

Development of a risk assessment method for biological hazards in the insect production process in Europe

Application to two farmed species and three consuming targets

G. CHAMBONNET¹, Ph. GOURLAY¹, N. BAREILLE^{1,*}

¹ UMR BIOEPAR, Oniris, Nantes, France

*Contact: nathalie.bareille@oniris-nantes.fr

Background

- Recent publication of a guide on good hygiene practices (IPIFF, 2019) where the applicable EU regulations for larvae production as food and feed are mentioned.
- Is the list of microbiological hazards to be controlled in feed and food in accordance with the current scientific knowledge on insects production?



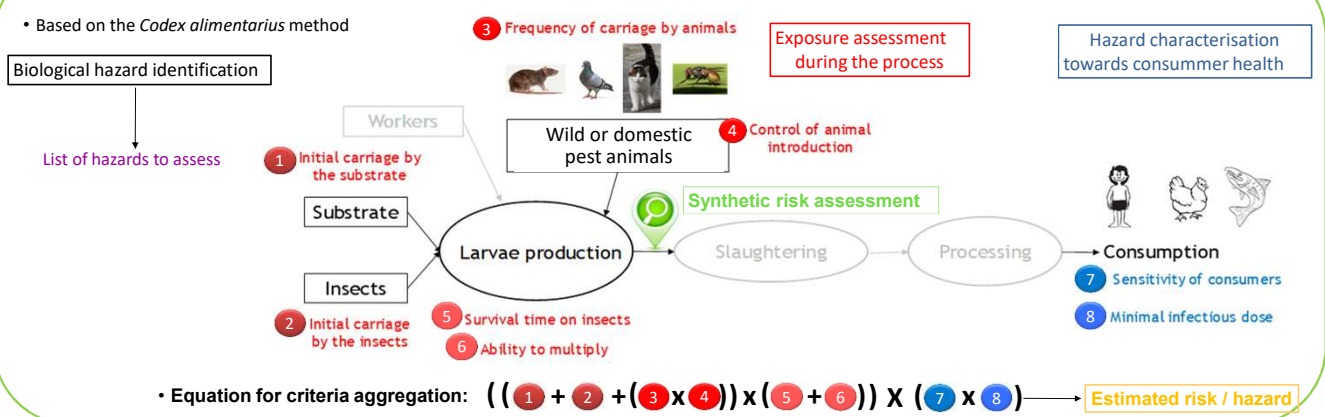
Aims

- Development of a risk assessment method for biological hazards in the insect production process in Europe
- Application to *Hermetia illucens* and *Tenebrio molitor* larvae as **feed** (for poultry or fish) or **food** (humans)



1. Risk assessment method

- Based on the *Codex alimentarius* method



2. Applications

- Few quantitative data available => qualitative approach : qualitative 4-levels scoring scales for the 8 criteria, qualitative aggregating matrices
- Data from literature, experts opinion and farm visits (Pays de la Loire Région, Western France)

Feed

Estimated Risk	<i>Hermetia illucens</i>	<i>Tenebrio molitor</i>
Hazard with the highest risk	<i>Clostridium botulinum</i>	
Hazards with a moderate risk	<i>Clostridium perfringens</i> Duck herpesvirus 1 Infectious bursal disease virus Newcastle virus <i>Salmonella enterica</i>	
	No biological hazards	

Food

Estimated Risk	<i>Hermetia illucens</i>	<i>Tenebrio molitor</i>
Hazards with the highest risk	<i>Bacillus cereus</i> <i>Campylobacter</i> spp. <i>Clostridium botulinum</i> <i>Listeria monocytogenes</i> <i>Toxoplasma gondii</i>	
Hazards with a moderate risk	<i>Clostridium perfringens</i> <i>Cryptosporidium</i> spp. <i>Giardia</i> spp. <i>Leptospira interrogans</i> <i>Salmonella</i> spp. <i>Verotoxigenic E. coli</i> <i>Yersinia enterocolitica</i>	

Discussion and conclusion

- Comprehensive risk analysis approach** ... but **lack of scientific knowledge** concerning the exposure assessment of the larvae during the production process for a few hazards for poultry (infectious bursal disease virus & duck herpesvirus 1) and for humans (*Cryptosporidium* spp. & *Leptospira interrogans*)
- Identification of **longer lists of biological hazards than the one covered by the regulations** EU 142/2011 for feed / EU 2073/2005 & 1441/2007 for food (**biological hazards under regulation written in purple in the tables above**) and the additional ones recommended in the guide on good hygiene practices (IPIFF, 2019 **biological hazards written in blue in the tables above**)
- A strict application of biosecurity** in the insect production process with regards to the risks of pathogen introduction by insects, wild and domestic pest animals and substrate must make possible reducing the biological hazards
- Risk assessment done at the step of live larvae ... **slaughtering process can be used as a control action** towards these hazards

Bibliography

(1) IPIFF, 2019. Guide on good hygiene practices for European Union producers of insects as food and feed. IPIFF Ed., 99p.

Acknowledgements: The authors thank the farmers for their warm welcome in their facilities

With the financial support of