FAIRMAN KNIGHT & SONS

SUSTAINABLE FARMING

Fairman Knight & Sons UK Limited operates one of the UK's most advanced circular-economy bio-conversion systems, transforming surplus food materials into high-value agricultural and industrial products using the Black Soldier Fly (BSF). The process is designed to ensure **100% resource recovery**, meaning no part of the input stream is wasted. Instead, every kilogram of surplus food is converted into valuable outputs: insect biomass, organic fertiliser, chitin and bio-oils. This positions Fairman Knight as a model for zero-waste bioconversion within the UK Food Valley.

The process begins with the sourcing and intake of **Category 3 surplus food materials**, which are legally permissible for use in insect farming under APHA regulations. These materials typically include bakery oversupply, fruit and vegetable trimmings, brewery by-products, and other nutrient-rich food residues. Fairman Knight holds the appropriate APHA ABP registrations, Trading Standards feed codes, and Environment Agency licences to transport, receive and process these streams safely and compliantly.

Upon arrival, the feedstock is **weighed, inspected, recorded and blended** into optimised substrates. This ensures consistent nutritional quality and traceability, forming the foundation for predictable insect performance. Unlike traditional waste disposal routes such as anaerobic digestion or landfill, Fairman Knight's system relies on **biological acceleration**: the BSF larvae consume and convert the material rapidly and efficiently.

During the bioconversion stage, BSF larvae can consume their own bodyweight in food daily, turning low-value surplus material into **protein-rich insect biomass**. The larvae grow through multiple instar stages in controlled rearing rooms where temperature, humidity, airflow and substrate composition are monitored. This ensures high conversion efficiency, rapid growth rates and minimal energy input compared to conventional livestock or industrial processing.

At harvest, the larvae are separated from the remaining substrate using mechanical sieving. The larvae then enter downstream processing for the extraction of several valuable components. Fresh larvae can be further processed into **insect purée**, suitable for pet-food or specialist feed applications. Dried larvae can be milled into **insect protein meal**, a sustainable alternative to fishmeal and soy for monogastric feed sectors. The lipid fraction is extracted to produce **insect bio-oil**, containing antimicrobial peptides with potential applications in feed, cosmetics and biochemistry.

The remaining substrate—known as **frass**—is a nutrient-dense fertiliser rich in chitin, NPK, beneficial microbes and soil-health compounds. Frass is screened, packaged and sold as both retail (e.g., 3kg bags) and bulk horticultural fertiliser, replacing synthetic inputs. Because frass is inherently stable, odour-controlled and biologically beneficial, it supports regenerative agriculture, peat-free growing systems and improved soil structure.

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What makes Fairman Knight's model unique is that **every output is a product, not a waste stream**. There is no effluent requiring disposal, no landfill requirement, and no unusable by-products. All biomass is either converted into larvae or becomes frass. Energy usage is minimised, and the system operates with a carbon footprint significantly lower than conventional waste-processing technologies.

In summary, Fairman Knight's surplus food-waste bioconversion system transforms waste into value through a natural, closed-loop process. By producing protein, oil, chitin and fertiliser with **zero waste**, the company delivers a scalable, sustainable solution to food-sector inefficiency and supports a more circular UK agriculture. This process uniquely for Lincolnshire yields 30,000 CO2e tonnes per annum, making it a huge carbon sink for Lincolnshire.

Yours faithfully

Julian Knight

Director

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