



Better Training for Safer Food *Initiative*

**Conference on the EU Novel Food Regulation
and the Case of Insects**

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***EFSA Risk Profile on Insects as
Food and Feed***

BTSF

**Bangkok, Thailand. 5th February
2018**

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1. The Role of EFSA

EFSA IS ASKED TO

- Provide independent scientific advice and support for EU law/policies on food and feed safety
- Provide independent, timely risk communication
- Promote scientific cooperation

...but EFSA DOES NOT

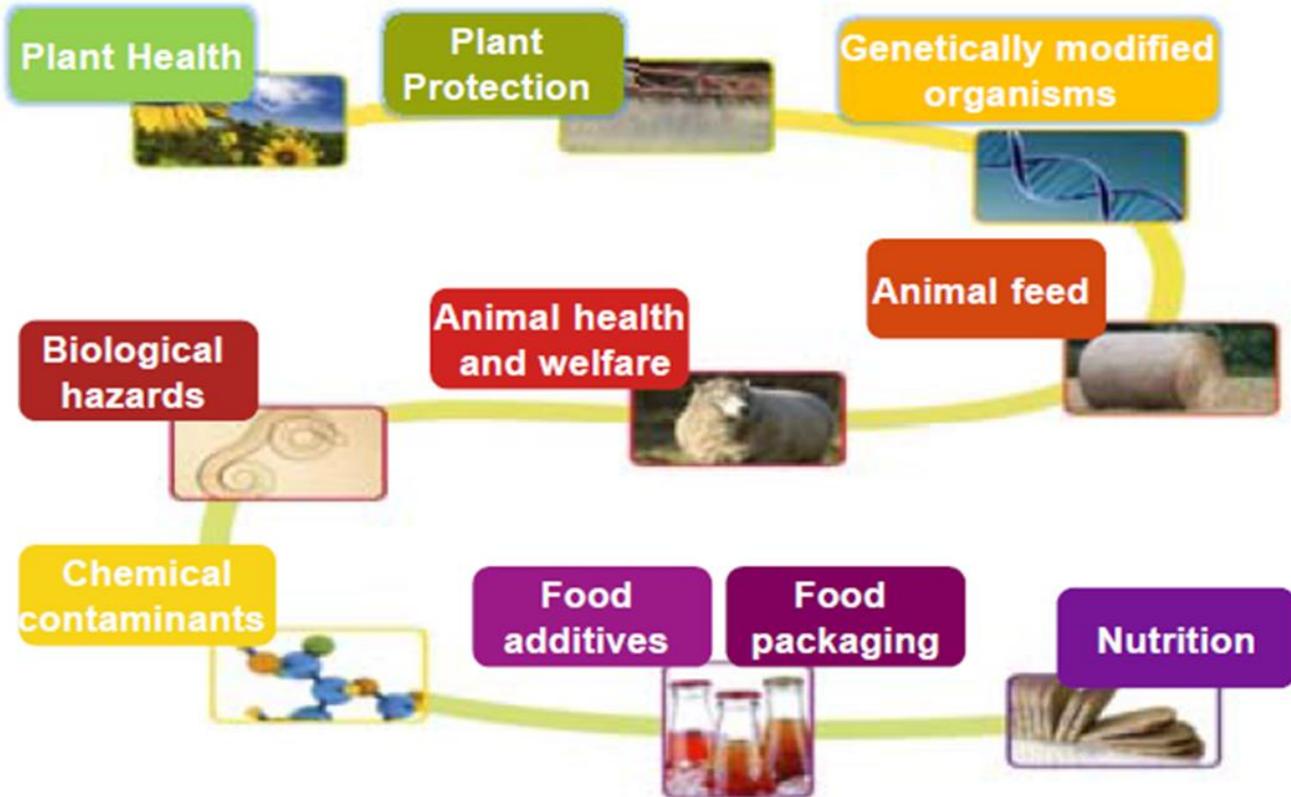
- develop food safety policies and legislation
- adopt regulations, authorise marketing of new products
- enforce food safety legislation
- take charge of food safety/quality controls, labelling or other such issues, like inspections and traceability



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... WHOSE ROLE IS TO PROVIDE SCIENTIFIC ADVICE FROM FIELD TO FORK





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SCIENTIFIC OPINION

ADOPTED: 5 October 2015

doi:10.2903/j.efsa.2015.4257

PUBLISHED: 8 October 2015

Risk profile related to production and consumption of insects as food and feed

- ❖ Covers potential **biological** (incl. prions), **chemical and environmental** hazards, as well as **allergenicity**
- ❖ Only **farmed** insects used as food and feed
- ❖ Taking into account the **entire chain**, from farming to the final product

2. Background on Insects

- **Growing interest in the EU in the production of insects for food and feed.**
- **Import of insects and insect products into the EU as food and feed is an issue that needs to be addressed as the use of insects is more common outside the EU.**
- **A number of organisations have started studying the prospect of using insects for food and feed (FAO, EU-funded research projects)**
- **DG for Health and Food Safety is evaluating policies in the area of insects in the framework of legislation on novel foods, and the need for further risk/policy measures to ensure the safety of the food and feed chain.**
- **In support of that, the Commission has decided to ask EFSA to elaborate an initial scientific opinion on the safety risks arising from the consumption and production of insects as food and feed.**

3. Terms of Reference

The Scientific Committee of EFSA was asked to:

- develop an Opinion to assess the **microbiological, chemical and environmental risks** arising from production to consumption of insects as food and feed
- Provide an overall conclusion on the potential risks posed by the use of insects in food and feed, **relative to such risks posed by the use of other protein sources** used in food or feed

Terms of Reference include

- **A risk profile approach**
- **The list of species in the mandate is indicative**
- **Hazards placed in the context of those from other sources of protein**
- **Importation of insects and products thereof, but not live insects**



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House cricket	<i>Acheta domesticus</i>
African migratory locust	<i>Locusta migratoria migratorioides</i>
Giant mealworm	<i>Zophobas atratus morio</i>
Mealworm	<i>Tenebrio molitor</i>
Buffalo worm	<i>Alphitobius diaperinus</i>
Wax worm	<i>Galleria mellonella</i>
American desert locust	<i>Schistocerca americana gregaria</i>
Tropical house cricket/banded cricket	<i>Grylloides sigillatus</i>
Lesser Wax Moth Worm	<i>Achroia grisella</i>
Silkworm	<i>Bombyx mori</i>



4. Outside the Terms of reference

- **Accidental release of insects**
- **Health or welfare of insects**
- **Plant health risks**
- **Products of apiculture**
- **Contamination by pesticide residues**
- **Hazards from insects harvested from the wild**
- **Occupational hazards**

5. Data and methodologies

- **EFSA Scientific Committee working group**
- **Scientific literature**
- **National risk assessments on insects (BE, NL,FR)**
- **Meeting with relevant stakeholders (participated as hearing experts) in February 2015**

6. Different issues taken into account

- **Consumption by humans and animals**
- **Microbiological hazards**
- **Prions**
- **Chemical hazards**
- **Allergens**
- **Processing**
- **Environmental hazards**
- **Uncertainties**

Consumption by humans

- **High content of protein/amino acids and other nutrients.**
- **There are no systematically collected data in Europe.**
- **Not known whether insects or insect based foods might have any unknown negative nutritional properties.**

Consumption by food-producing animals

- **Lack of information on the magnitude and frequency of feeding of insects to farm animals.**
- **Nutritional data indicate that insects provide protein similar to soybean meal and fishmeal.**
- **Histidine, lysine and tryptophan are found in relatively low amounts in insects compared to fishmeal and soybean.**
- **Feeding trials show that insect products may partially replace traditional protein sources in animal feeding**

Microbiological hazards

- **Published studies are very limited.**
- **Pathogenic bacteria may be present in nonprocessed insects depending on the substrate used and the rearing conditions (e.g. *Salmonella*, *Listeria*, *Bacillus*, *Clostridium perfringens*)**
- **Viruses pathogenic for vertebrates can be transmitted by insects via contaminated substrates.**
- **Parasitic (e.g. *Dicrocoelium dendriticum*) or fungal diseases are possible, but could be mitigated**
- **Published studies are very limited.**

- **The substrate used and the farming environment strongly influence insects' microbiota, and therefore the foodborne risk is influenced by their nature and hygienic conditions.**
- **The risk of infection would be modulated by a combination of the substrates used and the processing steps between farming and consumption.**

Prions

- **Prion proteins not naturally expressed in insects => no risks in relation to insect-specific prions.**
- **Mammalian prions cannot replicate in insects => insects are not considered to be possible biological vectors and amplifiers of prions.**
- **Insects farmed on a substrate or in an environment in which infectious prions are present could act as mechanical vectors of infection => potential risk of transmission of prion diseases.**

Chemical hazards

- **Data on transfer of contaminants from substrates to the insects are very limited.**
- **Insect species, stage of harvest, production methods, substrate, processing methods will all impact the occurrence and accumulation of contaminants in insect products.**
- **The greatest influence may be from the substrate**
- **The presence of most chemical contaminants in insects can thus be controlled by controlling the levels of contaminants in the substrate (except for natural toxins which are formed by fungi e.g. mycotoxins).**
- **From the limited data available, it is seen that insects may accumulate heavy metals from their substrates, in particular cadmium**

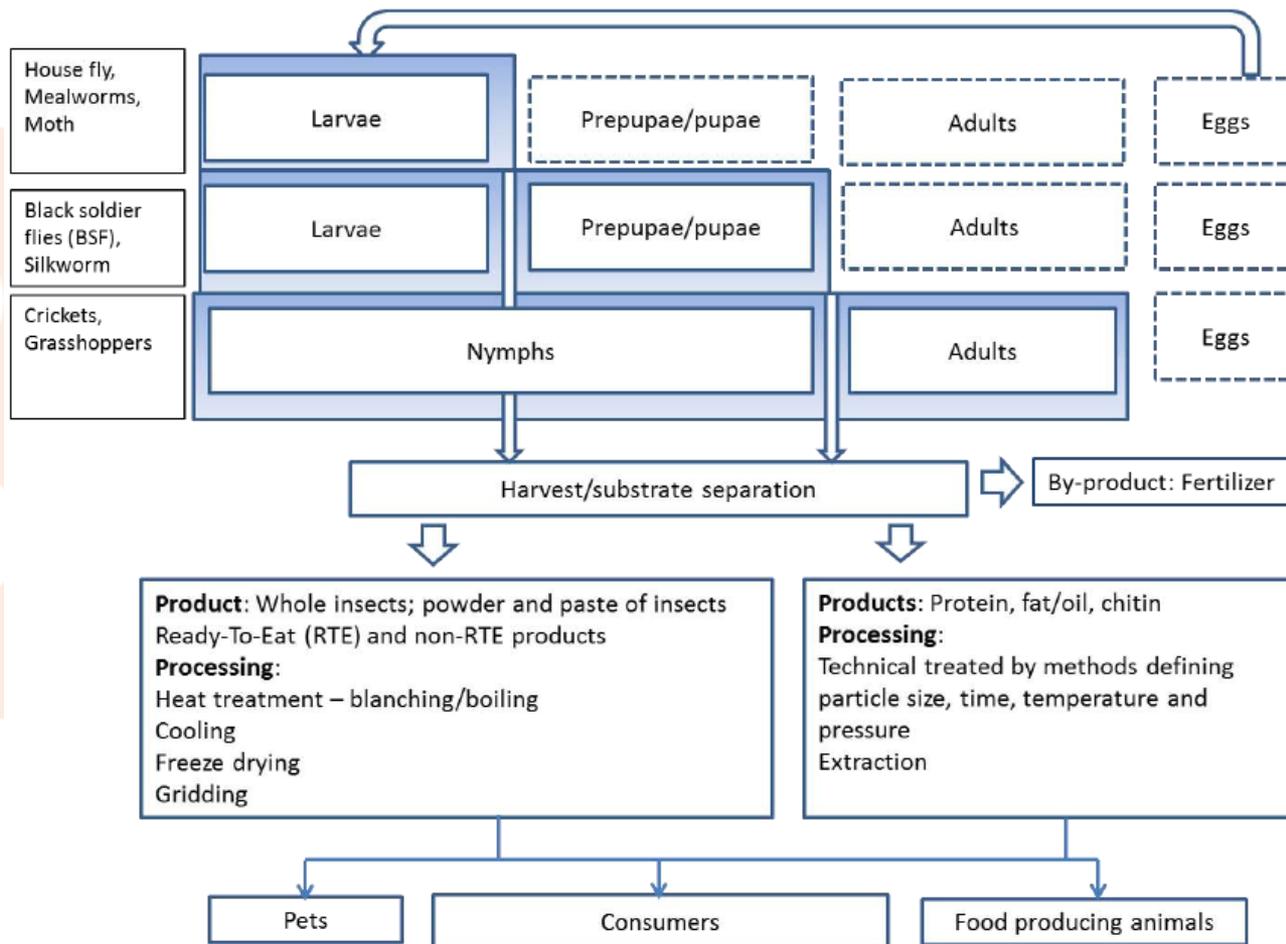
Allergenicity

- **Cases of allergic reaction and anaphylactic shock in humans.**
- **No information of allergy caused in pet and farm animals.**
- **A potential measure may be to indicate the presence of the insect protein and the possible allergenicity or cross reactivity on the label of the product.**



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Overview of the production process



Processing

- **The risk of transmission of pathogenic bacteria could be mitigated through effective processing.**
- **But spore-forming bacteria could survive heat treatment.**
- **The fate of contaminants may be influenced by concentration or dilution.**
- **Formation of toxic substances is possible, but no information is available.**

Environmental hazards

- **The environmental risk of insect farming is expected to be comparable to other animal production systems.**
- **Assessment of the individual production systems will determine the precise strategy adopted on a case by case basis.**

7. Comparison

The Opinion also addresses the occurrence of these hazards in non-processed insects grown on different substrate categories in comparison to the occurrence of these hazards in other non-processed sources of protein of animal origin.

- **Microbiological hazards:** when currently allowed feed materials are used as substrate their possible occurrence is expected to be comparable to their occurrence in other nonprocessed sources of protein of animal origin.
- **Prions:** their possible occurrence will depend on whether the substrate includes protein of human (manure) or ruminant origin.
- **Chemical hazards:** data on transfer of chemical contaminants from different substrates to the insects are very limited.
- **Other substrates:** hazards from insects fed on other substrates need to be specifically assessed.

8. Substrates

For the purpose of this Opinion, substrates are categorized as follows:

- A. Animal feed materials according to EU catalogue;**
- B. Food produced for human consumption, but no longer intended for human consumption (e.g. expired)**
- C. By-products from slaughterhouses (animals fit for human consumption)**
- D. Food waste from restaurants, households, caterings**
- E. Animal manure and intestinal content**
- F. Organic waste of vegetable origin (gardening and forest material)**
- G. Human manure**

In the context of insects produced for feed it could be relevant to distinguish between proteins of ruminant and non-ruminant origin.



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	Biological hazards	Prions	Chemical hazards
Group A: Feed materials authorized as feed for food producing animals	Equal or lower	Equal or lower, if the substrate does not include material of ruminant origin Unknown, if the substrate includes material of ruminant origin	Unknown if equal, lower or higher
Group B: Food produced for human consumption, but no longer intended (expired etc)			
Group C: By-products from slaughterhouses (animals fit for human consumption)			
Group D: Food waste from restaurants, catering and household			
Group E: Animal manure and intestinal content	Unknown		
Group F: Other types of organic waste of vegetable nature	Equal or lower	No expected occurrence	
Group G: Human manure, and sewage sludge	Unknown	Unknown	

Summarized from Scientific Opinion EFSA Journal 2015;13(10):4257

Acknowledgements

- **WG members**
- **Tilemachos Goumperis**
- **and you all for your attention!**

Acknowledgements: The Panel wishes to thank the members of the Working Group on Safety risks arising from the production and consumption of insects as food and feed: Dorte Lau Baggesen, Michael Bonsall, Adrian Charlton, Gerhard Flachowsky, Anne-Katrine Lundebye, Monika Neuhäuser-Berthold, Birgit Noerrung, Antonia Ricci, Nanna Roos, Ine van der Fels-Klerx, Henk van Loveren and Just M. Vlak for the preparatory work on this scientific opinion, and the hearing experts: Tarique Arsiwalla, Geert Bruggeman, Margot Calis, David Drew, Richou Han, Yupa Hanboonsong, Antoine Hubert, Jonathon Koppert and Paul Vantomme, and EFSA staff members: Tilemachos Goumperis and Pietro Stella for the support provided to this scientific opinion.



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