

Why Insects Deserve in Our Food Systems

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Abstract:

Insects as food and feed have recently gained popularity. This is evidenced by the increasing number of scientific papers and businesses producing insect products. This study will cover recent advances in this field and demonstrate how they contribute to a newly developing industry of insects as food and feed. It is very likely that early humans ate insects. Because edible insects are high in calories and nutrients, their consumption has the potential to end world hunger. Because of the inclusion of high-quality protein and various micronutrients, as well as potential environmental and economic benefits, edible insects are a key potential future food source.

Keywords: Edible insects, Food security, Double income, Sustainable future, Nutritional security.

Introduction:

By 2050, the world's food supply will need to feed an additional 2 billion people. Insect farming for food and animal feed could provide a long-term solution to the impending food crisis. Emerging technology may aid in the reintroduction of insects into the food chain as a source of protein and fertiliser on a large scale (Haldhar et al., 2021). Insects are critical to the biological underpinnings of our terrestrial ecology. They degrade garbage, contribute organic materials to the ground, act as pollinators for plant reproduction and dispersal, and provide food for a wide range of animal species, from birds to frogs to humans. Insect farming is not a new concept; today, 1-1.2 trillion insects are grown on farms for food and animal feed each year (Gahukar, 2018). However, until recently, the practice was primarily manual. Thanks to new technologies like artificial intelligence (AI) and the Internet of Things (IoT), we've reached a tipping point and can now industrialise insect breeding in a controlled environment. Insect breeding is a data-driven agro-industry that shares many similarities with precision agriculture.

There are approximately 342 species of edible insects across India. Our compilation shows that at least 16 species of insects are consumed by indigenous peoples of India (Manna et al., 2022). A number of start-ups are emerging in the indoor farming space. For example,

our company Insect is building the world's first fully automated vertical insect farm capable of producing 100,000 tons of insect products per year, with over 300 technology patents and a completely unique AI-driven farming process. Every day, over one billion data points (vision, weight, temperature, growth, speed, weather, and composition) are collected and integrated into proprietary predictive algorithms to improve insect breeding and rearing conditions.

AI can deduce up to 80% of the quality control information needed for daily mealworm insect reproduction from a single photograph taken at the right time. Programmable robots completely control *Tenebrio Molitor* insects.

The benefits of breeding and processing insects:

Protein source:

Insects are a reliable and efficient alternative protein source that uses fewer resources than traditional breeding. According to research, insects, particularly mealworms, use far less land than other animal protein sources to generate the same quantity of protein. According to one research, crickets are twice as effective as chickens in converting feed to meat, at least four times more efficient than pigs, and 12 times more efficient than cattle. Nowadays, 12% of the world's wild whole-fish capture is utilized to feed farmed fish as fishmeal. Products derived from the processing of insects such as the *Tenebrio Molitor* can be used in place of fishmeal. Mealworm has been demonstrated to cut mortality in farmed fish by 40%. Insect protein offers high-quality qualities and may be utilized as an alternative protein source across the food chain, from aquaculture feed to nutritional supplements for people and pets. In their natural diet, all animal species, regardless of diet, consume insects (Rumpold and Schlüter, 2013).

A beneficial component

Recent studies conducted on mice have shown a considerable reduction in cholesterol in animals given products derived from the processing of insects such as the *Tenebrio Molitor* (up to 60%, according to the Justus-Liebig University of Giessen). Moreover, due to its high protein level, it is a highly digestible component that may be employed in senior nutrition (Sangma *et al.*, 2016).

Sustainable Production:

In terms of CO₂, water, surface area, and raw supplies, insect farming is less expensive than traditional farming. Furthermore, when compared to other kinds of animal husbandry,



producing insects reduces pollution by nearly 99%, with 80 times fewer methane emissions than beef. Additionally, insects may be bred using agricultural by-products, such as products from crops that are not meant for human use, so maximizing agricultural productivity by eliminating waste. Lastly, using insect protein instead of fishmeal in aquaculture allows us to minimize overfishing and increase sea biodiversity.

Natural fertilizer:

Natural fertilizer is insect dejections (excreted waste). When compared to the usage of 100% chemical fertilizers, insect farm-generated fertilizer has proved its usefulness on plants and vegetable crops, with a considerable increase in biomass and yield. According to the study, it enhances yields by 20% and 25% for rapeseed and grape cultures, respectively, and by 40% for wheat production. Insects have shown their nutritional capability, favourable influence on soil, and little ecological impact over thousands of years. The most recent technological breakthroughs and their applications to AgTech (Agricultural Technology or agro technology) enable us to increase the importance of insects in our food systems while protecting the environment (Van Huis. 2020).

Conclusion:

Now we must overcome the last significant impediment: preconceived notions about insects as a food source, as well as regulations governing the usage and consumption of insect-derived proteins. In Europe, a prohibition on the use of insects as a protein source is taking shape. In 2017, the usage of insect proteins in feed for aquaculture animals was increased from feed for pet food to feed for aquaculture animals. The European Food Safety Authority (EFSA) determined last year that mealworms are acceptable for human consumption, and a judgment on the use of insects in swine and poultry feed is likely soon. This year is critical for all of us to respond to the issues of our time in order to maintain our planet while feeding an additional 2 billion people. Let us not overlook the importance and significance that these little creatures may play in assisting us in achieving this lofty aim.

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