



Promote insects as an alternative source of protein in broiler chicken feed



Insects: a sustainable protein alternative for broiler chicken feed production?

The production of poultry feed still mainly relies on plant proteins, requiring resource-intensive crops. Indeed, after the mad cow disease crisis (bovine spongiform encephalopathy), Regulation of EU council No 999/2001 set out rules on farmed animals feed, including the prohibition of processed animal proteins (PAP). Derogations have since then been issued, regarding insects PAP in poultry and pig feed (Regulation EU N° 2021/1372). However, cross-contamination risk with ruminant feed cannot be excluded, which would require specific regulations to mitigate it (e.g. separation of the production and

farming chains). This explains the ongoing dependence of poultry feed production on plant proteins from third countries, which often leads to environmental issues such as deforestation, habitat loss, and overexploitation of agricultural land. Insects emerge as an eco-friendlier and efficient alternative, being “an excellent feed material, with high concentration of highly digestible nutrients such as amino acids and phosphorous, and a high content in vitamins” which “would reduce this dependence on third countries’ protein” as highlighted in Regulation (EU) N° 2021/1372.

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Black soldier fly *Hermetia illucens* **Yellow mealworm** *Tenebrio molitor* **Common housefly** *Musca domestica*

Insect-based feed: main farmed species

Incorporating insect meals into broiler chicken feed would thus offer a solution to the overdependence on conventional used protein sources like soya meal from third countries, thereby mitigating the ecological footprint associated with their cultivation. Main insect larvae species used to manufacture animal feed are:

- Black Soldier Fly (*Hermetia illucens*)
- Common Housefly (*Musca domestica*)
- Yellow Mealworm (*Tenebrio molitor*)

These three species appear to be the most promising because of their nutritional composition, the ease of their life-cycle management and their ability to be mass-produced. They have been the subject of numerous scientific publications and are now the ones most commonly produced for animal feed in Europe (Foucard et Pampouille, 2020).



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Situation of insect farming

Europe leads the market in insect farming to produce pet food and feed for fish, poultry and pigs, especially France and Netherlands. According to a recent report, 500,000 tons of insect protein will be produced by 2030, with 120,000 tons for poultry feed (FAO, 2022). Two of the largest insects farms for animal feed in EU are French: Ynsect (*Tenebrio molitor*) and InnovaFeed (*Hermetia illucens*). These companies manufacture a range of insect-based products (Foucard et Pampouille, 2020):

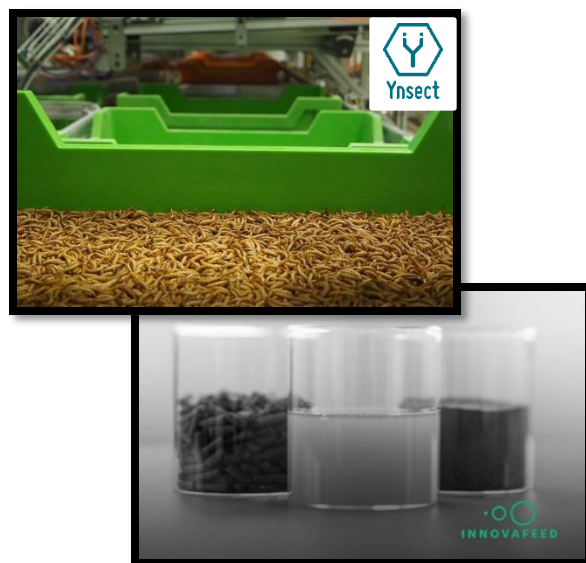
- Whole live larvae.
- Dehydrated whole larvae.
- Defatted whole larvae.
- Insect meals (protein concentrates = PAP).
- Insect oil/fat.
- But also amendment (soil fertiliser).

Whole unprocessed larvae are currently not authorised in European Union for use in poultry feed.

Benefits of insects in chicken feed

Insects as an alternative protein source of protein from plant-based in broiler chicken feed presents numerous benefits:

- Reduced environmental impact (less imports, avoid deforestation, less water and less space used - large volumes produced in vertical farming)
- Promoting European feed self-sufficiency
- Recycling and processing co-products from agriculture (e.g. fruit and vegetable peelings)
- Excellent nutritional value (level of crude proteins and amino acids comparable to that of soybeans)
- Improved poultry welfare (eating insects is a natural behaviour and could promote foraging behaviours, particularly in their live form)



Limits of insects in chicken feed

Despite being a promising protein source, challenges persist in achieving the development of a robust insect farming industry, economically affordable and able to control sanitary aspects, namely due to its recent development facilitated by recent regulatory authorisations. Other limits for the incorporation of insect protein in broiler chicken feed are:

- Environmental impact depends on the substrate used (insect diet), the production system (amount of energy consumption for insect farming - renewable source or not) and insect species.
- New logistic to adopt to avoid cross-contamination with feed for ruminant farming.
- Variability of insect meal quality.
- Precaution on chitin content as it could impair digestibility.
- Management of insect's welfare during farming.

References:

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