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Poultry:

Clamping down on carbon footprint

Livestock:

Industrial hemp finds potential market in livestock sector



Agritechnica 2023 preview - p5

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Editor: Madhuri Ramesh

Email: madhuri.ramesh@alaincharles.com

Editorial and Design team:

Prashanth AP, Sania Aziz, Miriam Brtkova, Robert Daniels, Shivani Dhruv, Matthew Hayhoe, Leah Kelly, Rahul Puthenveedu, Madhurima Sengupta, Louise Waters and Minhaj Zia

Publisher: Nick Fordham

Head of Sales: Vinay Nair

Email: vinay.nair@alaincharles.com

Magazine Manager:

Richard Rozelaar, Tel: +44 207 834 7676

Email: richard.rozelaar@alaincharles.com

India **TANMAY MISHRA**
+91 98 80075908
tanmay.mishra@alaincharles.com

Nigeria **BOLA OLOWO**
+234 8034349299
bola.olowo@alaincharles.com

South Africa **SALLY YOUNG**
+27 (0) 824 906 961
sally.young@alaincharles.com

Head Office:

Alain Charles Publishing Ltd
University House, 11-13 Lower Grosvenor Place
London SW1W 0EX, United Kingdom
Phone: +44 20 7834 7676 Fax: +44 20 7973 0076

Middle East Regional Office:
Alain Charles Middle East FZ-LLC
Office L2- 112, Loft Office 2, Entrance B, PO Box 502207
Dubai Media City, UAE
Phone: +971 4 448 9260 Fax: +971 4 448 9261

Production: Rinta Denil, Ranjith Ekambaram, Nelly Mendes and Infant Prakash
Email: production@alaincharles.com

Subscriptions: circulation@alaincharles.com

Chairman: Derek Fordham

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AGENDA

- 04 Calendar and industry events roundup
- 06 FAO Food Outlook and news updates



POULTRY

- 08 Clamping down on carbon footprint while supporting animal welfare



LIVESTOCK

- 10 Industrial hemp finds potential market in livestock sector



CROPS

- 12 Sets in the furrow is prime time for stimulating sugarcane



EQUIPMENT

- 14 Sustainable solutions score big in agricultural rendering



- 18 Robotic harvesters: Redefining the future of agriculture

TECHNOLOGY

- 20 Agri-drones give Vietnam a much needed tech boost



Advertisers Index

Compact Seeds and Clones SA	9	Omex Agrifluids Ltd	13
DLG Service GmbH.....	15	Pak Tavuk Gida San. Ve Tic. A.S.....	24
Eurofeed Technologies S.p.a.	11	Pel-Tuote Oy	21
Henke-Sass, Wolf GmbH	17	Unipoint AG	22

EVENTS 2023/24

NOVEMBER

29-01

Livestock Malaysia

Kuala Lumpur, Malaysia

<https://www.livestockmalaysia.com/>

DECEMBER

07-09

AgriPro and Tech Asia Expo

Hong Kong, China

<https://www.agriproasia.com/>

MARCH

07-09

VICTAM Asia

Bangkok, Thailand

<https://victamasia.com/>

12-14

Health & Nutrition Asia

Bangkok, Thailand

<https://www.viv.net/>

MAY

22-24

AGRITECHNICA Asia

Bangkok, Thailand

<https://www.agritechnica-asia.com/>

22-24

Horti ASIA

Bangkok, Thailand

<https://www.horti-asia.com/>

22-24

Livestock Philippines

Pasay City, Philippines

<https://www.livestockphilippines.com/>

Feed Tech Expo to concludes in India



Image Credit: Feed Tech Expo

Visitors who travel to Pune will benefit from the wide range of companies on display.

CATERING TO THE complete needs of the feed sector, the seventh edition of Feed Tech Expo took place in Pune, India, from 27-29 October at the Auto Cluster Exhibition Centre.

In order to support the blossoming feed market of India (which has reportedly grown from US\$4.9bn in 2017 to US\$11.4bn in 2023), India's only feed exposition returned once again, and presented a unique opportunity for the industry to connect and grow. The three-day event featured a host of exhibitors from leading industry players, providing them with a unique opportunity to reach present and prospective feed clientele from the thousands of attendees from the poultry, dairy and aqua industries.

On the other hand, visitors who travel to Pune benefitted from the wide range of companies on display, representing the entire diverse industry including raw material & nutrition, milling machinery, feed safety technology, animal health, feed manufacturing, ancillary technology, and more. This event was a one-stop-shop to discover the latest innovations set to define the industry in the years to come.

Previous events have seen the likes of notable names exhibiting such as Bühler, Arunodya, Amul, Virbac, CNH Industrial, Scafco, Siemens, Victam,

Knack Polymers, Randox, Tiaano, Thermodyne, and many more.

Beyond the exhibition floor, there was plenty more to occupy attendees time with a range of roundtable conferences and workshops that were held. Across these events, industry experts defined and unpacked the trends influencing the market and discussed how to bring the sector forward. Among the topics being singled out for scrutiny were multiplying dairy farm profits with silage; waste-to-wealth in poultry and dairy; digital disruption in the poultry and livestock sectors; FPO success models; changing dairy dynamics; process optimisation; and many more.

“We were a bit sceptical about participating in this exhibition but the footfall and number of visitors from the industry exceeded our expectation. We would certainly think about participating in the next edition,” said former participant Neeraj Nehra from Stitchwell Paco.

There are few events that can provide industry professionals with a better chance to deepen their understanding of India's feed market, discover the latest innovations and solutions, and grow their network with suitable partners.

Find out more about the conference at: <https://west.feedtechexpo.com/>

Agritechnica 2023: a powerhouse of inspiring innovations

THE WORLD'S LEADING trade fair for agricultural machinery, Agritechnica - held at the exhibition grounds in Hanover, Germany, from 12 to 18 November 2023 - has come to a close, boasting a record number of 470,000 visitors from 149 countries. 2,812 exhibitors from 52 countries presented their innovations, products and services across 24 halls at the fully booked exhibition grounds.

The organiser of Agritechnica, the DLG (German Agricultural Society), had chosen the guiding theme of 'Green Productivity' for the global showcase of the international agricultural machinery industry. As part of Agritechnica's technical programme, around 400 experts taking part in more than 300 professional events provided answers to many questions of the future, placing the topics of productivity and resource conservation at a large international stage.

With its many award-winning innovations and concepts, Agritechnica 2023 served as an important market guide for product launches and newly available solutions. 251 products were registered for the 'Agritechnica Innovation Award', while visionary concepts were prominent in the 'DLG-Agrifuture Concept Winner 2023' award. Also, with the 'Systems & Components Trophy', the supplier industry demonstrated its role as an innovation driver for the agricultural machinery sector.

The DLG Spotlight on "Smart Farming" presented the current state of automation and connectivity in agriculture. Exhibitors presented their digital smart farming solutions for greater efficiency and sustainability. The "agrifood start-ups" venue for company founders in the agricultural and food sectors brought creative entrepreneurs from all over the world together with investors, providing a stimulus for technical progress.

The debut of the DLG spotlight 'Inhouse Farming' attracted

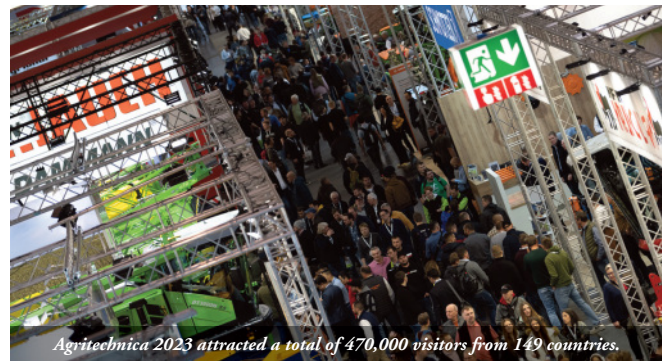


Image Credit: DLG

Agritechnica 2023 attracted a total of 470,000 visitors from 149 countries.

many farmers exploring new branches in farming, including new self-contained food systems. Moreover, 'Systems & Components' ideally complemented the world's leading trade fair for agricultural machinery as a technical spotlight, industry get-together and B2B platform for the supplier industry. The innovation award scheme 'Systems & Components Trophy - Engineers' Choice' showcased the latest developments and innovations in the field of components for agricultural machinery and related sectors.

"As the world's leading trade fair for agricultural machinery, Agritechnica 2023 has demonstrated how highly innovative the industry is. After four years, exhibitors were finally able to present their wealth of innovations to the world here in Hanover once again," said Timo Zipf, Agritechnica Project Manager. "Everyone appreciated the opportunity for face-to-face discussions, exchanges and networking opportunities, also to make new business contacts."

Find out more at: <https://www.agritechnica.com/en/>

Poultry India Exhibition promotes modernisation of the industry

POULTRY INDIA EXHIBITION, an international standard exhibition for the poultry industry was back with its 15th edition at Hitech Exhibition Centre, Hyderabad, Telangana, India & Knowledge Day Technical Seminar at Novotel, Hitech City, Hyderabad, Telangana in association with IPEMA. The main aim of the exhibition was to help keep abreast of the latest developments and practice in the poultry management, poultry health and nutrition, poultry breeding and new techniques in feed manufacturing and poultry production. The exhibition took place from 22-24 November.

Across the world poultry market, India ranks sixth (using FAOSTAT rankings). The domestic poultry industry is the fastest growing segment with a compound growth rate of 18%. Poultry meat being the most popular meat in India, it has been receiving significant boost through investments. Latest techniques of breeding, hatching, rearing and processing have transformed the poultry sector tremendously. Popularisation of hybrid poultry breeds,

thanks to efforts by both government and private sectors, has brought in more profits. Boiler meat production in India is estimated at about 4.8 mn tonnes annually. India's poultry industry, which includes broilers and eggs, is worth US\$12.96bn annually.

Egg production has increased from 30 bn in 2000 to 65 bn in 2014, with per capita egg consumption increasing from 28 to 65 per year during the period. India now ranks as one of the fastest growing major world poultry markets.

Poultry India closely follows the needs and objectives of the above-stated facts and has been playing a important role in the modernisation of the economy of poultry industry in India. The event has continued its efforts and reach every year to bring new businesses in technologies, poultry nutrition and animal health from all around the world to India.

AB Vista South Asia, Beijing smile Feed Sci & Tech Co. Ltd, Central poultry Development Organisation & Training institute, Deccan Automation Technology, Easy Agro Tech Industries Pvt Ltd, Gartech Equipments Pvt Ltd and International Innovation Nutrition Pte Ltd, among others participated in this year's exhibition.



Image Credit: Poultry India

The event brought new businesses in poultry nutrition from around the world to India.

Food Price Index drops in August, reversing July rebound

THE FAO FOOD Price Index (FFPI) averaged 121.4 points through August 2023, decreasing by 2.1% (2.6 points) from July, reversing the rebound registered in June and pushing the index up to 24% below its peak reached in March 2022. The decrease reflects the decline in the price indices for dairy products, vegetable oils, meat and cereals, while the sugar price index increased.

The FAO Cereal Price Index averaged 125 points in August, down 0.7% (0.9 points) from July and standing 20.6 points (14.1%) below its value shown last year. This can be equated to international wheat prices falling by 3.8% and international coarse grain prices also declining by 3.4%. Maize prices fell for the seventh consecutive month, hitting their lowest since September 2020. Among other coarse grains, world prices of sorghum declined in August while barley prices firmed.

In contrast, the FAO All Rice Price Index rose in August by 9.8% month-on-month to reach a 15-year normal high, reflecting trade disruptions in the

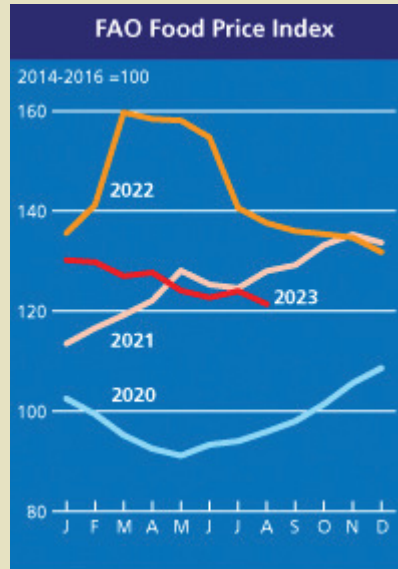


Image Credit: FAO

aftermath of India's July ban on Indica white rice exports. Due to seasonally tight availabilities ahead of new-crop harvests, uncertainty over the ban's duration and concerns regarding export restrictions extending to other rice types has caused

supply chain concerns.

FAO Vegetable Oil Price Index averaged 125.8 points in August, down by 4.0 points (3.1%) month-on-month after a brief increase in July. The decline reflected the lower prices across palm, sunflower, soy and rapeseed oils.

The Dairy Price Index averaged 111.3 points, a 4% (4.6 points) decrease from July, marking the eighth consecutive monthly decline and marking 22.4% below its value last year. International prices across all dairy products declined in August, influenced by an abundance of supply from Oceania and a slow in pace of Chinese imports.

The Meat Price Index averaged 114.6 points, down 3.6 points (3%) from July and 6.5 points (5.4%) from its value last year. International meat prices fell in August, with the steepest drop registered for ovine meat, with pig meat prices also declining significantly.

Finally, the Sugar Price Index averaged 148.2 points, a rise of 1.9 points (1.3%) from July and a 34.1% increase from last year.

Livestock Malaysia 2023 to discuss latest developments in market

LIVESTOCK MALAYSIA IS all set for its 10th edition in 2023, on the lookout for innovators, thought-leaders, and experts from around the world to meet, network, and discuss the challenges the industry is facing and the latest developments in the market today, eventually enhancing the livestock sector globally. This year, Livestock Malaysia will be held at the Kuala Lumpur Convention Centre (KLCC), from 29 November - 1 December.

Malaysia's livestock production is on the rise, projected to reach

around 4.1mn by 2026. This is an increase of 0.7% year-on-year, despite a decrease of 0.2% since 1966. In 2021, Malaysia was ranked 72nd in livestock production, with Cuba coming in first with 3.9mn heads. Experts at Livestock Malaysia will share their insights, experiences, ideas and priceless industry knowledge across a wide range of conferences which will cover aspects of poultry nutrition, poultry management and health, egg production and swine production, in order to increase livestock productivity.

This year, Livestock Malaysia is expecting to welcome 6,000 plus delegates and visitors and more than 150 exhibitors from 30 countries.

One of the major attractions of the show will be the international pavilions led by countries such as China, Korea and Taiwan, to name a few. They will bring a global perspective to the region's livestock sector.

Moreover, it also encourages valuable business partnerships, knowledge transfer and investment by which we can help to increase the region's competitiveness by further improving the quality and safety of feed, livestock and meat products.

Exhibitors will have the opportunity to generate sales leads, enhance brand image and brand awareness, and launch new products with trade visitors and delegates representing integrators, veterinarians, livestock farmers, feed millers, wholesalers, retailers, importers, and distributors.

Image Credit: Livestock Malaysia



Experts at the event will share their insights and experiences on poultry and beyond.

XAG P100 Pro agricultural drone launches in Vietnam



A Vietnamese user of XAG P100 Agricultural Drone carrying the equipment with a motorcycle.

THIS PRODUCT PROVIDES Vietnamese farmers with a fully autonomous, easy-to-operate solution with a large payload of 50 kg. As a proven way to lower production costs and mitigate climate risks, XAG P100 Pro is expected to be a widely used tool in Vietnam.

It is an electric unmanned aerial system, designed for precise seeding, crop spraying, fertiliser spreading and field mapping. It combines a flying platform and different payload systems to achieve multiple

functions. This technology is not a new concept but an upgraded version of its predecessor P100, which has helped local farmers ease the burden and grow more with less.

Equipped with the XAG RevoSpray 3 system and a 50-litre smart liquid tank, it can spray at a maximum flow rate of 22 litres per minute. Its crop protection efficiency reaches up to 19 hectares per hour for open fields and 2 hectares per hour for orchards.

Innovative solutions for medical treatment

AGRI-FOOD BUSINESS AB Agri has partnered with agritech company Aceae Nutra to develop a new tomato-based product that could offer a natural way to reduce traditional treatment in animals.

The two companies are working together to assess its application in livestock animals. Tomatoes being grown by AB Agri will be used in trials to determine the effectiveness of the product as a feed material.

“The industry is looking for ways to responsibly reduce the use of traditional treatments that bring either environmental or resistance concerns and this product is an exciting new prospect that offers real potential to achieve this goal,” said head of innovation at AB Agri, Natasha Whenham. She further explained the company’s commitment to nurture new technologies that have the potential to make a real impact in the production of responsible, affordable food – and turning those ideas into industry-relevant solutions.

“The data we have generated from initial lab-based trials is really promising,” said director of Aceae Nutra, Andrew Bottley.

Expanded API now available for Trimble Agriculture cloud

TRIMBLE AGRICULTURE HAS released its flexible API for the Trimble Agriculture Cloud, an industry cloud that streamlines farming operations. Besides helping farmers execute workflows with greater accuracy, more efficiency and fewer errors while driving sustainability, the Trimble Agriculture Cloud also centralises the data needed for compliance and regulatory requirements. For integrators, access to the Trimble Agriculture Cloud’s API enables third parties to connect to the Trimble platform and its key workflow applications, including Trimble Ag Software, Trimble Ag Mobile and the Precision-IQ field application, thereby expanding the value of the solutions they offer.

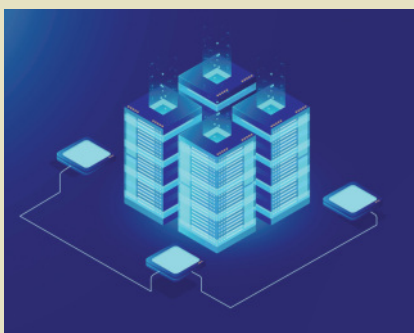


Image Credit: Trimble Agriculture

Trimble Ag helps farmers execute workflows with greater accuracy.

API capabilities include farm setup, task records and recommendations, materials, vehicle setup, work orders, harvest and crop zones activities. Through the combination of software and hardware, Trimble enables integrators to create value for farmers and their partners, including consultants, agronomists, custom applicators and more, by facilitating workflows that leverage connectivity to the machine in the field, improving the overall crop production process.

With the recent update of the Trimble Agriculture Cloud, the most common API workflows available to third-party integrators address the majority of applications on the farm, including accessing Trimble display as-applied data in third-party applications for productivity analysis and regulatory compliance, sending prescriptions to and from third-party applications to Trimble displays and aligning field resources such as boundaries, guidance lines and landmarks between connected third-party applications and Trimble displays for in-field execution.

“At Trimble, our vision is to help farmers work more efficiently through data-driven farming practices and decision support tools,” said Dave Britton, vice president of Product Management, Trimble Agriculture.

Clamping down on carbon footprints while supporting animal welfare



CP Food's carbon-neutral cage-free eggs have received TGO certification.

Image Credit: CP Foods

As the concept of carbon-neutral cage-free eggs gradually begins to pick up steam globally, more and more companies are becoming environmentally conscious and choosing the road to sustainability.

AS THE WORLD races to transform into a net-zero economy, the agriculture sector is gradually working its way to meet global expectations. Unlike the meat industry, the poultry sector is comparatively less carbon-intensive, but does however contribute to greenhouse gas emissions. Keeping in mind various factors including feed production, transportation and packaging materials, all of which largely contribute to the carbon footprint of eggs, several producers have now started leaning towards carbon-neutral practices, paving the way for a more sustainable and environmentally conscious egg industry.

Dutch egg company Kipster, popularly known as the pioneer of carbon-neutral eggs, in 2017, introduced the world's first carbon-neutral egg to the Netherlands. In December 2022, eggs from the first

American Kipster farm were available in Michigan and Cincinnati areas. According to their press release, Kipster has been using upcycled feed having a carbon footprint that is about half of that of conventional layer chicken feed. By using this, the company aims to avoid using land to grow crops for their chickens. Moreover, Kipster has succeeded in setting an example for other egg producers, who have also begun to follow suit by introducing their own line of carbon-neutral eggs.

CP Food's 'U Farm' has gone on to become the first carbon-neutral cage-free egg brand in Asia.

CP Foods introduces Asia's first carbon-neutral cage-free egg

Reflecting on their commitment to promote the consumption of the most animal-friendly and environmentally-friendly eggs, Charoen Pokphand Foods Public Company (CP Foods) recently introduced the first-ever carbon-neutral cage-free egg, which received certification from the Thailand Greenhouse Gas Management Organisation (TGO). The company's cage-free eggs brand, U Farm, has thus gone on to become the first 'carbon-neutral cage-free egg' in Asia.

The company which previously received the 'Global Warming Reduction' label from GTO, has showcased its dedication towards decarbonisation in food production by taking additional measures this year, to offset any remaining emissions through carbon credit purchase. Egg products that came with this label showed a significant decrease in greenhouse gas emission, which was 30% below the industry average.

Moreover, CP Foods strongly adheres to the internationally recognised standards by ensuring that its cage-free eggs come

from layer hens that are specially bred and raised within enclosed houses in a cage-free layer system.

Cage-free eggs gather steam in Thailand

Thailand with its thriving egg industry, comprises of more than 94.8mn layer hens, most of whom are kept in cages. According to a 2022 research study, nearly 75% of Thai egg producers expressed their disbelief in the feasibility of cage-free systems. However, times are changing, as cage-free egg progress in the country is now in full swing, with an increasing number of egg producers starting to show interest in the

Bite Me Softly through its adoption of a cage-free policy, is making a significant stride in animal welfare.

adoption of cage-free systems. For example, Bangkok's leading restaurant brand, Bite Me Softly, through its adoption of a cage-free policy, is making a significant stride in animal welfare.

Starting out as an online retailer specialising in bakery products, Bite Me Softly has since recognised its role in fostering an eco-friendly society. The company which has now transformed into a cafe and restaurant, has implemented a policy to source its eggs exclusively from cage-free systems. Moreover, as a part of a global trend towards cage-free eggs, Bite Me Softly has joined hands with local restaurants like Gyudon House, multinationals like Marriott and global corporations like Burger King, to pledge against buying eggs from caged hens.

According to a report by Humane Society International (HSI), Lalada Tangjerdjaras, programme manager for HSI in Thailand's Farm Animal Welfare and Protection programme said, "Bite Me Softly



Image Credit: Adobe Stock

Cage-free production systems allow birds to express their natural behaviour.

has taken an important first step to improve the welfare of farm animals by providing these sentient beings with enough room to spread their wings, and HSI is excited to be part of this growing global movement by working with stakeholders here on the ground in Thailand."

With more than 50% of their brand currently being cage-free, the company has assured going 100% cage-free in 2024.

"Bite Me Softly is sending a clear message to the egg industry and related stakeholders: in Thailand, the future of egg production is cage-free," Tangjerdjaras added. ■



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Industrial hemp finds potential market in livestock sector



Image Credit: Adobe Stock

Industrial hemp has a growing reputation for being a desirable addition to feedstock formulations..

Fluctuating prices of conventional feed ingredients have urged farmers to consider using industrial hemp byproducts, that have been widely recognised for their high nutritional value.

FOR THOUSANDS OF years, products from industrial hemp – the non-psychoactive cousin of the cannabis plant – have been used for a variety of purposes such as fibre, food and medicine.

In the US, hemp as an agricultural commodity has seen significant growth and development, with companies now producing hemp seed oil from cultivars having a tetrahydrocannabinol (THC) content lower than 0.01%. The process of producing hemp seed oil involves the extraction of oil from industrial hempseed, which forms hempseed cake as a byproduct. Despite being highly nutritious, finding a suitable market for this byproduct has been a challenge for hemp seed oil producers.

In recent years however, the livestock industry has opened its doors to industrial hemp, as its byproducts have gained

recognition for their potential as unconventional feed sources for dairy cattle.

Benefits for cattle

A study published in December 2022 explored the nutritional components of industrial hemp byproducts namely, industrial hemp ethanol extraction byproduct (IHEEB); industrial hemp stalk (IHS); industrial hemp seed meal (IHSM); and industrial hemp oil filter residue

▄▄ The livestock industry has opened its doors to industrial hemp as a potential feed source for dairy cattle.

(IHOFR), and their application in dairy cattle production.

Results showed that the nutritional composition of different feeds varied greatly:

- The non-degradable carbohydrate and protein components in the two types of IHEEB were found to be higher, while the effective degradation rate of rumen dry matter and protein was found to be lower.
- IHS was found to contain higher non-protein nitrogen and neutral detergent fibre (NDF), which enables it to provide more crude protein (CP) rumen effective degradation rate and carbohydrates, but the high acid detergent fibre also limits its application.
- IHSM which possessed 296 g/kg CP and high rumen undegradable protein and intestinal digested protein, was found to provide rumen bypass protein in dairy cows, making it a potentially good protein source.
- IHOFR which contained higher ether

extract, rumen available protein degradation rate, and total tract digested protein, had the potential to provide more energy and easily degradable protein for lactating cows.

In addition, the THC content of three industrial hemp byproducts that have not been assessed by the European Food Safety Authority (EFSA) was tested to evaluate their safety, and all of them were found to be less than the limit set by EFSA. The study hence concluded that industrial hemp byproducts can be considered for inclusion in dietary formulations as unconventional feed sources for dairy cattle, but the purpose of use needs to be properly considered.

Another recent study published in May 2023 investigated the impact of hempseed cake on bovine gut, respiratory and reproductive microbiota. Results from this longitudinal study indicated significant alterations in ruminal microbiota from the seventh day of feeding hempseed cake through to day 98. This included a distinct community structure, increased Shannon diversity index values, and enrichment of eight bacterial genera. On the other hand, a smaller effect was observed on the nasopharyngeal microbiota. Hempseed cake was also found to affect vaginal and uterine microbiota community structure, richness, and composition.

Evaluating human cannabinol exposure

Since the levels of cannabinoid (CBD and THC) residues present within the edible tissues of hempseed cake-fed cattle have not been clearly characterised, hempseed cake is still currently illegal to be used in food animal rations.

Therefore, in order to determine the safety of using hempseed cake as a source of protein and fibre in cattle feed, a team of scientists from the United States Department of Agriculture’s (USDA) Agricultural Research Service (ARS) and North Dakota State University (NDSU), led by Research Physiologist David J. Smith, evaluated the levels of cannabinoid residues in edible cattle tissues.

Results showed that cannabinoid concentrations in meat products were well below the legal and consumer safety threshold determined by global regulatory organisations. During the feeding period, urine and plasma collected from cattle were found to contain sporadic cannabinoid residues. Moreover, low levels of CBD and THC were observed in the adipose tissue, while the liver, kidney, and skeletal muscle contained cannabinoid concentrations that were too low to be detected.

Towards a sustainable future

With the growing reputation of industrial hemp as a desirable addition to feedstock formulations, other regions like Australia have had farmers trialling hemp byproducts as potential feed ingredients. For example, hemp producers in Western Australia’s (WA) South West have been feeding hemp-based pellets and protein-rich hemp meals high in omega fatty acids to their livestock.

|| Cannabinoid concentrations in meat products obtained from hemp-fed cattle were found to be well below the legal and consumer safety threshold determined by global regulatory organisations.



Image Credit: Adobe Stock

THC residues within edible tissues of cattle fed with hempseed cake were found to be well below the consumer limit.

Most EU countries have already approved using hemp as animal feed. However, in the US and other countries, further research is required, along with formal approval from regulatory authorities such as the Food and Drug Administration (FDA), for industrial hemp and its byproducts to legally be utilised in the livestock sector ■

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Setts in the furrow is prime time for stimulating sugarcane



Setts in the furrow is the prime time to stimulate the growth and development of sugar cane.

Image Credit: Omex

Dr. Terry Mabbett in conversation with director at Omex Agrifluids, Peter Prentis explains how the benefits of Omex Bio 20 far exceed those of standard soluble nutrient formulations.

SUGARCANE IS AN inherently slow starter but goes on to overtake and overwhelm the ground where planted. The slow start can pose problems, especially in relation to competition from weeds, but the upside is setts in the furrows is the ideal time to prime sugarcane with a combination of essential nutrients and naturally-sourced biostimulants. This is a clear message from the managing director at Omex Agrifluids, Peter Prentis who has an additional specific remit for research, development and marketing of the company's soluble nutrient products across Asia.

Omex Agrifluids with corporate headquarters, research, development and manufacturing facilities at Kings Lynn in the eastern England region of the UK, provides farmers and growers worldwide with a comprehensive portfolio of soluble liquid and soluble powder plant nutrient products. Sugarcane is high on the company's interest list and especially in Asia where extensive research work has been carried out in key sugarcane producing

countries like India, with ongoing field trials in the Philippines.

To get a fuller picture and better understanding of what the application of soluble nutrient products means for sugarcane, I visited Omex Agrifluids to speak with Peter Prentis. He told *Far Eastern Agriculture* how sugarcane's tardy take off is down to a complex three-stage sequential system of rooting – the initial roots put out by setts, the much longer and straighter stem roots and finally the buttress roots going deeper into the soil and essential for good anchorage.

Setts in the furrows is the ideal time to prime sugarcane with a combination of essential nutrients and naturally-sourced biostimulants.

Omex programme for sugarcane

The company recommends Omex Bio 20, a well-balanced formulation of macro-nutrients and micronutrients, synergised with inclusion of a naturally-sourced biostimulant, as the first application in the sugarcane crop cycle and to setts planted in the furrows. Prentis told *Far Eastern Agriculture* how the benefits of Omex Bio 20 far exceed those of standard soluble nutrient formulations. "This natural biostimulant sourced from a specific marine alga (seaweed) primes the sugarcane sett. It stimulates root growth and development to promote more root biomass. Collateral benefits include greater plant access to and absorption of soil water and nutrients. Net result is faster and stronger early root growth for prompter plant establishment," says Peter.

This unrivalled window of application opportunity gives growers the chance to apply a range of micronutrients. Sugarcane is essentially a gigantic grass, ultimately woody in nature and by far the bulkiest of all mainstream field crops. Despite these inherent characteristics, sugarcane is surprisingly sensitive to shortfalls of particular micronutrients or trace elements which, as the name suggests, are only required in tiny quantities, though essential nevertheless. The micronutrients are zinc,

manganese, boron, molybdenum and to some extent, copper.

Omex caters for sugarcane’s specific requirements with a range of dedicated products. “The Omex answer for zinc is Kingfol Zinc which contains zinc at a concentration of 70% w/v. Another product from our extensive Kingfol range (Kingfol Manganese at 52.8% w/v manganese) is the solution for the widespread sensitivity of sugarcane to shortfalls in this micronutrient,” says Prentis.

However, the options do not end there and especially for sugarcane farmers faced with an inherent soil deficiency in copper. Prentis says, “Some growers will find it more productive and convenient to use our Kingfol combination product called Kingfol Copper/Zinc /Manganese. This versatile combination product contains copper, zinc and manganese at respectively, 8.0% w/v, 33.0% w/v and 11.0% w/v.

“Boron and molybdenum, the next pair of micronutrients to be applied at this early stage in the crop cycle is among the least well known and understood of essential plant micronutrients. However, this does not lessen their importance for proper crop growth and development. Molybdenum has a vital role in nitrogen fixation and boron an equally essential role in the translocation of sugars. This is clearly important for sugarcane, because the concentration of sucrose in the canes ultimately determines the success or failure of sugarcane cropping.

“Adequate supplies of boron and molybdenum are provided by Omex Performa (Boron – 5.68% w/v; Zinc – 19.20% w/v and Molybdenum – 1.52% w/v) and much more quickly and efficiently due to the inclusion of an extract from seaweed with biostimulant properties,” says Prentis. Omex Performa was originally designed for sugarcane cultivation in South America where it has been used very successfully, especially in Brazil.”

Prime time for application of nutrients and biostimulants

Treatment of setts in the furrow with soluble nutrients is the prime time to stimulate growth and development of sugarcane. New shoots emerge more quickly and are significantly stronger. Photosynthesis starts more promptly to provide growth and plant establishment that much sooner in the crop cycle.

Shoots emerging from treated sugarcane setts look more robust for up to 90 days after planting. However, the proof comes at harvest time when sugarcane treated with a portfolio of Omex products is shown to give higher yields and crop quality due to bigger and heavier canes and, more crucially, higher sugar content.

Early treatment of setts in the furrow with Omex soluble nutrient and biostimulant products is now standard practice in key sugarcane growing countries around the world including India, Thailand and Indonesia. Farmers and growers will clearly balk at difficulties presented by trying to spray well-grown sugarcane. These well grown crops are so dense that spray application, whether using tractor drawn/mounted sprayers or manually-operated sprayers, is virtually impossible. The only other option for spraying sugarcane at these

■ Sugarcane treated with a portfolio of Omex products is shown to give higher yields and crop quality due to bigger and heavier canes and, more crucially, higher sugar content.



Image Credit: Omex

For such a dense and heavy crop at harvest, sugar cane is an inherently slow starter.

more advanced stages of growth and development is by aerial application of nutrients.

Peter Prentis summed up the situation, “Applying nutrients and biostimulants at the very start of the sugarcane crop cycle is by far the easiest option for sugarcane farmers and growers. Spraying setts in the furrow avoids all the logistical constraints of driving vehicles through or walking through well grown sugar cane with all the associated problems of achieving adequate spray coverage. However, the single biggest advantage of treating sugarcane setts in the furrow is providing these fledgling sugarcane plants with the right nutrient requirements at the right time, which is at the rooting and establishment stage of the crop.” ■

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Rendering directly reduces methane emissions.

Image Credit: Adobe Stock

Sustainable solutions score big in agricultural rendering

Finding alternative uses for otherwise 'waste' products could provide the solution to sustainable agriculture.

AGRICULTURAL RENDERING, OFTEN referred to as 'rendering,' is a sustainable and time-tested process that involves the conversion of unwanted or uneaten livestock and poultry meat, along with used cooking oil (UCO), into valuable secondary products. This process safely and hygienically transforms various by-products of meat processing, including fat, protein, feathers, bone, and more, into new and useful goods, ensuring that nothing goes to waste.

Rendering has a centuries-old history and is one of the earliest recycling practices. It effectively recovers materials that might otherwise be discarded, thus reducing waste and environmental impact. Renderers upcycle these materials to create high-value products like animal feed ingredients, pet food, biofuels, beauty products, household items, and industrial materials.

In North America, approximately 50% of a meat animal is considered 'inedible' by traditional standards, leading to a substantial amount of leftover materials.

Rendering reclaims this otherwise wasted food and transforms it into valuable resources, contributing to reduced carbon emissions, decreased food waste, and preserved landfill space.

There are a number of reasons as to why this is considered sustainable; it reduces environmental impacts by recycling agricultural by-products, saving resources, and limiting the need for landfill space. Additionally, rendering provides essential ingredients for animal nutrition and alternative fuels for various forms of transportation.

Indeed, rendering systems play a pivotal role in reducing carbon emissions through various interconnected mechanisms. For

Rendering systems are considered sustainable for several reasons."

example, by diverting organic waste from landfills, rendering prevents the decomposition of animal by-products in landfills, where they would release potent greenhouse gases like methane and carbon dioxide. This diversion alone is equivalent to removing 18.5 million cars from the road each year.

Rendering also directly reduces methane emissions, a greenhouse gas that is exceptionally effective at trapping heat in the atmosphere. The process significantly limits the amount of organic material sent to landfills, thereby curbing methane release during decomposition.

Rendering contributes to emission reduction by producing biofuels. These biofuels, such as biodiesel, emit significantly fewer carbon emissions compared to traditional petroleum-based fuels, offering a greener alternative for transportation.

The process conserves valuable resources, including water and energy. Cooking animal by-products in rendering recovers water that can be treated and returned to

the environment, reducing the need for fresh water sources and the energy required for water treatment. Rendering also consumes less energy compared to alternative disposal methods like incineration or landfilling.

Additionally, rendering helps preserve ecosystems and habitats by decreasing the demand for landfill space, thus protecting natural resources and minimising the damage caused by landfills to ecosystems and habitats.

Furthermore, rendering contributes to improved air and water quality, enhancing both human and animal health. By

Rendering helps preserve ecosystems and habitats by decreasing the demand for landfill space.”

preventing the accumulation of animal by-products in landfills, rendering reduces the emission of gases that can be harmful to health and the environment.

Extracting value

The Corona extreme spectrometer from ZEISS is a vital tool in the animal rendering process, ensuring maximum utilisation of valuable by-products. This full-scale spectrometer enables real-time monitoring of critical parameters in raw materials and end products, enhancing the quality of rendering processes. With the ability to measure parameters like moisture, fat, and protein content in a wide wavelength range, it offers accurate and repeatable results.

Benefits of Corona extreme include consistent quality assurance, optimisation of product quality through real-time adjustments, and increased sustainability by extending the shelf life of by-products through optimised drying. It operates



Image Credit: Adobe Stock

Rendering prevents the accumulation of animal by-products in landfills, reducing harmful gas emissions.

effectively in challenging environments, withstanding extreme temperatures and shocks while providing dependable measurements. This versatile spectrometer is suitable for various stages of the rendering process, facilitating resource efficiency and contributing to sustainability by repurposing food industry waste into reusable products. ■

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Robotic harvesters: Redefining the future of agriculture



Image Credit: JAV Global

The robot works by moving autonomously through the planting aisles with the elevated planting troughs.

With the advent of AI and automation, concepts such as robotics are being widely applied to agricultural practices around the world, thereby reducing labour and increasing overall yield.

THE EXPLOSION OF the human population - which is expected to surpass nine billion by 2050 - is intensifying the pressure on food production. At the same time, we are living in an era of rapid technological advancement, which is transforming the agriculture sector by introducing new and innovative ways to meet the growing global food demand. With the advent of artificial intelligence and automation, concepts such as robotics are being widely applied to agricultural practices around the world, thereby reducing labour and increasing overall yield. Harvesting is a crucial step in agriculture since it marks the end of the growing season and the efforts of farmers. Hence, the use of efficient harvesting techniques can help boost yield, quality and nutritional value of the crops,

while also contributing to food security and the economy.

Application of AI in fruit/crop harvesting

Against the backdrop of farming, the data obtained from farm fields is translated into commands by AI, which are followed by robotic components or sensors to attain the

“The data obtained from farm fields is translated into commands by AI, which are followed by robotic components or sensors to attain the required result.”

required result. According to a 2021 research study exploring various robotic harvesting systems, an AI-driven agricultural harvester can be divided into the following three mechanism layers:

Data sensing layer: In this layer, a sensor or vision system obtains data comprising either of fruit data used for fruit/crop detection or localisation data used for navigation or arm manipulation for fruit harvesting.

Decision making layer: In this layer, the data acquired from the previous step is processed for decision making. Prior to this, the entire plant is first mapped in order to identify crop areas, individual crops or ripe fruits as data sets or action points. After these data sets are ready, actions are then relayed to the robotic harvester by utilising various techniques such as image segmentation, data augmentation, data/feature fusion, deep learning, transfer learning and reinforcement learning.

Robotic actuating layer: In this layer, the actions relayed by the previous step are

implemented by the robotic component. Various actions including drilling, seeding, weeding, irrigation and fruit picking/harvesting are assigned to the robot, which is required to complete these actions by appropriately navigating through a field or greenhouse setting. Navigation, either for harvesting or fruit picking, requires robot motion planning. This is carried out by a number of approaches such as drone-based navigation or motion planning frameworks like MoveIt. With the emergence of AI, several deep learning approaches such as the convolutional neural network (CNN) model, VGG-16 is being utilised. Following identification of a fruit/crop, the robot moves its end effector to pick/sever it from the plant. Methods for plucking may however vary depending on the plant. For example, while methods such as visual servoing are a common choice for most crops, other methods that utilise approaches such as Learning from Demonstration (LfD) are often utilised for plucking certain crops such as tea leaves, that are prone to damages due to oxidation or cutting.

In recent years, several private companies and start ups around the world have began incorporating AI and deep learning concepts in the manufacture of agricultural robots. Results have shown great success, indicating potential for further precision and advancement.

IAV's strawberry-picking robot shows promise

At last year's AgEng-LAND. TECHNIK Conference held in Berlin, engineers at IAV Global, one of the world's leading engineering partners for the automotive industry, presented a self-developed

Tevel's harvesting system features eight Flying Autonomous Robots powered by AI, computer vision and machine learning algorithms."

strawberry-picking robot for the first time. The robot works by moving autonomously through the planting aisles with the elevated planting troughs. The robot's arm, equipped with a camera and a patented gripping system, uses cloud computing and artificial intelligence to locate the strawberries, determine their degree of ripeness and place the ripe fruit safely in a basket after separating the strawberry from the plant by the stem. Moreover, the system can also operate at night, with around 20 hours of picking without a break made possible with the robot.

Having successfully completed this process 3.5 million times in so-called endurance tests in the field, the robot was thought to be suitable for addressing various challenges including lack of manpower. While currently trained to specifically pick strawberries, IAV assured that the robot can be trained to pick other target crops in the near future.

Tevel's autonomous harvesting technology receives recognition

At this year's World Ag Expo held in California, Tevel Aerobotics Technologies, a developer of AI-powered autonomous

drones for fruit harvesting, has emerged as winner of the 'Top-10 New Product Competition.'

Also, in May 2023, Tevel announced its partnership with Unifruitti – one of the world's leading players in the production, marketing and distribution of fresh fruit – to revolutionise agriculture in Chile. Tevel's autonomous harvesting system was deployed in Unifruitti Chile's apple orchards from March to May, harvesting several varieties of apples with unparalleled efficiency.

Throughout the harvesting operations in Chile, Tevel made significant strides in the overall system performance and reliability, and selective picking to ensure the harvesting of the highest quality fruit. Tevel's harvesting system features eight Flying Autonomous Robots mounted on a ground harvesting platform developed by Darwin Harvesting Group. Powered by AI, computer vision and machine learning algorithms, the company's autonomous harvesting technology helps address challenges that the global agriculture industry has faced in the past decade. These include labour shortages during harvest time, resulting in lower fruit quality, higher labour costs, and lost revenue from unpicked fruit.

Researchers use Chat-GPT to design robotic tomato harvester

In a recent study published in Nature Machine Intelligence, researchers at the Technical University in Delft, Netherlands and the Swiss technical university EPFL utilised the popular large language model (LLM), Chat-GPT to design a fully functional tomato-harvester robot.

During the first stages of the study, researchers conversed with Chat-GPT regarding solutions to some of the most pressing challenges faced by humanity. The LLM pointed out that robotic crop harvesting would be an efficient solution to global food supply challenges. Deeper conversations with the AI platform helped researchers identify a basic robotic format. They also went one step further by trying to obtain technical suggestions from the AI including materials and computer code for controlling the device.

Although Chat-GPT appears to be valuable tool for the design process, researchers warn that results obtained from LLMs like these may be biased and involve plagiarism, which is why it is still unclear whether these designs can be considered novel. ■

Image Credit: Unifruitti and Tevel



Tevel's Flying Autonomous Robots harvesting apples in Unifruitti's orchards in Linares, Chile.

Agri-drones give Vietnam a much needed tech boost

With the adoption of drones becoming more widespread across rural Vietnam, a plethora of private drone technology companies have started popping up in various regions of the country.

A **S MORE AND** more Asian countries like Japan, Korea, India and China adopt agricultural drones into their farming practices, Vietnam has also begun to follow suit. With climate change and population growth continuing to be a worldwide concern, the move towards agricultural automation, digitalisation and mechanisation has become a necessity rather than a choice. This is why, despite playing a key role in Vietnam's economy, a large reliance on traditional farming methods that require an abundance of manpower, has taken a blow on the country's agriculture sector.

Agricultural drones have received a great deal of attention from Vietnamese farmers, authorities and businesses. In January this year, the Ministry of Agricultural and Rural Development's Plant Protection department announced standards for utilising drones to spray pesticides on fields. According to the department, these standards could be regarded as the first document guiding the registration and deployment of unmanned aerial vehicles (UAVs) in agriculture and plant protection activities.

Prior to the drafting of these standards, the department over a period of one year from 2021-2022, coordinated with a number of domestic aircraft suppliers, qualified testing organisations and member companies to conduct a series of experimental trials on seven major crop groups to test the efficiency of drones in pesticide spraying. Results from these trials showed that drone technology indeed presented a great potential in keeping pests at bay, especially on crops such as rice, maize and fruit trees. Moreover, their application also proved to be useful in



XAG P100 Pro Agricultural Drone flying over a rice field in Vietnam.

Image Credit: XAG

cutting down labour and water usage costs.

As mentioned in a report by Vietnam News, the department's deputy director, Huỳnh Tấn Đạt assured that there would be regular improvements in standards to make them Vietnamese standards and a common regulation for all fields pertaining to agricultural production. Grabbing this opportunity, numerous private drone technology companies have now started spreading their wings across rural Vietnam.

XAG P100 Pro launches in Vietnam

Chinese drone company, XAG's latest generation agricultural drone, P100 Pro was released in the Dong Thap province of Vietnam in July this year, providing Vietnamese farmers with a fully

Numerous private drone technology companies have started spreading their wings across rural Vietnam.

autonomous, easy-to-operate solution with a large payload of 50 Kg. Besides being able to bring down production costs and mitigate climate risks, the launch of the drone also established the Dong Thap Digital Agricultural Cooperative, which aims to promote the application of drone technology in rural areas of Vietnam. In addition, farmers have also been offered drone training courses to facilitate their access to the latest innovations, while also honing their digital skills and improving their overall employability.

Moreover, with Vietnam being the world's major agricultural exporter of rice, banana and durian, XAG's predecessor P100 drones were widely used on farm, assisting fruit growers to address labour shortage and make up for the reduction on agricultural input. The upgraded P100 Pro is an electric unmanned aerial system, designed for precise seeding, crop spraying, fertiliser spreading and field mapping. It combines a flying platform and different payload systems to achieve multiple functions.

Huida Tech and Agri Fly empower intelligent

transformation of Vietnamese agriculture

Chinese drone manufacturer, Huida Tech has entered into partnership with top dealer of Huida Tech drones, Agri Fly. This collaboration has opened a new chapter of global smart agriculture cooperation and empowers the intelligent transformation of agriculture in Vietnam with innovative technologies. The company also offers the integrated HD408 autopilot navigation system with modular design in Vietnam.

Huida Tech HD540Pro agricultural UAV with comprehensive, stable, and reliable performance is now available in the country. Huida Tech has self-developed

Farmers have been offered drone training courses to facilitate their access to the latest innovations.



Huida Tech and Agri Fly collaborate to revolutionise agriculture in Vietnam.

Image Credit: Huida Tech

main components, optimised spraying and spreading operation systems to adapt to more application scenarios, and made major advances in radar and vision sensing systems for easy operation and improved safety.

As the adoption of drones becomes widespread in rural Vietnam, it opens up greater access to a vast array of career opportunities for the next generation of farmers. ■

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VF light on the international market, contributing to the further development of vertical farming. With this pioneering technology, both companies are taking an important step towards a sustainable and future-oriented food supply," said Kim Vancauwenbergh, managing director of Colruyt Smart Technics.

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Asia's largest of its kind BSF production plant opens in Vietnam

Entobel sets industry record with opening of the largest insect protein production plant in Asia.

ENTOBEL, A GLOBAL leader in the production of functional insect protein for animal and plant nutrition, on 23 November, celebrated the opening of its new black soldier fly (BSF) production plant, the largest of its kind in Asia.

Entobel's state-of-the-art facility was constructed in an industry record time of 12 months and is currently the world's most CAPEX-efficient BSF production facility.

Featuring 50 levels of vertical rearing, incorporating automation via robotics, cutting-edge sensors and data analytics that enhance productivity, the facility leverages a US\$33mn Series B funding round raised in 2022 and backed by Mekong Capital, Dragon Capital and The International Finance Corporation (IFC), the Vung Tau facility marks Entobel's second industrial-scale production facility in Vietnam and will have an annual production capacity of 10,000 MT of insect protein. The facility will serve as an economic and community anchor, creating 150 jobs in manufacturing and operations.

Entobel has proven that it is possible and profitable to meet the growing global demand for sustainable feed ingredients.

By 2050, consumption of protein is projected to increase by approximately 75% as the global population continues to rise. Aquaculture – as the fastest-growing animal protein sector globally due to its resource-efficient ways of producing animal protein – is expected to plug the protein gap.

Entobel's end products include insect protein and insect oil primarily consumed by aquaculture and livestock industries."

Entobel's end products include insect protein and insect oil which are consumed primarily by the aquaculture and livestock industries. Additionally, Entobel also

produces insect frass, a sustainable base for fertiliser that reduces the need for chemical fertilisers that make up a large portion of agriculture field operational costs.

The company has a clear line-of-sight for regional expansion including continued expansion in Vietnam and is preparing to build new facilities in markets such as Indonesia and Malaysia. Entobel is targeting the launch of its Series C funding round in H1 2024 to support its growth plans.

"The Entobel team has demonstrated capital allocation efficiency and execution excellence through the successful construction of two industrial-scale facilities in the last four years. Successful commissioning of the Vung Tau plant, one of the largest globally as measured by insect protein production capacity, has de-risked the operational and technological aspects of the business model, enabling the plant to serve as a blueprint for Entobel's rapid regional expansion," said Sandy Singh Sandhu, CFO of Entobel. ■

Entobel's ultramodern facility was constructed in a record time of 12 months.



Image Credit: Entobel



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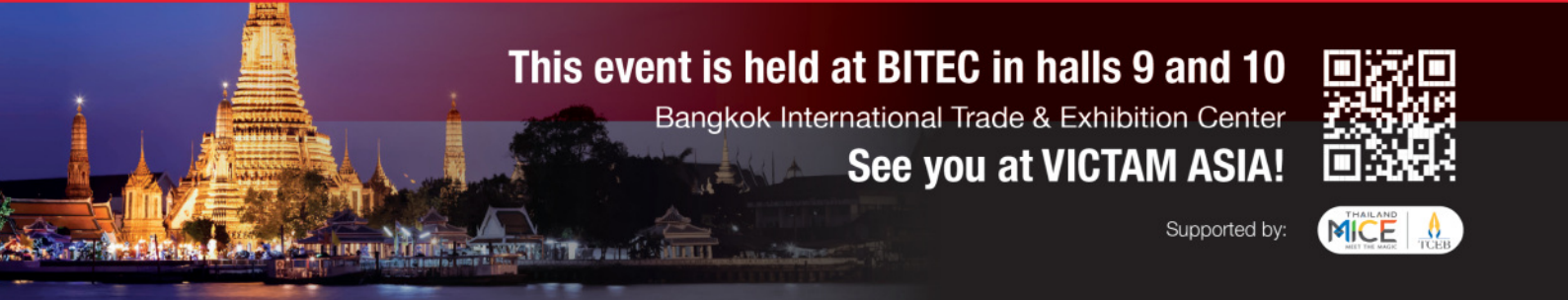


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