MAINSTREAMING ALTERNATIVE PROTEIN DIETS

As sustainable and scientifically proven as they are, will these diets ever become the convention?

by Veolia - Southeast Asia, Singapore

In the last few years, the use of alternative proteins has become more prolific, along with a greater consumer interest in health, ethical considerations, and food security concerns. While the consumption of non-meat protein is not a new phenomenon, this renewed interest is finding its way not just into the human food space, but also into pet diets and livestock feed.

Insect-based Diets: Gaining Acceptance with Pawrents

Of all the alternative proteins available, the insect-based option is perhaps the most misunderstood and the least readily accepted, even though the nutritional benefits of edible insects are well documented. And while there is no denying that they are highly nutritious and a viable source of energy, protein, fat, minerals, and vitamins, the idea of entomophagy remains a difficult hurdle to cross for many.

That said, the insect protein market is set to boom in this decade and analysts have identified a confluence of push and pull factors that are driving the rapid growth — including shortages in animal-based protein supply chain, the need for a more diverse, sustainable food supply, and smart investment strategies by key players in the market.

According to Rabobank, the demand for insect protein, mainly as an animal feed and pet food ingredient, could reach half a million metric tons by 2030, up from today's market of approximately 10,000 metric tonnes. The growth of insect protein as a pet food ingredient can be attributed to the rising premiumisation trend, where pet owners seek to nourish their pets with better, more natural, and high-protein meals and treats. In homes where pets are part of the family just as humans are, this is a market with huge potential.

Functional Benefit Claims

Besides being an efficient source of nutrition, insects offer some interesting functional benefits when applied in pet food formulations. Some of the established ones include:

- Antimicrobial activity — A current area of global concern for both human and animal health is the continued rise in antimicrobial resistance and multi-drug resistant pathogens, and antimicrobial peptides in black soldier fly (BSF) larvae offer immuno-modulating effects for pets.
- Intestinal Immunity — Several studies report on how dietary medium chain fatty acids help improve intestinal immunity of monogastric animals. These fatty acids positively modulate intestinal morphology and barrier function, and regulate host intestinal immune response, thus suppressing intestinal inflammation.
- Hypoallergenic — As a novel protein, insect-based pet foods offer a hypoallergenic protein source for pets suffering from food allergies and sensitive stomachs.
- Digestibility — BSF meal and BSF oil are well tolerated by dogs and can be safely included in dog diets, making it an ideal protein source for healthy development.

As scientists uncover more functionalities, the insect-based protein market holds great potential for further development as it approaches maturity.

A Sustainable Move: Bioconversion Technology

Another compelling reason for industrial-scale insect production lies in the environmental benefits that it offers. Globally, the demand for animal-based protein has been steadily climbing, and it shows no sign of abating. This creates mounting pressures on finite resources and poses a problem to the planet — with consequences consumers do not yet realise.

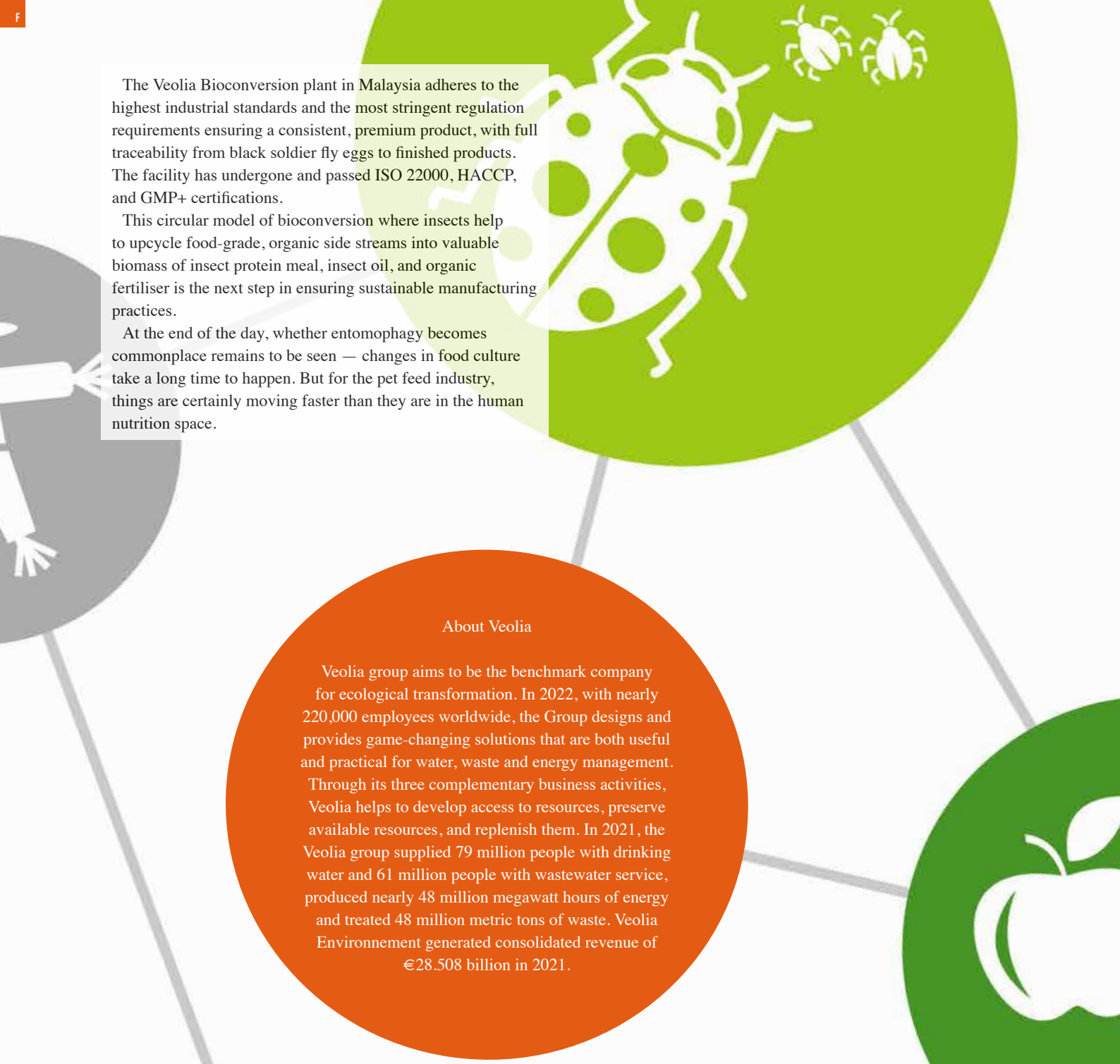
However, policymakers, agencies, and industry players are proposing viable solutions and finding ways to make them available. Insect farming has been proven to be much more sustainable (than livestock) in the long run, requiring less resources while presenting an opportunity to use up agricultural side streams, generating natural fertilizers as a by-product.

In 2017, Entofood and Veolia joined forces to provide a sustainable solution that enhances the circularity in the food chain. Veolia then successfully industralised its first bioconversion site in Malaysia, and it has been Asia's largest industrial manufacturer of insect-based functional ingredients, with a capacity of 3000 tonnes of finished products per year, since 2019.

The Veolia Bioconversion plant in Malaysia adheres to the highest industrial standards and the most stringent regulation requirements ensuring a consistent, premium product, with full traceability from black soldier fly eggs to finished products. The facility has undergone and passed ISO 22000, HACCP, and GMP+ certifications.

This circular model of bioconversion where insects help to upcycle food-grade, organic side streams into valuable biomass of insect protein meal, insect oil, and organic fertiliser is the next step in ensuring sustainable manufacturing practices.

At the end of the day, whether entomophagy becomes commonplace remains to be seen — changes in food culture take a long time to happen. But for the pet feed industry, things are certainly moving faster than they are in the human nutrition space.



About Veolia

Veolia group aims to be the benchmark company for ecological transformation. In 2022, with nearly 220,000 employees worldwide, the Group designs and provides game-changing solutions that are both useful and practical for water, waste and energy management. Through its three complementary business activities, Veolia helps to develop access to resources, preserve available resources, and replenish them. In 2021, the Veolia group supplied 79 million people with drinking water and 61 million people with wastewater service, produced nearly 48 million megawatt hours of energy and treated 48 million metric tons of waste. Veolia Environnement generated consolidated revenue of €28.508 billion in 2021.

Table 1

A Typical Bioconversion Process

The feedstock of pre-consumer, organic by-products and agricultural refuse is first collected from food processing plants. It is then pre-treated to ensure the right nutrition profile and optimum assimilation by the larvae.

In a controlled environment, adult black soldier flies reproduce in the breeding centre, where hundreds of millions of eggs are harvested each day for incubation. The larvae hatch and develop under close watch so that they grow in a stable, safe environment.

Larvae are washed and go through a heat treatment before being minced. Through a centrifugation process, the solids, liquids, and oils are separated mechanically without any solvent. The oil becomes *entolipid*, while the solid and aqueous phases are dried and grinded to obtain *entomeal*™.

Typical Output for an Insert Farming Facility

Entomeal™ **100% Black Soldier Fly** **(*Hermetia illucens*) Defatted Meal**	**Entolipid** **100% Black Soldier Fly** **(*Hermetia illucens*) Insect Oil**
The powder contains highly digestible proteins rich in essential amino acids, vitamins, minerals, medium-chain fatty acids, and bioactive peptides (antimicrobial peptides [AMPs]). It offers good palatability and is suitable for hypoallergenic pet diets.	The oil contains a unique fatty acid profile and is rich in medium-chain fatty acids such as lauric acid (28%) and omega-6 (linoleic acid, palmitic acid), which can improve animal health and boost immune systems.