefits for all involved.

The entire team at Stockyard Industries is excited to work under his guidance and looks forward to achieving new milestones together.

Stockyard Industries has also added a technical sales representative to the team – Niel Snyman.

Niel has a background in sales and over 12 years' experience working in the agricultural industry in South Africa, fulfilling the role of sales manager at Big Dutchman for the past three years.

Niel is tasked with responsibilities of working with customers regarding farm hygiene, including demonstrating the use of equipment and products, pre-

paring quotes, responding to enquiries and developing relationships to best service our pig and poultry customers across the country.

He will work closely with farm managers to address challenges and foster solid and productive partnerships, with his problem-solving abilities being set to enhance the company's service quality and customer satisfaction.

Niel began his career working in hatcheries in various roles, including agriculture manager and is looking forward to bringing his experience to the pig and poultry markets of Australia.

Stockyard Industries is confident that Niel's appointment will lead

to innovative hygiene solutions and stronger customer relationships.

The company looks forward to the positive impact he will make in his new role.

For more information about Stockyard Industries and its services, visit stockyardindustries.com



Stockyard Industries' new technical sales representative Niel Snyman.



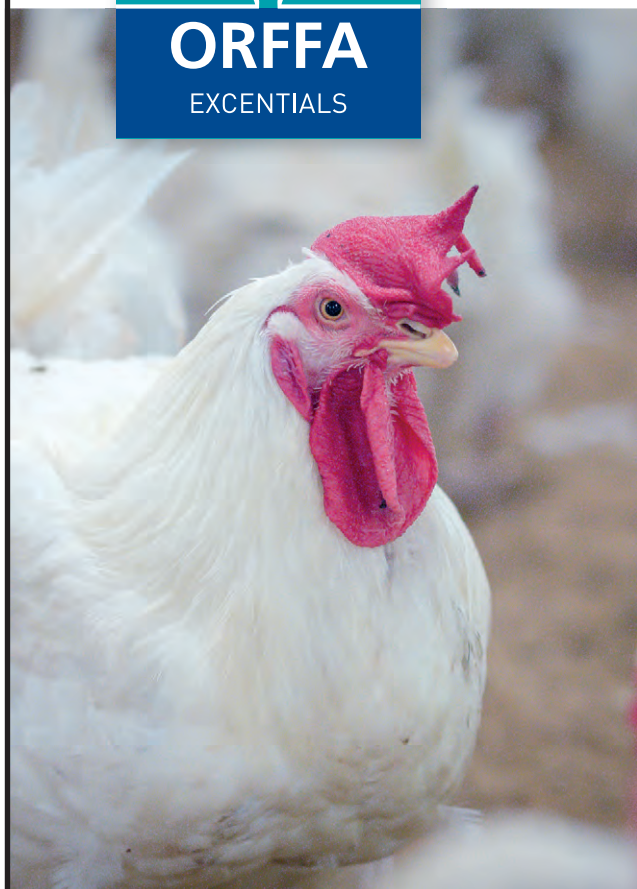
Mark Manchip is the new project manager at Stockyard Industries. Mark can be contacted on mark@stockyardindustries.com or 0487 743 322.



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Carbon dioxide and N2 mixture improves broiler chicken welfare during stunning



AT slaughter, animals are stunned to induce unconsciousness so that they do not feel pain and distress before death during the bleed-out process.

In Europe, broiler chickens are either stunned using an electrical water bath or carbon dioxide delivered in two phases.

Carbon dioxide stun-

ning usually involves a first phase of <40 percent CO2 to induce unconsciousness after which it is increased up to 90 percent CO2 to induce an even deeper state of unconsciousness.

The lower concentrations are used first to induce unconsciousness because high concentrations of CO2 are aversive to birds.

The use of inert gases, such as nitrogen, alone or in combination with CO2 has been suggested as possible more humane alternatives to CO2 stunning systems.

The aim of this study was to determine if CO2 combined with N2 induced less aversive behaviours prior to death.

Mixed-sex Ross 308 broiler chickens (n = 243) were obtained from a commercial farm in Spain at 39-days-old and allocated to one of three treatments – indus-

try standard 40C90C, 40C60N with a first phase the same as the industry treatment followed by a second phase of 60 percent N2 and <2 percent oxygen, or 20C80N with a first phase of 20 percent CO2 and a second phase of 80 percent N2.

Behaviour and brain activity were monitored during each of the treatments.

The chickens subject to the 40C90C treatment showed more aversive behaviours and some remained conscious until the second phase, which is known to cause pain.

While all treatment groups showed some signs of aversion during stunning prior to loss of consciousness, the 40C60N and 20C80N treatments reduced the average time it took for chickens to lose consciousness (19 and 20 seconds respectively)

and had reduced variability in those times, compared to the 40C90C treatment (53 seconds).

Time until brain death was 64 and 70 seconds for the 40C60N and 20C80N treatments respectively, while it was 177 seconds for the 40C90C treatment.

The researchers concluded that the stunning treatments with CO2 and N2 resulted in a more rapid induction of unconsciousness and reduced signs of aversion in broiler chickens.

Overall, the 20C80N treatment was found to have the best animal welfare outcomes.

The study 'Alternatives to carbon dioxide in two phases for the improvement of broiler chickens' welfare during stunning' can be viewed in its entirety at mdpi.com/2076-2615/14/3/486#

In Europe, broiler chickens are either stunned using an electrical water bath or carbon dioxide delivered in two phases. Researchers concluded that the stunning treatments with CO2 and N2 resulted in a more rapid induction of unconsciousness and reduced signs of aversion in broiler chickens.



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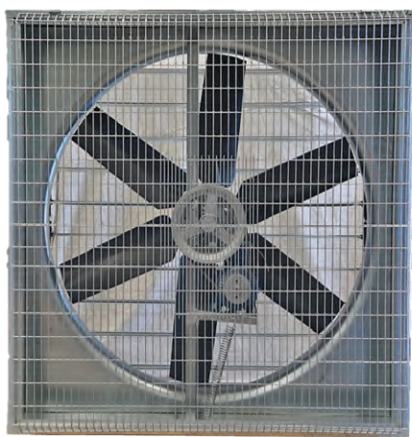


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Aurum Poultry's new general manager

SPECIALTY poultry producer Aurum Poultry Co is excited to announce the arrival of its new general manager, John King.

Mr King joins the Aurum team with a wealth of food industry knowledge, both in front of and behind the scenes.

Originally from Queensland, Mr King comes to the role with more than seven years' experience in sales, business development and corporate business management solutions.

"My experience has assisted me in understanding the context of culture and philosophy in food production, while also developing a realistic perspective around ethics, sustainability and financial management," Mr King said.

"Aurum Poultry Co has a unique value proposition, strong market potential and scalability, and I'm excited to be joining the team at this

unique moment in its journey.

"Being a vertically integrated food supplier – with the ability to mitigate food waste due to a broad customer portfolio and end-to-end management process – it is well placed to set a new standard in the industry."

Mr King hopes to bring a transformational management style to the business, ensuring Aurum remains a progressive respectful business and workplace for staff.

"Ultimately, we want to continue to honour our poultry, our people and our customers at Aurum Poultry Co – making it a part of our DNA not to be compromised for short-term gain or a self-serving agenda," he said.

With such a strong understanding of the food industry, from both a sales and customer perspective, the Aurum Poultry Co management

team is delighted with the appointment.

Director Sam Wong said, "As Aurum Poultry Co grows, it is vital that we invest in individuals with strong leadership skills and business acumen."

"John brings a level of knowledge, wide range of experience and a fresh perspective that we know will be hugely beneficial as we look to expand the business now and into the future."



John King joins specialty poultry producer Aurum Poultry Co as its new general manager.



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At SBA, quality is just part of our DNA.



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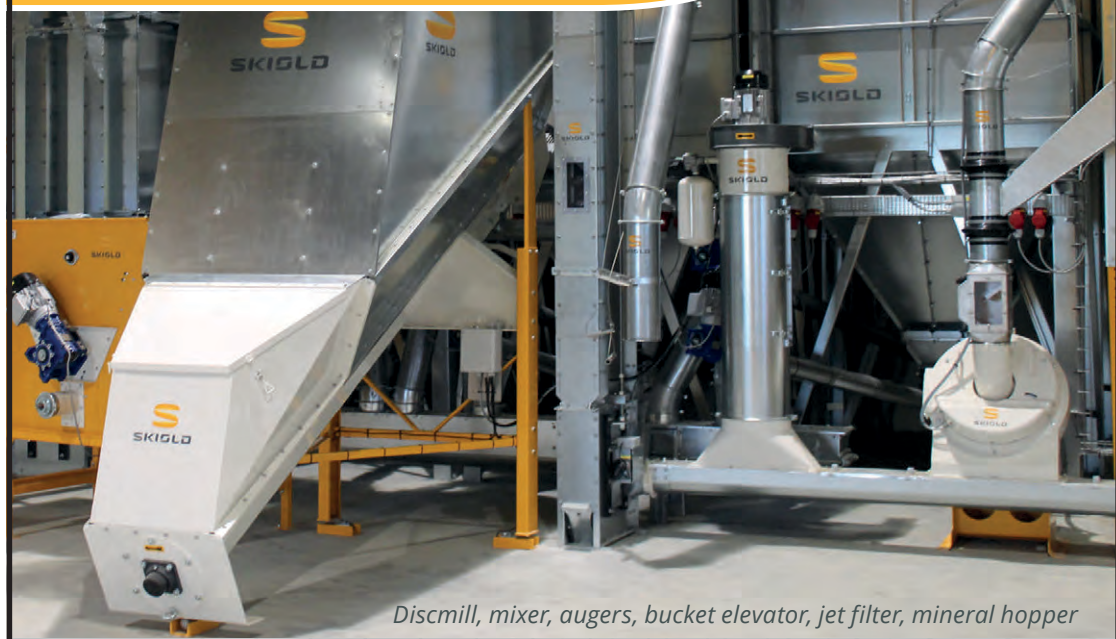
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Alltech®

Agri-Food Outlook | 2024

The 2024 Alltech Agri-Food Outlook revealed global feed production survey data and trends.

2024 Alltech Agri-Food Outlook

GLOBAL animal feed production remained steady in 2023 at 1.29 billion metric tons, a slight decrease of 2.6 million metric tons – or 0.2 percent – from 2022's estimates, according to the 2024 Agri-Food Outlook released by Alltech recently.

The annual survey, now in its thirteenth year, includes data from 142 countries and more than 27,000 feed mills.

The overall lower demand for feed was due in part to the more efficient use of feed made possible by intensive production systems that focus on using animal nutrition, farm management and other technologies to lower feed intake, while producing the same amount of protein or more.

A slowdown in the overall production of animal protein, in response to tight margins experienced by many feed and animal protein companies, also contributed to lower feed demand.

Changing consumption patterns caused by inflation and dietary trends, higher production costs and geopolitical tensions also influenced feed production in 2023.

Top 10 countries

The top 10 feed-producing countries are China (262.71 MMT, +0.76 percent), the US (238.09 MMT, -1.13 percent), Brazil (83.32 MMT, +1.84 percent), India (52.83 MMT, +13.43 percent), Mexico (40.42 MMT, +0.02 percent), Russia (35.46 MMT, +3.83 percent), Spain (27.53 MMT, -11.88 percent), Vietnam (24.15 MMT, -9.63 percent), Japan (23.94 MMT, -1.15 percent) and Türkiye (23.37 MMT, -11.48 percent).

Together, the top 10 countries produced 63.1 percent of the world's feed production (same as in 2022), and almost half of the world's global feed production is concentrated in four countries – China, the US, Brazil and India.

Notable species results and outlook

Poultry experienced an increase in broiler feed production (385.04 MMT, +13.10 MMT,

+3.5 percent) and remained steady with a slight increase for layers (170.88 MMT, +0.01 MMT, 0 percent).

Broiler feed now accounts for 29.9 percent of the total feed tonnage in the world, thanks to a 3.5 percent increase in overall tonnage in 2023.

While this growth was not uniform across all regions, the poultry sector is poised to keep holding strong in 2024, due to a combination of regional successes and global market dynamics.

Some of the biggest factors that will contribute to the resilience of the broiler sector include reduced costs for inputs, such as feed and energy, and increases in margins and profitability.

For layers, there are industry-wide efforts to optimise feed efficiency and to keep pace with changing dietary trends and new purchasing power.

Some markets around the globe were significantly impacted by macroeconomic challenges and disease outbreaks, which can disrupt production cycles.

Still, the general outlook for the layer industry remains positive owing to its resilience in the face of difficult circumstances, when other protein sectors often struggle to adapt.

The poultry sector is poised for continued strength, driven by a blend of regional successes and global market dynamics.

The broiler forecast remains optimistic because of lower input costs, increased industrial margins and shifting consumer behaviours.

For layers, challenges persist, but there are pockets of resilience and growth.

Notable regional results

North America saw a decrease of 2.8 MMT (259.26 MMT, -1.1 percent), with beef feed tonnage down significantly.

The pig and dairy sectors also slipped slightly, but the broiler, layer and pet sectors more than made up the difference.

Feed tonnage in the broiler sector was up nearly 2.9 percent.

Latin America experienced growth in 2023

by 2.46 MMT (200.67 MMT, +1.24 percent).

Despite high production costs, geopolitical tensions and changing consumer behaviour due to economic reasons, the region continues to lead global growth, mainly because of its export-driven aquaculture, poultry and pork markets.

Europe continued its downward trend in feed production, with a decrease of 10.07 MMT (253.19 MMT, -3.82 percent) due to issues that included the invasion in Ukraine and the spread of animal diseases such as African swine fever and avian influenza.

Asia-Pacific led feed production growth in 2023, with an increase of 6.54 MMT (475.33 MMT, +1.4 percent).

Feed production growth in the region's ruminant sectors offset a setback in the aqua sector.

The region is home to several of the top 10 feed-producing countries, including China, India, Vietnam and Japan.

Africa experienced continued but slower growth with an increase of 1.95 percent, nearly 1 MMT to total 51.42 MMT.

The Middle East saw a slight decrease of 0.12 MMT (35.93 MMT, -0.32 percent).

Oceania had the third-highest growth, 3.71 percent or 0.39 MMT to total 10.78 MMT.

Alltech works together with feed mills and industry and government entities around the world to compile data and insights to provide an assessment of feed production each year.

Compound feed production and prices were collected by Alltech's global sales team and in partnership with local feed associations in the first quarter of 2024.

These figures are estimates and are intended to serve as an information resource for industry stakeholders.

To access more data and insights from the 2024 Alltech Agri-Food Outlook, including an interactive global map, visit alltech.com/agri-food-outlook

Alltech

Chicken code crucial to protect farmers

A MANDATORY code of conduct is urgently needed to protect chicken meat farmers from market power abuse at the hands of processors, an industry report has found.

NSW Farmers Association poultry meat manager David Banham interviewed more than 150 farmers at workshops across the country as part of a year-long investigation into the poultry meat sector, conducted through a joint project with the National Farmers Federation and the Australian Chicken Growers' Council.

The project uncovered significant inequities within the poultry meat supply chain in the process, as detailed in a report revealing the widespread misuse of market power within the industry, released by the NFF recently.

"The message from poultry farmers was clear – there is little to no choice in processors, growing contract terms are unfair and there is a deliberate undermining of collective bargaining efforts within the supply chain," Mr Banham said.

"Growers are receiving less than 6 percent

of the retail price for a roast chicken, as processors continue to exercise significant market power over poultry farmers day in, day out.

"There is no doubt that growers are getting the raw end of the deal, and there needs to be significant reform within the sector to address these issues before more poultry farmers are forced to shut their doors."

Mr Banham said to improve conditions for poultry farmers into the future, the report recommended the Federal Government implement a mandatory code of conduct to govern growers, processors and supermarkets operating within the poultry industry.

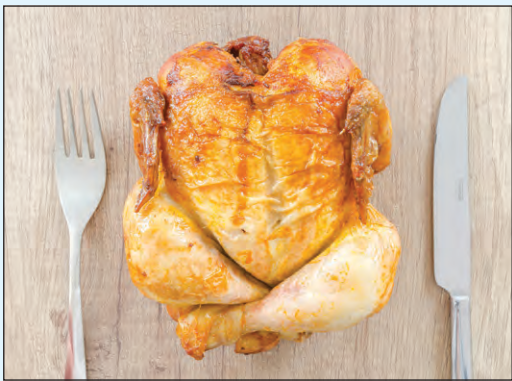
"Currently, poultry farmers are at the mercy of a highly concentrated processing sector, with almost a code

of secrecy existing around the prices they receive for all their hard work," he said.

"Having a mandatory code of conduct enforced by the Australian Competition and Consumer Commission would support fair trading as well as best practice policy and regulation of supermarkets and processors within the poultry meat industry.

"For poultry farmers, this code could mean more power to negotiate and better enforceability of contracts in the chicken meat supply chain – meaning a fairer deal at the farm gate and a brighter future moving forward."

Read the report at nff.org.au/wp-content/uploads/2024/04/Final-Report-NFF-Market-Price-Transparency-Project-April-2024-v2.pdf



Growers receive less than 6 percent of the retail price for a roast chicken. Photo: Lukas



Check with your service provider to confirm if you will be impacted before the 3G network closures. Photo: Hassan Ouajbir

Australia's 3G networks are closing down

ACT now, don't delay – here's what you need to know.

Australia's 3G networks are closing down. It is important that Australians know if they will be impacted and have time to upgrade their phones and other devices before the 3G networks close.

If you receive notice from your service provider to upgrade your device, don't put off taking action, contact your service provider.

The closure has already commenced

TPG Telecom/Vodafone has already switched off its 3G mobile network services as of January 2024.

If you're a Vodafone customer or business reliant on the 3G network, it's crucial to upgrade to a device compatible with 4G or 5G networks. Visit vodafone.com.au/support/network/3g-closure for more information.

Telstra will close its network on 30 June 2024 – visit telstra.com.au/support/mobiles-devices/3g-closure for more information.

Optus 3G network will be shut down from September 2024 – visit optus.com.au/support/mobiles-tablets-wearables/important-changes-3g

All 3G devices will be affected, not only phones

If you have an older device that relies on a 3G network, you must upgrade your device now.

This includes mobile phones, tablets, smart watches, eftpos machines, personal emergency response solutions and medical alarms.

More details can be found at amta.org.au/3g-closure

Some 4G devices will be affected

Some early 4G handsets don't support 4G voice calling, which means they use the 3G network and, after the closure, these devices will not be able to make a call.

There are also a number of devices that support normal 4G voice calls, but force emergency 000 calls to 3G.

If you have devices that don't support 4G and 4G emergency calling, you should upgrade your device, otherwise you will not be able to make an emergency call to 000 after the 3G networks close.

Contact your service provider to check your device

It's important that you check with your device manufacturer or service provider to confirm if you will be impacted before these

network closures.

Get in touch with your service provider to check your device – amta.org.au/3g-closure/service-providers

While service providers are advising customers through a variety of communications forms, including text, email and post, it is important to reach out to your service provider and check if you need to take any action.

Further information

Visit the Department of Infrastructure, Regional Development, Communications and the Arts 3G network switch off website, in infrastructure.gov.au/media-communications-arts/phone/mobile-services-and-coverage/3g-network-switch, or the ACMA's 3G network switch off website, acma.gov.au/3g-network-switch, for further advice.

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Tax time coming soon, don't miss out

WITH farmers focused on maximising yields and harvesting at this busy time, it's easy for the end of financial year to creep up unnoticed.

Aussie Pumps would like to alert farmers and small business owners to the Federal Government's instant asset write-off support, which finishes on June 30, 2024.

Instant asset write-off
Aussie Pumps is urging business owners to consult with their tax agent to determine if they are eligible.

Companies with a turnover of less than \$10 million can get the benefit of instantly writing off assets worth individually up to \$20,000.

The benefits are enormous.

Now is the time to buy and take advantage of these tax incentives.

Aussie Pumps has some great suggestions



Aussie Pumps 4" QP transfer pump is ideal for managing water resources.

for products to consider, which will appeal to farmers, businesses and tradespeople.

Focused on meeting market needs through research and user feedback, Aussie Pumps designs products to be more efficient, ultra-reliable and last a lifetime.

The inspiration is the feedback from a wide range of customers who use the company's products.

Effluent solutions

When surveyed about their requirements for effluent pumps, farmers stated that reliability and performance was key.

That resulted in the development of the Aussie GMP semi trash range of motor pumps for handling solids-contaminated water.

These cast-iron self-priming pumps are super robust, with big open impellers, making



Aussie Pumps 4" effluent pump transfers up to 2300LPM.

them ideal for moving effluent and wastewater.

Available in both single phase and three phase with port sizes from 1.5" up to 6", the range delivers exceptional value for money.

Move water fast

Water management on farms often means moving large volumes between dams or tanks to maximise storage or relocate resources.

That's where the Aussie QP Drought Buster range of water transfer pumps come into their own.

The company offers a range of self-priming transfer pumps from 2" (QP-2) to 6" (QP602), with maximum flows as high as 2900LPM.

The self-priming capability they offer, with vertical lifts up to 8.2m, means the pumps are fast to set up and simple to use.

Clean up with Aussie

Aussie Pumps has done a huge amount of research and development for quite unique engine and electric-drive pressure cleaners.

Conceived, designed and built in Sydney Australia's Norwest business district, the machines offer features that are significantly upgraded from imported options.

The big breakthrough

was the company's unique 'Scud' frame design.

Built in stainless steel, these ergonomically designed frames house either Honda petrol or Yanmar diesel engine-drive heavy duty pressure cleaners.

They are suitable for a wide range of tasks – from poultry shed washdown to contract cleaning, local government work or trades such as concreting, brick cleaning and of course plant washdown for those in the earth-moving or quarry industries.

The heart of the system is a 'Big Berty' Bertolini pump, gearbox drive running at slow speed, 1450rpm.

They are designed for a long and trouble-free life.

The latest introduction of the Scud is a high-flow version, which is particularly suitable for cleaning effluent in dairies, cleaning poultry sheds and similar applications.

Where do you get them?

Aussie Pumps has a wide network of distributors operating in the region.

Dealer contacts are listed on the austiepumps.com.au website or call 02 8865 3500.



Of those surveyed, many had a "personal", though not "close personal", relationship with their chickens.

Owners have personal bond with their ex-commercial laying hens

HOUSEHOLD chickens are estimated to be the third most numerous pets in wealthy countries, with many owners in the United Kingdom adopting ex-commercial laying hens that would otherwise be slaughtered.

Rather than only being backyard chickens, many owners view them as pets that they would not kill unless euthanasia was deemed appropriate.

However, the literature on their care and the human-bird relationship is limited.

The researchers of this study aimed to obtain a large holistic body of information about how owners cared for their chickens, how they viewed their relationships with them and the challenges they faced.

An online survey (n = 2059) involving

60 questions targeted owners of adult hens and/or roosters.

A large proportion of the respondents lived in the UK, where the British Hen Welfare Trust rehomes over 60,000 ex-commercial hens each year.

The survey included questions about a hormonal implant that suppresses egg laying, providing potential health benefits for hens.

Many respondents had a "personal", though not "close personal", relationship with their chickens.

There was a higher prevalence of poor hen health reported than in prior studies, with egg yolk peritonitis a leading cause of death.

Implants were only used by 6.3 percent of owners, 68 percent had not heard of them.

Though the occur-

rence of vegan or vegetarian owners was relatively high compared to the general population, 76.4 percent of carers ate chicken meat or eggs.

The researchers concluded that there should be more locally available and affordable avian-specialist veterinary care for chickens, more research and education about implants and rooster-specific care is needed, and the development of more tailored support for people caring for ex-commercial chickens is recommended.

The study 'From the backyard to our beds: The spectrum of care, attitudes, relationship types and welfare in non-commercial chicken care' can be viewed in its entirety at doi.org/10.3390/ani14020288

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BASF global technical product manager feed enzymes Dr Guilherme Pasquali.

Selecting correct xylanase to optimise production of oligosaccharides with potential prebiotic effect

FOR many years, xylanases have been utilised in animal feeds to improve the nutritive value of raw materials for poultry and swine.

While the underlying modes of action by which xylanases improve nutrient digestion are not yet fully characterised, scientific evidence suggests that in vivo benefits may stem from:

- Viscosity reduction
- Cell wall degradation
- Potential prebiotic effects.

Most xylanases employed in animal feeds are endo-1,4-β-xylanases, which are enzymes that cleave the 1,4-β-glycosidic bond

of the arabinoxylan backbone.

While the term endo-β-1,4-xylanase is generally used for most feed xylanases, commercially available xylanases can vary widely based on enzyme properties that greatly influence in vivo efficacy.

Factors such as enzyme stability in the digestive tract and during feed processing, optimal pH range and the ability to depolymerise soluble and/or insoluble arabinoxylans, as well as the amount and type of released oligosaccharides, can vary greatly.

As such, it is essential to consider these characteristics when selecting xylanases for animal feed.

Why does GH10 xylanase produce more prebiotic oligosaccharides?

One common method to distinguish between different xylanases is based on their glycoside hydrolase family.

This classification system is determined by the amino acid sequence and structural features of the enzyme.

The majority of commercially available xylanases approved for feed application belong to GH family 11.

Natugrain TS, for example, is a combination of a GH10 xylanase and β-glucanase.

The literature suggests that GH10 and GH11 xylanases can produce distinct types and amounts of arabinoxyloligosaccharides.

With GH10 xylanases in particular having higher catalytic versatility due to their more flexible structure, which allows for more efficient depolymerisation of the arabinoxylan backbone.

A GH10 xylanase can attack the linkage close to a substituted xylose residue and requires only two unsubstituted xylose residues to break down the arabinoxylan structure, as shown in Figure 1.

In contrast, a GH11 xylanase requires at least three consecutive unsubstituted xylose residues to cleave the backbone, limiting its

activity to only unsubstituted regions of the backbone, as illustrated in Figure 2.

Due to the complexity of arabinoxylan, which contains several other sugar residues, for example arabinose, the theoretical ability of a GH10 xylanase to hydrolyse arabinoxylan is higher than a GH11 xylanase.

As a result, a GH10 xylanase maximises the production of AXOS (DP2-DP7) as shown by an in vitro test, where the arabinoxylan was treated either with a GH10 or a GH11 xylanase (see Figure 3).

It is worth noting that, in this in vitro test, neither of the xylanases produced the monosaccharide xylose, indicating the absence of β-xylosidase activity.

Xylose is believed to have detrimental effects on poultry and its energetic value for pigs is still unclear.

In addition to producing higher levels of AXOS, a GH10 xylanase also releases a more diverse range of oligosaccharides which tended to be smaller.

Studies suggest that smaller AXOS molecules have a higher fermentation rate and generate more short-chain fatty acids than larger AXOS.

Optimising short-chain fatty acid production with GH10 xylanase

A recent ex vivo study using digesta from growing broilers as a representative model of authentic cecum confirming the superior fermentation activity generated by GH10 xylanases.

In this study, AXOS were produced in vitro by treating arabinoxylan with different enzymes, including a GH10 xylanase (Natugrain TS), a GH11 xylanase (Product E) and an enzyme cocktail with multiple enzyme activities (Product R).

The AXOS were then added to intestinal digesta contents using the ex vivo fermentation model and the production of SCFA was measured after

five and 10 hours.

As shown in Figure 4, the SCFA concentration was significantly higher after five and 10 hours when the arabinoxylan was treated with the GH10 xylanase, whereas the utilisation of a GH11 xylanase or an enzyme cocktail composed of multiple NSP-degrading enzymes did not significantly affect SCFA production.

The GH10 xylanase (Natugrain TS) was found to produce larger amounts of AXOS than a GH11 xylanase, which may explain why SCFA production was optimised when the arabinoxylan was treated with the GH10 xylanase.

Studies have shown that AXOS can be fermented by some beneficial bacteria such as bifidobacterium spp in the chicken hindgut, increasing SCFA production, particularly in the ceca.

Short chain fatty acids such as lactate, butyrate, acetate and propionate are especially important for maintaining gut homeostasis, supporting the inhibition of pathogens by lowering the pH and improving gut barrier and immune function.

Restricting the production of branched-chain fatty acids in the hindgut with GH10 xylanase

Branched-chain fatty acids are produced by the microbiota during fermentation of branched-chain amino acids.

High levels of BCFA indicate ongoing protein fermentation activity, which can negatively impact gut health.

Excessive protein fermentation, in addition to releasing BCFA, can lead to the production of toxic compounds such as indoles, biogenic amines, phenols, sulphur-containing compounds and ammonia.

Therefore, the fermentation of proteins and amino acids in the hindgut is believed to be harmful to the host.

To maintain optimum gut homeostasis, the production of branched-

chain fatty acids in the cecum must be minimised.

In this study, after 10 hours of fermentation, the use of AXOS produced by the GH10 xylanase (Natugrain TS) tended to reduce BCFA production compared to the untreated arabinoxylan (see Figure 5).

This effect could be attributed to the provision of large amounts of AXOS, which are the preferred substrate for bacteria, thereby slightly suppressing protein fermentation, which can benefit the host since protein fermentation in the hindgut can lead to the production of toxic substances.

Additionally, the use of xylanase in feed has been shown to improve the ileal digestibility of protein, which could further boost the suppressing effect on protein fermentation in vivo, since lower amounts of undigested protein would reach the hindgut.

The application of a GH11 xylanase or an enzyme cocktail of NSP-degrading enzymes did not significantly impact on the production of BCFA.

Conclusion

In summary, xylanases can differ in their ability to produce AXOS.

GH10 xylanases (for example Natugrain TS) with a high versatility in breaking down arabinoxylans have been shown to produce more AXOS, or at least more fermentable AXOS than a GH11 xylanase or an enzyme cocktail with multiple NSP-enzymes.

Therefore, a subsequent effect of GH10 xylanases authorised as digestibility enhancers in the European Union (such as Natugrain TS) might be to optimise fermentation activity in the ceca by promoting the production of short-chain fatty acids, while reducing the concentration of branched-chain fatty acids in the hindgut, thereby supporting optimal hindgut homeostasis.

Guilherme Pasquali
BASF Animal Nutrition

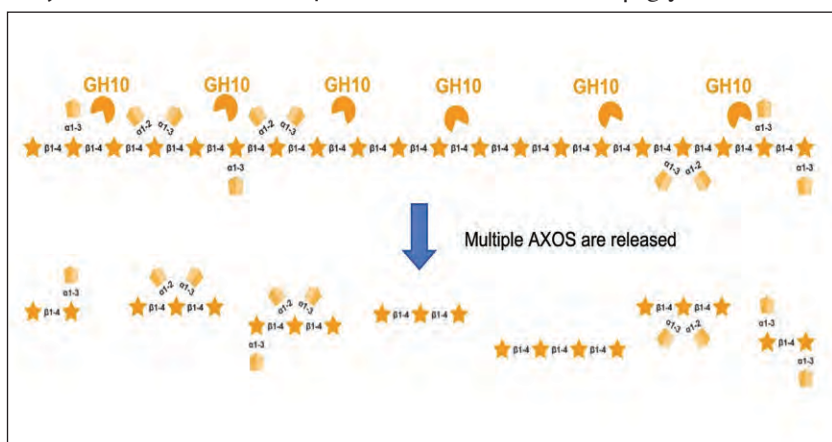


Figure 1. Schematic representation of GH10 xylanase – more versatility and large amounts of AXOS produced.

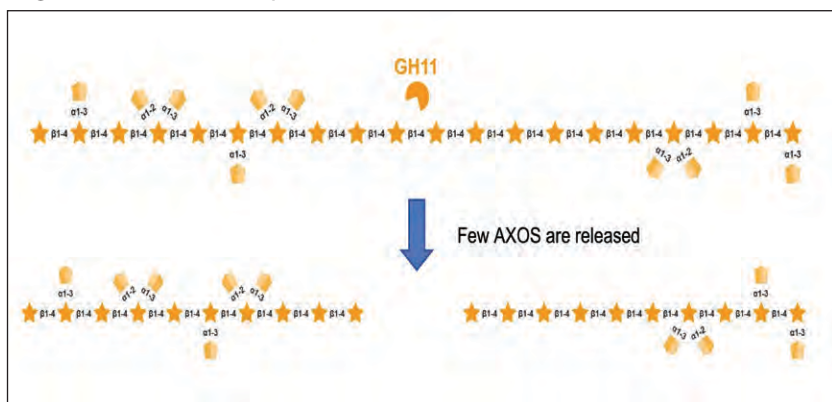


Figure 2. Schematic representation of GH11 xylanase – more selectivity and fewer AXOS produced which are usually large in size (>DP5).

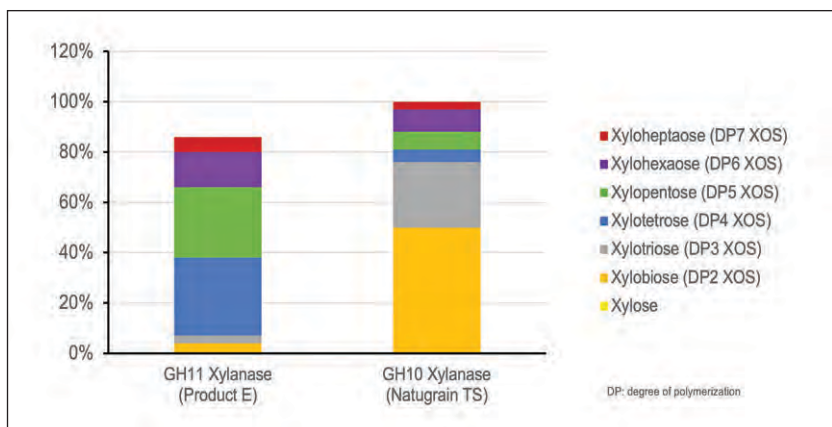


Figure 3. Arabinoxyloligosaccharides production by GH11 and GH10 xylanase (Natugrain TS).

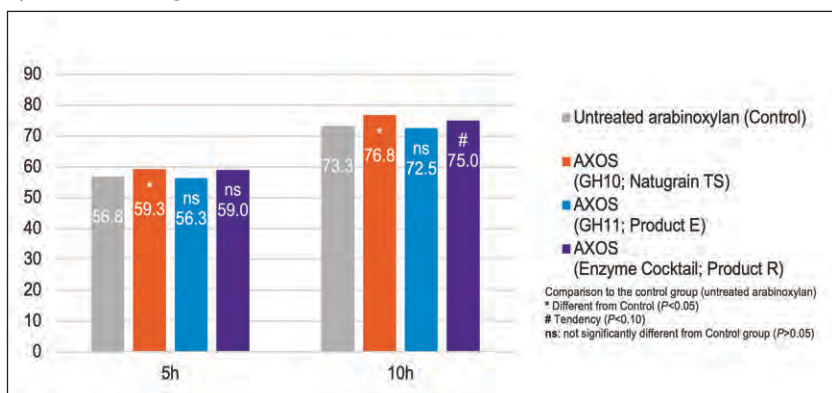


Figure 4. Total short-chain fatty acid concentration (mM) after five and 10-hour fermentation. Presented at the World's Poultry Congress 2022.

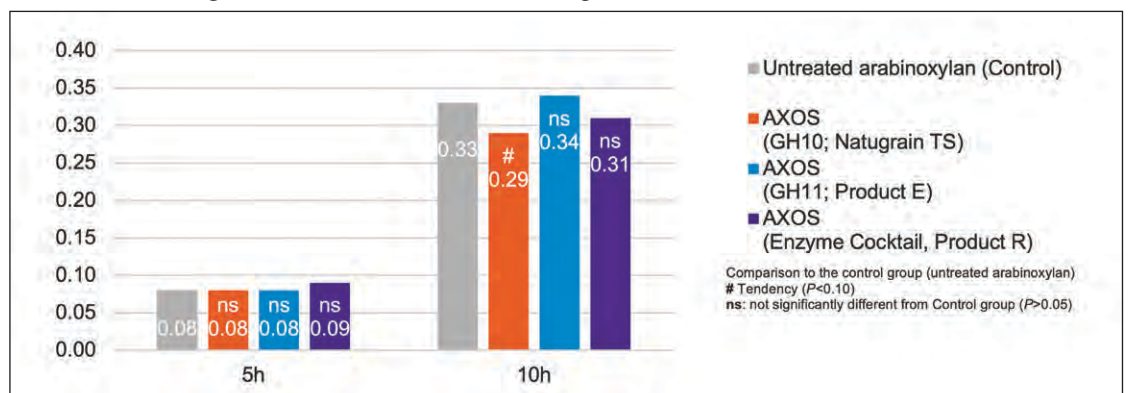


Figure 5. Total branched-chain fatty acid concentration (mM) after five and 10-hour fermentation. Presented at the World's Poultry Congress 2022.

Kemin sponsors Food with Purpose

KEMIN are proud sponsors and exhibitors at the upcoming combined Poultry Information Exchange, Australian Pork Limited and Australasian Milling Conference – Food with Purpose 2024, where the industry comes together to share knowledge, innovation and ideas for the poultry, pig and milling industries.

The Food with Purpose 2024 focus sits perfectly with our core values at Kemin, as delivered by our local Australian and New Zealand team, backed by worldwide experts within Kemin.

For over 30 years, Kemin has been the Australasian – including the Pacific and Papua New Guinea – leader in feed mill and ingredient, and salmonella and mould-control, solutions and advice across the region.

Our local team of technical services, sales, engineering and industry consultants will be present at the show to guide you through the fit-for-purpose solutions appropriate for your business.

To further underpin this position, we present Health Guard, a

comprehensive offering that focuses on the multi levels of protection against diseases and stressors across the production chain – beginning with knowledge and progressing to the feed, water, biosecurity and immunity components of livestock production.

Health Guard is a pioneering program that takes a tailored approach to livestock management, acknowledging the unique challenges faced by different species.

This initiative is genuinely committed to addressing the key pain points and combines several layers of protection to avoid losses to our industry.

Feed is one of the vital aspects to a healthy and productive protein production.

For feed quality, we offer Sal CURB targeting salmonella and Myco CURB for mould prevention.

Kemin supplies liquid application systems to safely and effectively apply these products via our locally in-house designed, built, commissioned and serviced ‘SS Plus Liquid Applicator System’ (via supply agreement).

These systems pres-

ent minimal up-front cost to the client, other than local safety compliance and integration into their batching system (that is bunding and interfacing, if required).

Kemin Application Solutions also offer the individually tailored millSMART program, to improve milling efficiency, by increasing throughput and reducing energy consumption via our KemWET range.

The Australia and New Zealand-based Kemin team works with those in the industry to develop systems that safely, accurately and efficiently apply these products in your specific product system.

With our primary focus on feed safety and feed quality.

Take the opportunity to discuss your needs directly with our technical services, sales and engineering staff at our stand, or please arrange a site visit for further discussion.

We cover Australia, the Pacific, Papua New Guinea and New Zealand from our Sydney office, regional bases, and NSW, Queensland, Western Australian, Auckland and Christ-

church warehousing locations.

Our Sal CURB and Myco CURB variants are available in both dry powder and liquid, in varying pack sizes, for direct addition in the mixer at the feed mill or processor.

For larger operations, liquid addition systems offer application consistency, efficiency, accuracy and safety by removing the need for staff to handle product directly.

Smaller operations often use our dry solutions, hand-tipping inclusion in premix or via micro bin dosing.

Protein meals – meat, fish, vegetable – are also recognised risk-areas for salmonella entry into the feed channel.

Kemin works closely with all sectors to supply fit-for-purpose solutions to ensure ingredient quality, safety and value.

Depending on storage conditions, mould risk can be a consideration.

Kemin country president ANZ Trina Parker said, “Quality outcomes for feed, the animal and the operations budget considerations are bundled with our targeted solutions.”

Kemin



Kemin are proud sponsors and exhibitors at the upcoming combined Poultry Information Exchange, Australian Pork Limited and Australasian Milling Conference – Food with Purpose 2024.



Industry comes together at Food with Purpose to share knowledge, innovation and ideas for the poultry, pig and milling sectors.



The Kemin local team of technical services, sales, engineering and industry consultants will be present at the show to guide you through the fit-for-purpose solutions appropriate for your business.

HEALTH GUARD



HEALTH GUARD

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“HEALTH GUARD” is a pioneering program that takes a tailored approach to livestock management, acknowledging the unique challenges faced by different species. This initiative is genuinely committed to addressing the key pain points and combines several layers of protection to avoid losses to our industry.


Kemin (Australia) Pty. Limited
 Phone: +61 2 9844 5700
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Nathan Lister - Technical Services Manager
Mob: 0438 190 388 | nlister@lallemand.com

Alex Turney - Managing Director, AUS & NZ
Mob: 0419 005 511 | aturney@lallemand.com

www.lallemandanimalnutrition.com




Patarker

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8 Robertson Place
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mobile: 0466 956 263

Greg Heeney
Sales Manager - Monogastric and Milling (AU)
greg.heeney@kemin.com
mobile: 0456 294 643

Trina Parker
Country President (ANZ)
trina.parker@kemin.com
mobile: +64 274 872 524

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BEC

Ashley McAllister
PRODUCT MANAGER - MONOGASTRIC

+61 439 605 339
a.mcallister@becfeed.com.au
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Tony Lawlis
SENIOR TRADER, SALES
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+61 487 442 003
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New Baiada poultry plant to open in Australia in 2026

BAIADA is building a new poultry processing plant in Tamworth, NSW.

The company announced that construction had begun on the new facility and was expected to be completed by early 2026.

On a LinkedIn post, Baiada said, "This new facility will stand as a beacon of progress and possibility, as well as our commitment to setting new standards in the poultry industry." "We have collabo-

rated with industry experts worldwide to create the processing plant, which will embrace some of the most innovative, sustainable and advanced processing technology in the world."

When completed, the facility will have the capacity to process up to 3 million chickens per week, with an on-line process from start to finish.

It will also feature complete air chilling processing and online

bone detections, plus fully automated cold storage and online traceability.

Keeping sustainability in mind, Baiada is installing an "advanced water system initiative to reduce town water usage."

It is estimated that 85 percent of the plant's wastewater will be treated to potable standards for reuse within the facility itself.

Once the plant is open and operating at full capacity, it will employ

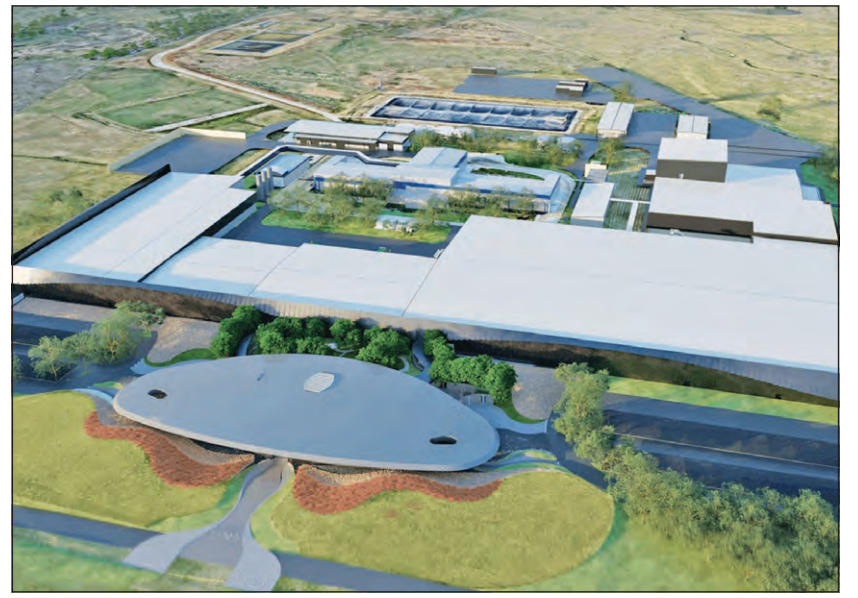
more than 700 people.

Less than one year ago, Baiada announced another expansion project in which it was constructing two fully automated breeding farms in the Riverina region of NSW.

Baiada is the second largest broiler producer of Oceania.

During the past year, the company slaughtered 208 million broilers.

The company is also involved in turkey production.



A rendering of the Baiada poultry plant under construction in Tamworth Australia. Photo: Baiada.

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 mick@abbeylabs.com.au
 0412 10 11 14

Abbey Animal Health Pty Ltd
 B27/1 Maitland Place, Norwest, NSW 2153
 T 02 8088 0720 | F 02 8088 0721 | W www.abbeylabs.com.au

Simon Lakin
 National Sales Manager
 simon.lakin@abbeylabs.com.au
 0418 240 291

Abbey Animal Health Pty Ltd
 B27/1 Maitland Place, Norwest, NSW 2153
 T 02 8088 0720 | F 02 8088 0721 | W www.abbeylabs.com.au

DANIEL FISHER
 0434 468 644
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 0421 078 855
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William Lloyd
 Business Manager - Southern NSW
 william.lloyd@abbeylabs.com.au
 0448 270 066

Abbey Animal Health Pty Ltd
 B27/1 Maitland Place, Norwest, NSW 2153
 T 02 8088 0720 | F 02 8088 0721 | W www.abbeylabs.com.au

Brett Wisemantel
 Business Manager - Northern NSW and Southern QLD
 brett.wisemantel@abbeylabs.com.au
 0428 357 109

Abbey Animal Health Pty Ltd
 B27/1 Maitland Place, Norwest, NSW 2153
 T 02 8088 0720 | F 02 8088 0721 | W www.abbeylabs.com.au

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Stephen Fisher
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 stephen.fisher@abbeylabs.com.au
 0400 617 277

Abbey Animal Health Pty Ltd
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 T 02 8088 0720 | F 02 8088 0721 | W www.abbeylabs.com.au

Jay Richards
 Business Manager - Central and Northern QLD
 jay.richards@abbeylabs.com.au
 0472 535 565

Abbey Animal Health Pty Ltd
 B27/1 Maitland Place, Norwest, NSW 2153
 T 02 8088 0720 | F 02 8088 0721 | W www.abbeylabs.com.au

Jodie Driscoll
 National Sales Manager
 jodie@ccdanimalhealth.com.au
 0428 247 272

Juan Diaz
 National Key Account Manager - Poultry
 juan@ccdanimalhealth.com.au
 0419 620 310

Eddie Pecotich
 National Key Account Manager - Biosecurity
 eddie@ccdanimalhealth.com.au
 0437 408 961

Unit 2, 84-92 Barnes St Tamworth NSW 2340

Tiffany Gordon
 Vet/Equine Territory Manager - Southern
 tiffany.gordon@abbeylabs.com.au
 0448 902 524

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