

IPIFF Contribution Paper on the application of insect frass as fertilising product in agriculture

Context & general remarks

1. General context

Similarly to conventional animal farming activities, there is a multitude of by-products that insect production generates. In addition to the main outputs (i.e. whole insects, proteins or fats), insect farms also produce insect **larvae faeces** (later referred to as ‘insect frass’), which **have great potential to be upcycled as fertilising product** (e.g. organic fertiliser, compost material or soil improver). In addition to its interesting NPK profile¹, this product contains certain beneficial bacteria that act as plant growth microorganisms, thereby improving plants’ health and facilitating their absorption of nutrients².

Moreover, the land application of insect frass is **consistent with circular economy’s principles**, by reintroducing valuable materials into the food production chain - as alternative to linear models that would end with its disposal (incineration or landfilling) or ‘lower value uses’ (energy recovery) - **while offering sustainable solutions to European farmers and/or gardeners**.

Mainly used in nurseries, viticulture, by professional or amateur horticultors as well as by arable farmers, insect frass constitutes a valuable alternative to today’s fertilising products, primarily in the context of a **reduced availability of mineral fertilisers**³ in the future. At the same time, insect production grows rapidly in Europe, thereby generating rising quantities of insect frass⁴. Although insect frass represents a valuable product, many EU farmers are not today in a position to valorise these materials efficiently (e.g. those are being disposed of as waste or reused as biogas).

IPIFF - the EU umbrella organisation of insect producers as food and feed therefore considers **safeguarding the possibilities for valorising those products as fertilising products** as a matter of high priority at EU level. These efforts would indeed play a pivotal role in **bolstering the competitiveness and overall growth of the sector**, while enhancing its ‘circularity potential’ and **contributing to generating complementary revenues for insect producers**.

2. EU regulatory landscape and IPIFF’s main recommendations

Today, several EU countries strictly regulate the conditions for commercialising insect frass on their national market (e.g. by imposing treatment standards for frass, such as pressure sterilisation, or through lengthy and burdensome authorisation procedures). However, its legal status remains uncertain in many other EU Members States. **This ‘fragmented regulatory patchwork’ thus limits the possibilities** for many insect producers to upcycle such high-quality materials, impeding **their commercialisation on the European market**.

¹ The content of nitrogen, phosphorus and potassium.

² J. Poveda et al., Applied Soil Ecology, <https://doi.org/10.1016/j.apsoil.2019.04.016>

³ The vast majority of phosphorus minerals used for fertilisers are found in Morocco and Russia.

⁴ While today the mass of frass produced in the EU exceeds several thousand tonnes, it is expected that by mid-2020s it will reach 1.5 million tonnes.

Against this background, IPIFF pleads for immediate EU action with a view to safeguarding the valorisation of insect frass as fertilising product, and thereby establishing a minimum level playing field among insect producers in Europe.

- In our view, these efforts should primarily focus on **clarifying or specifying the existing EU rules** with the view to authorising their use across the continent, ‘aligning’ to the already existing requirements for animal manure under the EU ‘animal by-products’ legislation (later referred to as ABP legislation) and ‘harnessing the existing opportunities’ opened by the EU organic rules. Such EU provisions also include a series of **obligations** for insect producers to **achieve appropriate safety standards** (e.g. biological and microbiological targets) in case they intend to apply the frass directly on land (i.e. without thermal treatment).
- Further off, we recommend **exploring the possibilities for developing specific EU rules** - e.g. via tailored **processing standards for insect producers** defined in the EU ABP legislation. We indeed trust that these efforts would contribute to ensuring increasing EU market access for insect frass products

IPIFF calls for clarifications on the EU regulatory status of insect frass

1. Regulatory background

[Regulation \(EC\) No 1069/2009](#) on animal-by-products (later referred to as ‘EU ABP legislation’) defines ‘manure’⁵ and specifically regulates its conditions of use (e.g. as organic fertiliser or for other ‘technical applications’). While ‘insect frass’ is not legally defined in this text, **several national competent authorities consider that such products should fall under the ‘generic category’ of ‘manure’**, so its conditions of use are aligned with those foreseen for other animal manures. Such classification allows operators to market insect frass as organic fertiliser ⁶(following heat treatment of 70 °C for 60 minutes), as well as to spread it on land without prior processing⁷. The latter is **consistent with the possibilities already foreseen in the EU organic legislation** - i.e. Annex I of [Regulation \(EC\) 889/2008](#) permits the use of dejecta of insects (which is considered a synonym for insect frass) by EU organic farmers.

In contrast, **several EU countries classify these products as ‘Category 2’ materials differing from ‘manure’**. According to those authorities, insect frass is considered distinct from manure due to the possible occurrence of other items that are not per se faecal materials (e.g. live and dead insects, feeding substrates residues, shreds of exoskeletons). Whilst this qualification makes the use of organic insect more uncertain in those countries, those authorities also often require insect producers to implement stringent processing treatments in case the final product is intended for commercialisation as fertilising product - i.e. pressure sterilisation which consists of thermal treatment of 133 °C for at least 20 minutes⁸.

For the IPIFF members, the above national regulatory uncertainties make it **necessary to clarify as soon as possible the legal status of insect frass at EU level**, notably to ‘secure viable options’ for upcycling such materials in the form of (processed) organic fertiliser or via direct land spreading, similarly to **what is already made possible for other animal manures** (*see recommendation n° 1 below*). Such a solution would allow insect producers to reach appropriate safety targets, pending some broader reflections could be engaged on the opportunity of developing more tailored standards for insect frass in the longer term.

⁵ Article 3.20 defines ‘manure’ as ‘any excrement and/or urine of farmed animals other than farmed fish, with or without litter’.

⁶ Consisting of organic matter - not in the context of organic certification.

⁷ See Annex XI, section 2 of Regulation (EC) No 142/2011.

⁸ According to annex XI, Chapter I, section 2 of Commission Regulation (EU) No 142/2011, competent authorities may authorise the use of other standardised process parameters (than 70 °C for one hour) provided an applicant demonstrates that such parameters ensure minimising of biological risks.

2. IPIFF recommendations

Recommendation n° 1: align the status of insect frass with standards applying to other animal manures

As previously mentioned, the **insect producing sector urgently needs solutions** from the EU legislator in order to **secure the efficient valorisation of those materials**: against this background, the **classification of insect frass as ‘manure’** - under the EU ABP legislation - constitutes, in our view, the ‘most pragmatic’ option, allowing operators to continue to sell their products on their national market, while ensuring compliance with appropriate safety standards.

According to such a classification, the upcycling of insect frass via land application may be envisaged through one of the three following outlets:

- insect frass may be sold as **organic fertiliser**, provided that the final product has undergone **appropriate thermal treatment**, i.e. heating at 70 °C for one hour, as foreseen **under the EU ABP legislation**⁹. Such treatments allow the production of standardised and stable quality products, i.e. some characteristics notably required by ‘specialised’ markets such as nurseries, horticulture or viticulture. While the above standards reflect the position of several EU national authorities, these would apply equally to all insect producers across the European Union, thereby contributing to ensuring a level playing field, to the benefit of operators for which more stringent solutions are being applied at national level.
- insect frass **may be composted** under the same thermal treatment foreseen for organic fertilisers¹⁰ (see above) or following ‘alternative’ treatments as permitted by national authorities¹¹.
- insect frass may be **spread directly on agricultural land**, without prior processing, as already permitted under the EU ABP legislation for other animal manures or under the EU organic legislation (i.e. according to Annex I of the Regulation (EC) No 889/2008 on organic production, dejecta of insects - which should include insect frass - may be used for soil fertilisation). We recommend operators to conform to certain ‘obligations’ in order to achieve appropriate levels of safety (see *chapter II recommendation n° 3 for more details on this subject*).

Against this background, we call for **the European Commission services to clarify** (e.g. through a Standing Committee Decision or Guidance to Member States) that **‘insect frass’ is considered as ‘manure’ in the framework of the EU ABP legislation**. As part of this exercise, IPIFF is eager to collaborate with the European Commission and Member States authorities by providing relevant documentation on the insect producers’ practices and/or field trials.

Recommendation n° 2: explore the need and opportunities of establishing a specific EU regulatory definition and requirements for insect frass

While aligning the status of insect frass to the one of other manures seems the most suitable solution in the short run (see *recommendation n° 1 above*), we also consider it worthwhile to engage in a more in-depth reflection on developing **tailor-made requirements at EU level** (such as the insertion of a definition for ‘insect frass’ and processing requirements under the EU ABP legislation¹²), combined with the creation of a product category in the framework of the EU fertilisers’ legislation (later referred to as FPR Legislation)¹³.

The above option would indeed entail the following advantages:

⁹ See Article 13 f. of Regulation (EC) No 1069/2009.

¹⁰ For more details, see annex V, Chapter III, section 1 of Regulation (EU) No 142/2011.

¹¹ For more details, see annex V, Chapter III, section 2 and 3 of Regulation (EU) No 142/2011.

¹² Modification of [Regulation \(EU\) No 142/2011](#) implementing Regulation (EC) No 1069/2009.

¹³ Regulation (EU) 2019/1009 on the marketing of EU fertilising products.

- By setting **treatment parameters** that are tailored to the **specificities of insect frass products** (e.g. heating temperature), European insect producers would be in a position to safeguard all relevant nutritional characteristics of the product (e.g. treatment methods ensuring that important bacteria for plant health are not being killed), while microbial risks would be appropriately addressed. The definition of such treatments could be developed alongside with research experiments on the ways to process insects and the compatibility with the sector-specific needs of plants¹⁴.
- The setting of a specific **endpoint** for insect frass under the EU ABP legislation would lead to harmonised and simplified national **authorisation procedures**.
- Finally, the definition of such an endpoint would allow insect producers to **trade their (processed) frass freely across the European Union**, i.e. in case a specific category would be created under the EU FPR legislation¹⁵ (CMC 10). Such entry would provide ‘legal basis’ for these products, thereby allowing their commercialisation on the EU market, notably towards specialised markets (see recommendation n° 1 above)¹⁶.

IPIFF is eager to collaborate with the **European Commission services** (e.g. DG SANTE & DG GROW), as well as with **Member States authorities** in order to engage the above reflections (e.g. provide appropriate documentation and pieces of evidence in support of specific treatment parameters).

IPIFF proposals for specifying the conditions for the direct spreading of insect frass on agricultural land

1. Regulatory & technical background

According to Article 13 (f) of Regulation (EC) No 1069/2009, manure may be ‘*applied to land without processing*’ (later referred to as ‘direct spreading’). **Theoretically, this option should be open to insect producers** - unless Member States consider that ‘*those products may present a risk for the spread of any serious transmissible disease*’ - in case insect frass would be categorised as manure (as recommended above - see recommendation n° 1) .

Direct spreading of insect frass can be of particular relevance for European crops, fruit and vegetable producers, including organic farmers, notably because this process allows maintaining the high nutritional properties of those products. However, those unprocessed products are not intended for further commercialisation nor for trade.

In the absence of EU defined regulatory status for insect frass under the EU ABP legislation (other than Category 2 materials - see chapter 1 above for more details), their **direct spreading on agricultural land is possible in a few EU countries only**.

2. IPIFF recommendations

Although direct spreading excludes thermal treatment, **we recommend insect producers to implement mechanical sieving methods and killing step(s)** to eliminate potential remaining live larvae in the insect excrements and minimise the technically unavoidable presence of dead larvae, feeding substrates residues or shreds of exoskeletons, in accordance with the requirements of Regulation (EC) 1069/2009. In our view,

¹⁴ IPIFF is pleading on further research efforts (in the framework of Horizon Europe Research Programme) to better characterise the chemical and microbiological properties of insect frass (see the [IPIFF Contribution Paper on Research, developed in the context of the public consultation on the Co-design of the Horizon Europe Programme](#)).

¹⁵ Annex II part II - CMC 10 of the Regulation.

¹⁶ Insect frass should be defined as a ‘generic entry’, including all insect species that are being used in the EU for food or feed (instead of having an entry for each individual insect species).

these measures must be combined with the adoption of **strict monitoring plans** (i.e. microbiological and chemical analysis), which would allow insect producers order to maintain appropriate ‘safety status’ for their products (*see recommendation n° 3 below*). The outcome of further experiments/field trials and research activities should pave the way for defining more specific conditions for their direct spreading (*see recommendation n° 4 below*).

✚ Recommendation n° 3: set an endpoint sieving criteria and appropriate monitoring plans to ensure the safe use of (thermally) untreated frass

In our view, land spreading of untreated insect frass should only be made possible provided that operators conform with the following specifications:

- Insect frass (final product) **shall be free from live larvae** and contain a **maximum threshold of dead larvae** (e.g. < 2% of the total frass mass)¹⁷ in order to prevent the possible dispersion of insects in the environment. These targets may be achieved via **appropriate sieving methods** (e.g. double sieving process), followed by a killing step: each operator being responsible for defining the sieving technique/mechanical separation process that is best tailored to its production model (while enabling to efficiently mitigate the presence of unwanted materials in the frass), as well as to set up subsequent checks to mitigate the absence of such larvae, against the above-mentioned targets.
- **Samples/ product analysis** shall be conducted to mitigate **microbiological and chemical risks** associated with the production in insect frass: notably, requirements applying for processed manure intended for the production of organic fertilisers or soil improvers (e.g. *E.Coli*, *Salmonella*, *Enterococcus spp*)¹⁸ could serve as benchmark in order to achieve adequate ‘microbiological status’. On the contrary, unsatisfactory results would lead to rejecting the product or command to apply heat/treatment for the product to be recategorised as processed manure. If deemed appropriate, insect producers should also take samples to control the presence of heavy metals or other nutrients (e.g. phosphorus, nitrogen).

We suggest defining the above obligations in the framework of the EU ABP legislation. Yet, as those steps might require to develop a specific regulatory definition and requirements, which can only be realistically envisaged in a mid-term horizon (*see recommendation n° 2 for more details*), we recommend **national authorities to consider establishing the above criteria/standards as part of their national legislation or national control plans**.

In our view, adherence to the above standards would indeed allow insect producers to efficiently mitigate **potential microbiological and chemical risks** associated with the direct spreading of insect frass. Notably, recent trials conducted by insect producers suggest that microbial contamination remains lower or at comparable levels to other animal manures. New experiments and field trials should enable us to collect evidence confirming the above findings¹⁹.

Besides, we do call for research projects to be conducted in order to evaluate the nutritional benefits of certain bacteria present in the frass (for plant health) and better characterise the influence of the feeding substrate on the properties of the final product (*see recommendation n° 4 below*).

¹⁷ Current sieving techniques do not allow to guarantee the total absence of insect larvae (dead larvae) contrary to live larvae which may be eliminated via killing following a 2nd mechanical sieving step.

¹⁸ Microbiological standards for processed manure are provided in annex XI, chapter I, section 2 (d) of Regulation (EU) No 142/2011, i.e. 1000 CFU/g for *Escherichia Coli*, 1000 CFU/g for *Enterococcaceae* and absence in 25 g in the case of *Salmonella*).

¹⁹ Several projects or field trial are up and running. While preliminary results have been collected by certain products, new trials are underway or foreseen and serve to strengthen documentation/pieces of evidence (for further evidence, you may contact the IPIFF Secretariat).

✚ **Recommendation n° 4: develop EU research projects on the nutritional properties of insect frass**

- We recommend all national authorities to **authorise the running of field trials**, which evaluate the impact of untreated insect frass on land, as these would serve to complement existing experiments already conducted in that field.
- We also call for more **ambitious research projects** (e.g. EU funded Research projects) to be conducted in this area. These would notably focus on characterising **the nutritional benefits of insect frass** as well as their suitability for different markets/croplands (e.g. nurseries, horticulture or viticulture), notably by evaluating the **microbes** that may act as Plant Growth Promoting Organisms (PGMs) and the influence of the feeding substrate on the properties of the product and subsequent consequences on **plant health** and/or **plant development**²⁰. Finally, these research projects should also examine what could be the most suitable (thermal) processing methods allowing to ‘safeguard the nutritional properties of the product’²¹.

²⁰ Research on currently authorised substrates and non-authorised substrates at EU level (e.g. former foodstuffs containing meat and fish, anticipating possible future EU regulatory changes).

²¹ See the [IPIFF Contribution Paper on Research, developed in the context of the public consultation on the Co-design of the Horizon Europe Programme.](#)