Newsletter on Insects for feed, food and bioconversion of organic substrates

Items published between 01 February and 31 March 2024

This newsletter is produced by a research team on entomoconversion and the “Direction pour la Science Ouverte” (DipSO). It is the result of multi- source monitoring (media, articles, ...).

Scope :

- **Europe/France**
- **Thematics axes** : insects (Tenebrio molitor et Hermetia Illucens) , substrates (organic waste, by-products, ...), industrials applications and products (frass, fertilizer, ...)
- **Sources** : articles, information on ongoing and completed projects, regulatory documents, calls for expressions of interest, private sector activities.

Note : Items in this newsletter do not represent INRAE's position.

Substrate - media

- FreezeM secures funding to scale revolutionary insect protein tech
- Solving Food Waste with Insects and the Circular Economy of Insect Farming
- London insect farm hatches plan for greener way to feed animals
- Net Hero Podcast – Insects: Nature’s waste warriors!

Substrate - articles

- Effect of the Rearing Substrate Contamination with λ-Cyhalothrin Pesticide on the Growth Performance and Survival of Black Soldier Fly (Hermetia illucens) Larvae: A Study of Biodegradation Kinetics. Mbokou Foukmeniok et al.
- Exploiting Agri-Food Waste as Feed for Tenebrio molitor Larvae Rearing: A Review. Kotsou et al.
- Bridging the Gap: Scaling Up the Sustainable Production of the Yellow Mealworm with Agricultural By-Products—Insights into Larval Growth and Body Composition. Vrontaki et al.
- Effect of Temperature on the Nutritional Quality and Growth Parameters of Yellow Mealworm (Tenebrio molitor L.): A Preliminary Study. Kopecka et al.
- Rearing methods of four insect species intended as feed, food, and food ingredients: a review. Morales-Ramos et al.

- Nutritional Composition of Black Soldier Fly, Hermetia illucens (L.) during Various Life Stages Reared on Vegetable and Fruit Waste. Deshmukh et al.

- Using kin discrimination to construct synthetic microbial communities of Bacillus subtilis strains impacts the growth of black soldier fly larvae. Zhao et al.
- Black Soldier Fly Larvae Grown on Hemp Fiber: Nutritional Composition and Production of Potential Bioactive Peptides. Leni et al.
- Bean Sprouts, Lettuce, and Milk as Water Sources in Tenebrio molitor Larval Growth. Lee et al.
- Enhanced biodegradation of microplastic and phthalic acid ester plasticizer: The role of gut microorganisms in black soldier fly larvae. Wang et al.
- Density-dependent development of the yellow mealworm Tenebrio molitor (Coleoptera: Tenebrionidae). Koutsogeorgiou et al.
- Physicochemical properties and ellagic acid accumulation in Tenebrio molitor larvae fed with pomegranate peel-enriched media. Gulsunoglu-Konuskan & Dag.

- Vitamin E: An assistant for black soldier fly to reduce cadmium accumulation and toxicity. Shi et al.
- Dynamic expression of cathepsin L in the black soldier fly (Hermetia illucens) gut during Escherichia coli challenge. Chiang et al.
- Go local: Enhancing sustainable production of Tenebrio molitor through valorization of locally available agricultural byproducts. Adamaki-Sotiraki et al.
- Biotransformation of Pb and As from sewage sludge and food waste by black soldier fly larvae: Migration mechanism of bacterial community and metalloregulatory protein scales. Deng et al.
- Efficient agri-food waste valorization using mealworm (Coleoptera: Tenebrionidae) into nutrient-rich biomass for food and feed. Musembi et al.
- Microbial fermentation and black soldier fly feeding to enhance maize straw degradation. Yu et al.
- Ammonia emissions related to black soldier fly larvae during growth on different diets. Coudron et al.
- Physical pretreatment of three biowastes to improve black soldier fly larvae bioconversion efficiency. Peguero et al.
- Bacterial proximity effects on the transfer of antibiotic resistance genes within the alimentary tract of yellow mealworm larvae. Crippen et al.
- Performance of Larvae of the Black Soldier Fly (Hermetia illucens) in the Bioconversion Process of Brewery Waste and Insect Farming (Ephestia Kuehniella). da Costa e Silva et al.
- Differences in ingestion and biodegradation of the melamine formaldehyde plastic by yellow mealworms Tenebrio molitor and superworms Zophobas atratus, and the prediction of functional gut microbes. Li et al.
- Improving Tenebrio molitor Growth and Nutritional Value through Vegetable Waste Supplementation. Lopez-Gamez et al.
- Black soldier fly life history traits can be influenced by isonutrient-waste-based diets. Oddon et al.
- Selective breeding of cold-tolerant black soldier fly (Hermetia illucens) larvae: Gut microbial shifts and transcriptional patterns. Ma et al.
- Unlocking the Potential of Substrate Quality for the Enhanced Antibacterial Activity of Black Soldier Fly against Pathogens. Achuoth et al.
- Analysis of the gut microbiome associated to PVC biodegradation in yellow mealworms. Xu & Dong.

Product - media

- Singapore to commercialize insect protein in meals
- Alimentation animale : se tourner vers les insectes comme alternative
- Iowa Senate OKs rules for plant or insect based proteins labeled as meat
- Insect meal: An alternative feed resources for poultry
- Booming Pet Ownership Culture and Sustainability Drive Unprecedented Growth in the Korean Insect Feed Industry

Product - articles

- Future opportunities for products derived from black soldier fly (BSF) treatment as animal feed and fertilizer - A systematic review. Siddiqui et al.
- The Role of Insects in Sustainable Animal Feed Production for Environmentally Friendly Agriculture: A Review. Hancz et al.
- Effect of replacing soybean meal with Hermetia illucens meal on cecal microbiota, liver transcriptome, and plasma metabolome of broilers. Beller et al.
- Diet replacement with whole insect larvae affects intestinal morphology and microbiota of broiler chickens. Vasilopoulos et al.
- A bio-economic model for estimating economic values of important production traits in the black soldier fly (Hermetia illucens). Zaalberg et al.
- Investigation of the suitability of 3 insect meals as protein sources for rainbow trout (Oncorhynchus mykiss). Owens et al.
- Mealworm and black soldier fly larvae as protein supplements for beef steers consuming forage. Carrasco & Drewery.
- Inclusion of black soldier fly (Hermetia illucens) larvae frass as an alternative protein source in the diet of Florida native yearling ewes. Fernandez-Mora et al.
- In situ evaluation of multiple edible insects as feed for cattle. Dominguez et al.
- Influence of a Mixture of Protein Hydrolysate from Black Soldier Fly Larvae and Schizochytrium on Palatability, Plasma Biochemistry, and Antioxidative and Anti-Inflammatory Capacity in Cat Diets. Li et al.
- Effects of antimicrobial peptides from dietary Hermetia illucens larvae on the growth, immunity, gene expression, intestinal microbiota and resistance to Aeromonas hydrophila of juvenile red claw crayfish (Cherax quadricarinatus). Zhang et al.
- The impact of diets containing Hermetia illucens meal on the growth, intestinal health, and microbiota of gilthead seabream (Sparus aurata). Rimoldi et al.
- Effect of feeding meal of yellow and lesser mealworm and defatted black soldier fly larvae on growth performance and gut health of weaned piglets. Malla et al.
- De Novo Genome Assembly at Chromosome-Scale of Hermetia illucens (Diptera Stratiomyidae) via PacBio and Omni-C Proximity Ligation Technology. Costagli et al.
- Effect of three different insect larvae on growth performance and antioxidant activity of thigh, breast, and liver tissues of chickens reared under mild heat stress. Stelios et al.
- Dynamic effects of black soldier fly larvae meal on the cecal bacterial microbiota and prevalence of selected antimicrobial resistant determinants in broiler chickens. Ho-Fung Lau et al.
- Assessment of Full-Fat Tenebrio molitor as Feed Ingredient for Solea senegalensis: Effects on Growth Performance and Lipid Profile. Hachero-Cruzado et al.
- Black soldier fly larvae meal as a potential modulator of immune, inflammatory, and antioxidant status in gilthead seabream juveniles. Moutinho et al.

- Combined Dietary Supplementation of Tenebrio molitor Larvae and Chitosan in Growing Pigs: A Pilot Study. Zacharis et al.
- Evaluating the fillet quality and sensory characteristics of Atlantic salmon (Salmo salar) fed black soldier fly larvae meal for whole production cycle in sea cages. Radhakrishnan et al.
- Selenium-Rich Black Soldier Fly Supplementation Enriches Serum Indexes and Egg Selenium Content in Laying Hens. Zhang et al.
- Flight toward Sustainability in Poultry Nutrition with Black Soldier Fly Larvae. Salahuddin et al.
- Black soldier fly (Hermetia illucens) larvae meal improves quail growth performance. Silva et al.

Industrials applications - media

- Insect Meal: A Grand Challenge
- EU Consumer Acceptance of Edible Insects: Survey Report – International Platform of Insects for Food and Feed, Brussels
- Innovafeed offers new insect-protein brand, Hilucia | Feed & Grain
- Insect protein producer Entobel signs supply deal with pangasius firm Vinh Hoan
- Mr Bug Extends Its Insect Protein Reach With Homegrpwn Dog Food
- Regulatory renaissance: APAC insect protein sector has 'much to learn' from plant-based products
- Insect Protein Industry Will Hit Big Revenues In Future
- Insect protein start-ups on combatting consumer reluctance
- GEA explores potential of insect protein for animal feed

Industrials applications - articles

- Computational modelling of extrusion process temperatures on the interactions between black soldier fly larvae protein and corn flour starch. Gamero-Barraza et al.
- Environmental, economic and quality assessment of hybrid solar-electric drying of black soldier fly (Hermetia illucens) larvae. Lehmad et al.
- Response of Pasture Grasses to Organic Fertilizer Produced from Black Soldier Fly Frass. Rodgers et al.
- Primary study on frass fertilizers from mass-reared insects: Species variation, heat treatment effects, and implications for soil application at laboratory scale. Praeg & Klammsteiner
- The Effect of Dietary Protein Hydrolysate from Black Soldier Fly Larvae and Schizochytrium on Palatability, Nutrient Metabolites and Health Status in Beagle Dogs. Wei et al.
- Hermetia illucens Frass Fertilization: A Novel Approach for Enhancing Lettuce Resilience and Photosynthetic Efficiency under Drought Stress Conditions. Sawinska et al.
- Farmed Insect Frass as a Future Organic Fertilizer. Nogalska et al.
- Effects of frass from larvae of black soldier fly (Hermetia illucens) and yellow mealworm (Tenebrio molitor) on growth and insect resistance in field mustard (Brassica rapa): differences between insect species and frass treatments. Chia et al.
- Comparison of the Effect of Drying Treatments on the Physicochemical Parameters, Oxidative Stability, and Microbiological Status of Yellow Mealworm (Tenebrio molitor L.) Flours as an Alternative Protein Source. Vlahova-Vangelova et al.
- Monitoring compositional changes in black soldier fly larvae after processing (drying and blanching) using near infrared spectroscopy. Cozzolino et al.
- Evaluation of the antagonistic activity of black soldier fly frass extracts against plant pathogens using single- and double-layer agar bioassays. Arabzadeh et al.
- Skin Anti-Aging Potential through Whitening and Wrinkle Improvement Using Fermented Oil Derived from Hermetia illucens Larvae. Hwang et al.

- Comparison of microwave and vacuum oven drying on the amino acid composition and antioxidant properties of black soldier fly (Hermetia illucens) prepupae. Lier et al.
- Evolving dynamics of insect frass fertilizer for sustainable nematode management and potato production. Anedo et al.
- Compositional, volatile, and structural features of Hermetia illucens (black soldier fly) flours: The effect of population and life stages. Matsakidou et al.
- Biofuel production utilizing Tenebrio molitor: A sustainable approach for organic waste management. Koyunoglu.

Substrate - media

Sources : mainstream media, regulatory sources, institutionnal, company,..

27/02/2024

FreezeM secures funding to scale revolutionary insect protein tech

FreezeM, an agtech company focusing on Black Soldier Fly (BSF) protein production, secured $14.2 million in Series A funding to accelerate market ...

worldbiomarketinsights.com

hermetia illucens

27/02/2024

Solving Food Waste with Insects and the Circular Economy of Insect Farming

by Mr. Ankit Alok Bagaria, Co-Founder of Loopworm Solving food waste requires a multifaceted approach that addresses behavioural, economic, l...

farmersreviewafrica.com

tenebrio molitor hermetia illucens

26/02/2024

London insect farm hatches plan for greener way to feed animals

By Ben Makori and Sachin Ravikumar LONDON (Reuters) - Buzzing underneath a set of railway arches in central London are hundreds of thousands ...

wncy.com

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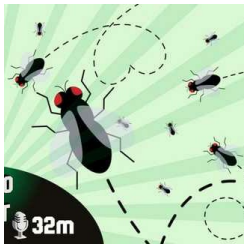

14/02/2024

Net Hero Podcast – Insects: Nature's waste warriors!

... they are nature's ultimate waste disposal experts and one company has ... eaters and can munch through organic waste. But not only do they ...

wastemanagement.einnews.com

hermetia illucens

Substrate - articles

Sources : HAL, Pubmed, BASE, MDPI, F100Research, Jounal of Insects as Food and Feed, ...

28/03/2024

Effect of the Rearing Substrate Contamination with λ-Cyhalothrin Pesticide on the Growth Performance and Survival of Black Soldier Fly (Hermetia illucens) Larvae: A Study of Biodegradation Kinetics. ...

Purpose Pesticide residues may be present in fruits and other organic wastes used as rearing substrates for black soldier fly larvae (BSFL, Hermetia illucens). These contaminants are toxic, and their presence in rearing substrates might affect ...

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hermetia illucens | tenebrio molitor

27/03/2024

Exploiting Agri-Food Waste as Feed for Tenebrio molitor Larvae Rearing: A Review. Kotsou et al.

The agri-food industry generates substantial amounts of waste, including by-products and residues. The increasing demand for sustainable and eco-friendly practices in the agri-food sector has sparked an interest in finding alternative uses for ...

www.mdpi.com

tenebrio molitor

25/03/2024

Bridging the Gap: Scaling Up the Sustainable Production of the Yellow Mealworm with Agricultural By-Products—Insights into Larval Growth and Body Composition. Vrontaki et al.

Amidst the escalating global demand for protein-rich livestock feed, there's an urgent call to explore innovative alternatives. Insects, renowned for their rich protein, lipid, and nutrient profiles, offer a sustainable solution. Integrating ...

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tenebrio molitor

20/03/2024

Effect of Temperature on the Nutritional Quality and Growth Parameters of Yellow Mealworm (Tenebrio molitor L.): A Preliminary Study. Kopecka et al.

The nutritional quality of insects is related to many factors, including their rearing conditions. In this study, the effects of temperature on the contents of crude protein, lipids, ash, and amino acids and the body size and weight of Tenebrio ...

www.mdpi.com

tenebrio molitor

19/03/2024

Rearing methods of four insect species intended as feed, food, and food ingredients: a review. Morales-Ramos et al.

Abstract. Over the past 2 decades, the potential of insects as food and feed has been recognized globally. Insects as feed ingredients can improve sustaina

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hermetia illucens | tenebrio molitor

19/03/2024

Nutritional Composition of Black Soldier Fly, Hermetia illucens (L.) during Various Life Stages Reared on Vegetable and Fruit Waste. Deshmukh et al.

The larvae of Hermetia illucens L., the black soldier fly (BSF), feed on organic waste, minimizing environmental pollution and transforming waste into insect biomass that is rich in protein and fat. The studies on nutritional spectra in different ...

bioone.org

hermetia illucens

17/03/2024

Using kin discrimination to construct synthetic microbial communities of Bacillus subtilis strains impacts the growth of black soldier fly larvae. Zhao et al.

Black soldier fly larvae are insects capable of converting various organic waste materials. Previous research has utilized host-related microorganisms and synthetic communities to promote larval grow...

onlinelibrary.wiley.com

hermetia illucens

16/03/2024

Black Soldier Fly Larvae Grown on Hemp Fiber: Nutritional Composition and Production of Potential Bioactive Peptides. Leni et al.

Black soldier fly larvae (BSFL) represent a way of converting organic substrates into valuable biomolecules, and are potentially exploitable as feed and food. In the present work, BSFL grown on retted hemp fiber were chemically analyzed to evaluate ...

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hermetia illucens

14/03/2024

Bean Sprouts, Lettuce, and Milk as Water Sources in Tenebrio molitor Larval Growth. Lee et al.

The Tenebrio molitor larva (yellow mealworm) holds great potential as a sustainable ingredient in food and feed. Optimizing its growth under mass farming requires careful water management. However, the availability and cost of fresh fruit and ...

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tenebrio molitor

14/03/2024

Enhanced biodegradation of microplastic and phthalic acid ester plasticizer: The role of gut microorganisms in black soldier fly larvae. Wang et al.

Hermetia illucens larvae are recognized for their ability to mitigate or eliminate contaminants by biodegradation. However, the biodegradation charact...

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hermetia illucens tenebrio molitor

14/03/2024

Density-dependent development of the yellow mealworm Tenebrio molitor (Coleoptera: Tenebrionidae). Koutsogeorgiou et al.

Abstract The increasing global population has led to high food demand and the interest for alternative resources is highly topical. The interest in utilizing insects as a source of food and feed has been rapidly increasing, as the on-growing ...

brill.com

tenebrio molitor

08/03/2024

Physicochemical properties and ellagic acid accumulation in Tenebrio molitor larvae fed with pomegranate peel-enriched media. Gulsunoglu-Konuskan & Dag.

Edible insects are a promising and sustainable food source for humans due to their low environmental footprint, high feed conversion ratio, and high protein content. Furthermore, the nutritional profile of the edible insects can be modified ...

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tenebrio molitor

07/03/2024

Vitamin E: An assistant for black soldier fly to reduce cadmium accumulation and toxicity. Shi et al.

Cadmium (Cd) is a toxic heavy metal associated with osteoporosis, liver, and kidney disease. The black soldier fly (BSF) Hermetia illucens may be expo...

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hermetia illucens

07/03/2024

Dynamic expression of cathepsin L in the black soldier fly (Hermetia illucens) gut during Escherichia coli challenge. Chiang et al.

The black soldier fly (BSF), Hermetia illucens, has the potential to serve as a valuable resource for waste bioconversion due to the ability of the larvae to thrive in a microbial-rich environment. Being an ecological decomposer, the survival ...

journals.plos.org

hermetia illucens

06/03/2024

Go local: Enhancing sustainable production of Tenebrio molitor through valorization of locally available agricultural byproducts. Adamaki-Sotiraki et al.

Insects receive increasing attention as an alternative source of protein for animals and humans, and thus, the production of low-cost insects for meet...

www.sciencedirect.com

tenebrio molitor

05/03/2024

Biotransformation of Pb and As from sewage sludge and food waste by black soldier fly larvae: Migration mechanism of bacterial community and metalloregulatory protein scales. Deng et al.

The accumulation and transformation of lead (Pb) and arsenic (As) during the digestion of sewage sludge (SS) by black soldier fly larvae (BSFL) remain...

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hermetia illucens

02/03/2024

Efficient agri-food waste valorization using mealworm (Coleoptera: Tenebrionidae) into nutrient-rich biomass for food and feed. Musembi et al.

Abstract. The utilization of yellow mealworm, Tenebrio molitor (Linnaeus, Coleoptera: Tenebrionidae), for food and feed is gaining interest globally. Howev

academic.oup.com

tenebrio molitor

02/03/2024

Microbial fermentation and black soldier fly feeding to enhance maize straw degradation. Yu et al.

This study used an innovative synergistic microbial and insect approach to treat maize straw and kitchen waste substrates, including cyclic microbial ...

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hermetia illucens

02/03/2024

Ammonia emissions related to black soldier fly larvae during growth on different diets. Coudron et al.

Abstract Black soldier fly (Hermetia illucens) is considered a farmed animal. The larvae live in a moist substrate, which leads to a complex interaction with the microbial community. As such the combined metabolism of the insects and that of ...

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hermetia illucens

28/02/2024

Physical pretreatment of three biowastes to improve black soldier fly larvae bioconversion efficiency. Peguero et al.

Black soldier fly larvae (BSFL, Hermetia illucens (L.)) are recognized for efficient biowaste reduction while yielding valuable proteins and fats for ...

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hermetia illucens

27/02/2024

Bacterial proximity effects on the transfer of antibiotic resistance genes within the alimentary tract of yellow mealworm larvae. Crippen et al.

Abstract. The arthropod intestinal tract and other anatomical parts naturally carry microorganisms. Some of which are pathogens, secrete toxins, or carry t

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hermetia illucens tenebrio molitor

26/02/2024

Performance of Larvae of the Black Soldier Fly (Hermetia illucens) in the Bioconversion Process of Brewery Waste and Insect Farming (Ephestia Kuehniella). da Costa e Silva et al.

This work aimed to evaluate the performance of black soldier fly larvae - Hermetia illucens (BSFL) in the bioconversion process of waste resulting from beer production and insect farming (Ephestia kuehniella). The different treatments were defined ...

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hermetia illucens

21/02/2024

Differences in ingestion and biodegradation of the melamine formaldehyde plastic by yellow mealworms Tenebrio molitor and superworms Zophobas atratus, and the prediction of functional gut microbes. ...

Plastics biodegradation by insect larvae is considered as a new strategy for plastic wastes treatment. To uncover the biodegradation of a more complex...

www.sciencedirect.com

tenebrio molitor

16/02/2024

Improving Tenebrio molitor Growth and Nutritional Value through Vegetable Waste Supplementation. Lopez-Gamez et al.

Huge amounts of vegetable wastes are generated by the food industry. Their bioconversion into valuable products (e.g., insect flours or biofertilizer) through insect farming is a promising solution to reduce their negative environmental and ...

www.mdpi.com

tenebrio molitor

15/02/2024

Black soldier fly life history traits can be influenced by isonutrient-waste-based diets. Oddon et al.

To maximise the black soldier fly (BSF) bioconversion capacity, a waste that is not suitable for use as it is, can have a positive effect if combined with others in a formulation. In this perspecti...

www.tandfonline.com

hermetia illucens

13/02/2024

Selective breeding of cold-tolerant black soldier fly (Hermetia illucens) larvae: Gut microbial shifts and transcriptional patterns. Ma et al.

The larvae of black soldier fly (BSFL) convert organic waste into insect proteins used as feedstuff for livestock and aquaculture. BSFL production per...

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hermetia illucens

11/02/2024

Unlocking the Potential of Substrate Quality for the Enhanced Antibacterial Activity of Black Soldier Fly against Pathogens. Achuoth et al.

Globally, antibiotics are facing fierce resistance from multidrug-resistant bacterial strains. There is an urgent need for eco-friendly alternatives. Though insects are important targets for antimicrobial peptides, it has received limited research ...

pubs.acs.org

hermetia illucens

02/02/2024

Analysis of the gut microbiome associated to PVC biodegradation in yellow mealworms. Xu & Dong.

The potential of invertebrates in the biodegradation of plastic polymers such as polyvinyl chloride (PVC) is receiving increasing attention. The prese...

www.sciencedirect.com

tenebrio molitor

Product - media

Sources : mainstream media, regulatory sources, institutionnal, company,..

29/03/2024

Singapore to commercialize insect protein in meals

The Singapore Food Agency (SFA) plans to table a draft food safety bill to...

www.asian-agribiz.com

11/03/2024

Alimentation animale : se tourner vers les insectes comme alternative

La demande mondiale d'aliments pour animaux et la concurrence pour les protéines augmentent chaque année. Des recherches sont menées dans le ...

www.business-magazine.mu

28/02/2024

Iowa Senate OKs rules for plant or insect based proteins labeled as meat

The Iowa Senate has voted to establish fines for food processors that sell products in Iowa with labels suggesting food made with plant or insect ...

www.radioiowa.com

15/02/2024

Insect meal: An alternative feed resources for poultry

Insects are natural foods for poultry. Chickens can be found picking worms and larvae from the grass, soil and litter where they walk. The use ...

www.feedandadditive.com

hermetia illucens | tenebrio molitor

08/02/2024

Booming Pet Ownership Culture and Sustainability Drive Unprecedented Growth in the Korean Insect Feed Indu...

Korea is witnessing a ground-breaking surge in the insect feed market, with an astounding 23.6% CAGR forecasted between 2023 and 2033. The industry, ...

www.fmiblog.com

hermetia illucens

Product - articles

Sources : HAL, Pubmed, BASE, MDPI, F100Research, Jounal of Insects as Food and Feed, ...

28/03/2024

Future opportunities for products derived from black soldier fly (BSF) treatment as animal feed and fertilizer - A systematic review. Siddiqui et al.

The pursuit of novel food products with good nutritional value for both direct and indirect human consumption is crucial. Given the nutritional benefits of insects and the sustainability of this sort of farming, using them as food for farmed ...

link.springer.com

hermetia illucens

26/03/2024

The Role of Insects in Sustainable Animal Feed Production for Environmentally Friendly Agriculture: A Review. Hancz et al.

The growing demand for animal protein, the efficient use of land and water, and the limitations of non-renewable energy sources highlight the global importance of edible insects. This paper provides an overview of the key issues regarding the ...

www.mdpi.com

tenebrio molitor hermetia illucens

24/03/2024

Effect of replacing soybean meal with Hermetia illucens meal on cecal microbiota, liver transcriptome, and plasma metabolome of broilers. Beller et al.

Despite the existence of a number of studies investigating the effect of insect meal on the growth performance of broilers, knowledge about the metabo...

www.sciencedirect.com

hermetia illucens

21/03/2024

Diet replacement with whole insect larvae affects intestinal morphology and microbiota of broiler chickens. Vasilopoulos et al.

Insect-based diets are gaining interest as potential ingredients in improving poultry gut health. This study assessed the dietary treatment with whole dried Tenebrio molitor larvae (TM) on broiler chickens' gut microbiota and morphology. 120 ...

www.nature.com

hermetia illucens tenebrio molitor

18/03/2024

A bio-economic model for estimating economic values of important production traits in the black soldier fly (Hermetia illucens). Zaalberg et al.

Abstract Black soldier fly (BSF) larvae are exceptionally efficient at converting otherwise unusable waste products, while having a minimal impact on the environment. To optimise the production of BSF larvae, selective breeding could be used. ...

brill.com

hermetia illucens

05/03/2024

Investigation of the suitability of 3 insect meals as protein sources for rainbow trout (Oncorhynchus mykiss). Owens et al.

Abstract. An in vivo trial was conducted to determine the apparent digestibility coefficients (ADCs) of insect meals for rainbow trout, Oncorhynchus mykiss

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tenebrio molitor

02/03/2024

Mealworm and black soldier fly larvae as protein supplements for beef steers consuming forage. Carrasco & Drewery.

Abstract. The global population is projected to increase, indicating there will be greater demand for animal protein to meet the associated food needs. Thi

academic.oup.com

hermetia illucens

02/03/2024

Inclusion of black soldier fly (Hermetia illucens) larvae frass as an alternative protein source in the diet of Florida native yearling ewes. Fernandez-Mora et al.

Abstract. The objective of the study was to evaluate the effects of partially replacing soybean meal (SBM) with black soldier fly larvae frass (BSFL) on nu

academic.oup.com

hermetia illucens

02/03/2024

In situ evaluation of multiple edible insects as feed for cattle. Dominguez et al.

Abstract. Livestock production is growing and intensifying in response to a growing population and associated food demands. Commercially reared insects hav

academic.oup.com

hermetia illucens

28/02/2024

Influence of a Mixture of Protein Hydrolysate from Black Soldier Fly Larvae and Schizochytrium on Palatability, Plasma Biochemistry, and Antioxidative and Anti-Inflammatory Capacity in Cat Diets. ...

The objective of this research was to evaluate palatability, plasma biochemistry, antioxidative and anti-inflammatory capacity, and immune levels in cats by feeding supplementing inclusion of different levels of a mixture of protein hydrolysate ...

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hermetia illucens

22/02/2024

Effects of antimicrobial peptides from dietary Hermetia illucens larvae on the growth, immunity, gene expression, intestinal microbiota and resistance to Aeromonas hydrophila of juvenile red ...

Antimicrobial peptides (AMPs), which are widely present in animals and plants, have a broad distribution, strong broad-spectrum antibacterial activity...

www.sciencedirect.com

hermetia illucens

22/02/2024

The impact of diets containing Hermetia illucens meal on the growth, intestinal health, and microbiota of gilthead seabream (Sparus aurata). Rimoldi et al.

The present study investigated the effect of replacing fishmeal (FM) with insect meal of Hermetia illucens (HI) in the diet of Sparus aurata farmed inshore on growth, gut health, and microbiota composition. Two isolipidic (18% as fed) and isoproteic ...

link.springer.com

hermetia illucens tenebrio molitor

17/02/2024

Effect of feeding meal of yellow and lesser mealworm and defatted black soldier fly larvae on growth performance and gut health of weaned piglets. Malla et al.

Black soldier fly larvae (BSFL), lesser mealworm (LMW) and yellow mealworm (YMW) are suggested as a sustainable novel protein source which could impro...

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hermetia illucens tenebrio molitor

17/02/2024

De Novo Genome Assembly at Chromosome-Scale of Hermetia illucens (Diptera Stratiomyidae) via PacBio and Omni-C Proximity Ligation Technology. Costagli et al.

Hermetia illucens is a species of great interest for numerous industrial applications. A high-quality reference genome is already available for H. illucens. However, the worldwide maintenance of numerous captive populations of H. illucens, each ...

www.mdpi.com

hermetia illucens

15/02/2024

Effect of three different insect larvae on growth performance and antioxidant activity of thigh, breast, and liver tissues of chickens reared under mild heat stress. Stelios et al.

This study investigated the potential of insect-based diets to mitigate heat stress impact on broiler chickens, focusing on growth performance and antioxidant stability. Four dietary groups were examined, including a control and three treated ...

link.springer.com

hermetia illucens | tenebrio molitor

15/02/2024

Dynamic effects of black soldier fly larvae meal on the cecal bacterial microbiota and prevalence of selected antimicrobial resistant determinants in broiler chickens. Ho-Fung Lau et al.

Background We had earlier described the growth-promoting and -depressive effects of replacing soybean meal (SBM) with low (12.5% and 25%) and high (50% and 100%) inclusion levels of black soldier fly larvae meal (BSFLM), respectively, in Ross ...

animalmicrobiome.biomedcentral.com

hermetia illucens

11/02/2024

Assessment of Full-Fat Tenebrio molitor as Feed Ingredient for Solea senegalensis: Effects on Growth Performance and Lipid Profile. Hachero-Cruzado et al.

Tenebrio molitor (TM) is considered as one of the most promising protein sources for replacing fish meal in aquafeeds, among other things because it is rich in protein, a good source of micronutrients and has a low carbon footprint and land ...

www.mdpi.com

tenebrio molitor

10/02/2024

Black soldier fly larvae meal as a potential modulator of immune, inflammatory, and antioxidant status in gilthead seabream juveniles. Moutinho et al.

This study aimed to evaluate the effects of fish meal (FM) replacement with defatted Hermetia illucens larvae meal (HM) on the hematological profile, ...

www.sciencedirect.com

hermetia illucens

06/02/2024

Combined Dietary Supplementation of Tenebrio molitor Larvae and Chitosan in Growing Pigs: A Pilot Study. Zacharis et al.

Nowadays, the global animal industry faces considerable challenges in securing sufficient feed resources. Responding to consumer demands for reduced use of antibiotics in animal nutrition, better animal welfare status, and reduced impact on ...

www.mdpi.com

tenebrio molitor

06/02/2024

Evaluating the fillet quality and sensory characteristics of Atlantic salmon (Salmo salar) fed black soldier fly larvae meal for whole production cycle in sea cages. Radhakrishnan et al.

There is scarce research on the use of black soldier fly larvae (BSFL) meal in the diets of Atlantic salmon (Salmo salar) reared in a real farm. Thus,...

www.sciencedirect.com

hermetia illucens

05/02/2024

Selenium-Rich Black Soldier Fly Supplementation Enriches Serum Indexes and Egg Selenium Content in Laying Hens. Zhang et al.

A certain amount of selenium (Se) is usually added to the diet of laying hens to improve the quality and nutritional value of eggs. The present study was carried out to investigate the effect of selenium-rich black soldier fly (BSF) supplementation ...

link.springer.com

hermetia illucens

03/02/2024

Flight toward Sustainability in Poultry Nutrition with Black Soldier Fly Larvae. Salahuddin et al.

Black soldier fly larvae (BSFL), Hermetia illucens (L.) (Diptera: Stratiomyidae), have emerged as a promising feed ingredient in broiler chicken diets, known for their high protein content, nutritional richness, and environmental sustainability. ...

www.mdpi.com

hermetia illucens

02/02/2024

Black soldier fly (Hermetia illucens) larvae meal improves quail growth performance. Silva et al.

The aim of the present study was to determine the nutritional value of black soldier fly (BSF) larvae meal for quail (experiment I) and the dose–response effects of BSF levels on growth performance, relative organ weight, and body composition ...

link.springer.com

hermetia illucens | tenebrio molitor

Industrials applications - media

Sources : mainstream media, regulatory sources, institutionnal, company,..

21/03/2024

Insect Meal: A Grand Challenge

...known as frass, is a sustainable natural fertilizer in crop production. In this way, insects fill a unique role in upcycling ... and other ...

www.ars.usda.gov

hermetia illucens | tenebrio molitor

14/03/2024

EU Consumer Acceptance of Edible Insects: Survey Report – International Platform of Insects for Food and Feed, ...

Consumption of edible insects in Europe growing at an unprecedented rate A new survey (available here) by the International Platform of Insects ...

ipiff.org

tenebrio molitor

26/02/2024

Innovafeed offers new insect-protein brand, Hilucia | Feed & Grain

The company has redesigned its insect protein brand around a complete range of high-quality ingredients for animal and plant nutrition with minimal ...

www.feedandgrain.com

hermetia illucens

22/02/2024

Insect protein producer Entobel signs supply deal with pangasius firm Vinh Hoan

Entobel, a Singapore-based insect protein producer with operations in Vietnam, has signed a strategic partnership with Vietnamese pangasius producer ...

www.seafoodsource.com

hermetia illucens

19/02/2024

Mr Bug Extends Its Insect Protein Reach With Homegrpwn Dog Food

... Bug is the only insect food provider made with homegrown mealworms ... for humankind to broaden its food horizons and embrace nutritious insects ...

food.einnews.com

tenebrio molitor

19/02/2024

Regulatory renaissance: APAC insect protein sector has ‘much to learn’ from plant-based products

The insect protein sector in Asia Pacific still has âmuch to learnâ from its plant-based counterpart when it comes to the development of regulations ...

www.foodnavigator-asia.com

12/02/2024

Insect Protein Industry Will Hit Big Revenues In Future

Insect protein refers to the protein derived from insects, which are increasingly recognized as a sustainable and nutritious source of protein ...

mnmblog.org

09/02/2024

Insect protein start-ups on combatting consumer reluctance

Insects are not only thought to contain at least as much protein as conventional meat, but are also more environmentally sustainable. However, ...

www.foodnavigator.com

09/02/2024

GEA explores potential of insect protein for animal feed

Since 2017, GEA has been supporting Future Green Solutions in carrying out research on processing black soldier larvae into nutritional animal ...

www.gea.com

hermetia illucens

Industrials applications - articles

Sources : HAL, Pubmed, BASE, MDPI, F100Research, Jounal of Insects as Food and Feed, ...

31/03/2024

Computational modelling of extrusion process temperatures on the interactions between black soldier fly larvae protein and corn flour starch. Gamero-Barraza et al.

Insects such as the black soldier fly (BSF) are recently being studied as food sources to address concerns about how to meet the food demand of the gr...

www.sciencedirect.com

hermetia illucens

29/03/2024

Environmental, economic and quality assessment of hybrid solar-electric drying of black soldier fly (Hermetia illucens) larvae. Lehmad et al.

The exploration of insects as a sustainable protein source is gaining interest as an alternative solution to ensure food security and meet the increas...

www.sciencedirect.com

hermetia illucens

25/03/2024

Response of Pasture Grasses to Organic Fertilizer Produced from Black Soldier Fly Frass. Rodgers et al.

Livestock and dairy farmers are increasingly required to maintain productivity and profitability while mitigating the environmental harm associated with high-input agriculture. Accordingly, to reduce reliance on synthetic fertilizers, a wide ...

www.mdpi.com

hermetia illucens

21/03/2024

Primary study on frass fertilizers from mass-reared insects: Species variation, heat treatment effects, and implications for soil application at laboratory scale. Praeg & Klammsteiner

Insect farming has gained popularity as a resource-efficient and eco-friendly method for managing organic wastes by converting them into high-quality ...

www.sciencedirect.com

hermetia illucens tenebrio molitor

14/03/2024

The Effect of Dietary Protein Hydrolysate from Black Soldier Fly Larvae and Schizochytrium on Palatability, Nutrient Metabolites and Health Status in Beagle Dogs. Wei et al.

Protein hydrolysate from black soldier fly larvae (BSFP) has garnered great attention with its lower allergenicity, high amount of essential amino acids, and small bioactive peptides. Schizochytrium is a promising alternative source of n-3 FUFA ...

www.mdpi.com

hermetia illucens

12/03/2024

Hermetia illucens Frass Fertilization: A Novel Approach for Enhancing Lettuce Resilience and Photosynthetic Efficiency under Drought Stress Conditions. Sawinska et al.

Agriculture is faced with the need to reduce mineral fertilizers in order to reduce costs but also to meet political goals. Resilience-enhancing climate change, especially in the face of increasingly frequent and prolonged droughts, has become ...

www.mdpi.com

hermetia illucens

12/03/2024

Farmed Insect Frass as a Future Organic Fertilizer. Nogalska et al.

The aim of this incubation experiment was to evaluate the effect of Tenebrio molitor L. frass on selected chemical and microbiological properties of acid peat. The optimal rate of mealworm frass in the substrate for growing ornamental trees ...

www.mdpi.com

tenebrio molitor | hermetia illucens

07/03/2024

Effects of frass from larvae of black soldier fly (Hermetia illucens) and yellow mealworm (Tenebrio molitor) on growth and insect resistance in field mustard (Brassica rapa): differences between ...

Insect frass has potential in sustainable agriculture. We investigated its effects as soil amendment on plant growth and resistance to insect herbivory. Initially, raw frass from black soldier fly (B...

onlinelibrary.wiley.com

hermetia illucens | tenebrio molitor

07/03/2024

Comparison of the Effect of Drying Treatments on the Physicochemical Parameters, Oxidative Stability, and Microbiological Status of Yellow Mealworm (Tenebrio molitor L.) Flours a... Alternative .. Alternative ...

The increasing production of edible insects on an industrial scale makes it crucial to implement appropriate technologies after harvesting to process safe and high quality insect products. The aim of this work was to compare the impact of different ...

www.mdpi.com

tenebrio molitor

05/03/2024

Monitoring compositional changes in black soldier fly larvae after processing (drying and blanching) using near infrared spectroscopy. Cozzolino et al.

Determining which processing technique is better to guarantee the safety and nutritional value of black soldier fly larvae (BSFL) is of critical impor...

www.sciencedirect.com

hermetia illucens

01/03/2024

Evaluation of the antagonistic activity of black soldier fly frass extracts against plant pathogens using single- and double-layer agar bioassays. Arabzadeh et al.

Abstract Larval frass from insects which consists of larval excrement, exoskeleton, and undigested diet, is a rich source of organic material and microorganisms. Despite its potential value, research on frass valorisation in agriculture is limited. ...

brill.com

hermetia illucens

27/02/2024

Skin Anti-Aging Potential through Whitening and Wrinkle Improvement Using Fermented Oil Derived from Hermetia illucens Larvae. Hwang et al.

As the aging population increases, so has interest among emerging seniors in anti-aging ingredients that enhance functionality by incorporating fermentation with natural materials. In this study, fermentation conditions for enhancing the fun...

www.mdpi.com

hermetia illucens

24/02/2024

Comparison of microwave and vacuum oven drying on the amino acid composition and antioxidant properties of black soldier fly (Hermetia illucens) prepupae. Lier et al.

Hermetia illucens or black soldier fly (BSF) is one of the edible insects with the potential to replace animal protein in feed. This study is aimed to...

www.sciencedirect.com

hermetia illucens

23/02/2024

Evolving dynamics of insect frass fertilizer for sustainable nematode management and potato production. Anedo et al.

Potato production faces major challenges from inadequate soil fertility, and nematode infestation, yet synthetic fertilizers and nematicides are costly and harmful to the environment. This study explored the potential of chitin-fortified black ...

www.frontiersin.org

hermetia illucens

16/02/2024

Compositional, volatile, and structural features of Hermetia illucens (black soldier fly) flours: The effect of population and life stages. Matsakidou et al.

The scope of the present study was to study the effect of different populations of Hermetia illucens, commonly known as black soldier fly (BSF), on th...

www.sciencedirect.com

hermetia illucens

09/02/2024

Biofuel production utilizing Tenebrio molitor: A sustainable approach for organic waste management. Koyunoglu.

This paper presents a study on the utilization of mealworms (Tenebrio molitor) for biofuel production, offering an innovative and sustainable approach...

www.sciencedirect.com

tenebrio molitor