

Insects crawling their way into feed regulation

Insects can be valuable ingredients in animal diets. In fact, they are a natural source of food for some animals, but the relevant current legislation must be reviewed to make sure this type of mini-livestock is able to be used in livestock feed.

By Emmy Koeleman

“We have to find solutions to feed the growing world population” - is a frequently heard credo at conferences at the moment. Protein, derived from insects, represents one possible solution. They already serve as human food in some parts of the world and are often sold as (live) food for e.g. birds, iguanas, etc that are kept as pets. But on a larger scale, there are numerous qualities possessed by insects, in particular fly larvae, which make them well suited for use in animal feed. But incorporating insects into the diet of production animals comes with many hurdles. Many current feed and food legislation frameworks have no special section for insects. Insects are not vertebrates like livestock animals and fish and this is causing some confusion about how to see this type of mini-livestock. Are insects a novel ingredient? Or do they tick the box as being livestock? In the case of livestock feed, insects are primarily of interest in the form of processed animal protein (PAP) – animal meal – and are to date treated according to this definition.

Insect fat is a different story and is already allowed to be fed to non-

ruminants. But why is the road to use insect meal in animal feed such a bumpy one?

Navigating through the maze

The EU funded project PROteINSECT (2013-2016) is one of the working groups that has made a (dynamic) working document on this topic, as a tool for insect producers to navigate through the maze of the current feed and food legislation and which rules apply to them. Also Wageningen University, Venik in the Netherlands and the IPIFF (International Producers of Insects for Feed and Feed) have made similar documents.

The current legislation was also recently discussed at a large international conference on the use of insects in food and feed, held in May this year in the Netherlands. Here some of the current European legislation policies that have to be considered when using insects to feed production animals were discussed. The document from PROteINSECT states that insects produced for either human consumption or use in animal feed will be subject to several requirements from different regulations. Producers of insect meal have to work with the EC General Food Law Regulation 178/2002 for example. Producers and distributors of insect



products will also be subject to EC Regulation 854/2004 on food hygiene and EC Regulation 1831/2003 on feed hygiene. These regulations require food or feed business establishments to be registered and then approved following an on-site visit. Business operators are also required to implement and maintain procedures based on hazard analysis and critical control point (HACCP) principles.

TSE regulation is key

The above mentioned rules are



Photo: Reuters

not considered to be the main hurdles. When you look within the Catalogue of Feed Materials (EC 68/2013), there is no specific entry for 'insect meal' although there is a listing for 'whole or parts of terrestrial invertebrates' suggesting that the use of insect protein in animal feed may be possible. However, if they are to be used for feed, insects must meet the requirements of Directive EC 2002/32 on Undesirable Substances in Animal Feed. This sets the maximum permitted levels of contaminants such as heavy metals. But most importantly, insects

must be processed in accordance with the EU Animal By-Products Regulation 1069/2009 to become processed animal protein (PAP) before they can be fed to animals. Imported insect material from non-EU countries must also be processed in accordance with this regulation. Under this regulation, non-pathogenic insects are classed as category 3 material (low risk material) and are therefore deemed suitable for feeding to farmed animals. However, in response to the BSE outbreak, the TSE regulation EC 999/2001 prohibited all PAP, with the

exception of hydrolysed proteins, from being used in animal feed. But, in 2013 the European Commission made an exception for fishmeal that enables the use of non-ruminant PAP in farmed fish species intended for human consumption. Although, this isn't the case for insect derived PAP as this regulation concerns processing in slaughterhouses, including controls in the slaughterhouses etc. Insects do not follow the same route as livestock when it comes to slaughtering, so that is why insect PAP is not allowed.

Dutch insect farm Kreca: From a hobby to a big business



Marieke Calis has been in the business with her parents from a young age.



The crickets are kept on paper structures within a rolling storage cart.

There are numerous insect producing farms around the world and Kreca, based in Ermelo in the Netherlands is one of them. The company was established in 1978 and has since been successfully operating throughout Europe.

The farm was set up by the Calis family, who started the insect business as a hobby. The farm now produces 12 different insect species, intended for human food (5%) and pet food (95%). The main season for production for pet food is April until mid-October and production is a few tonnes per week in the main season. "All the insects are fed a plant based diet and no antibiotics are used. Waste streams (from restaurants for example) are not used by us as the contents vary too much and the quality cannot be ensured. We use very fine corn meal or groat meal (less than a millimetre), which we store in three different silos on-site. We use several tonnes of feed per week," Marieke Calis explains. Kreca is considered as one of the insect farms that is really active in cooperation and establishing the frameworks needed for insect breeders. For example a handbook was made in which some basic hygiene and management rules are explained. "We carry out a bacteriological investigation four times a year and a quality check once a year. We also test the presence of heavy metals in the insects on a regular basis. This is of particular interest for insects intended for human food," Calis explains. The farm wants to focus on pet food, human food and pharma ('the higher segment') and has currently no intention of producing for the livestock feed business.



All the insects are fed a plant based diet and no antibiotics are used.

What to feed the insects?

Attention will also need to be paid to legislation covering the safe use of substrates (the feed for the insects), such as vegetable and domestic waste and manure, on which insects can be reared very economically. Housefly larvae can reduce substrate mass by 60% over a 10 day period, resulting in environmental benefits as well. However, under the ABP regulation (EC regulation 1069/2009), insects reared for the production of PAP would currently be considered 'farmed animals' and therefore would be subject to the relevant regulation. The same regulation

states that manure is classed as category 2 material and only category 3 material can be used as feed for farmed animals. Catering waste is classed as category 3 material; which is currently prohibited as feed for farmed animals, with the exception of fur animals. Insect farms such as Kreca use corn and groat meal to feed the insects (see *box above*). In contrast, waste products from bioethanol production such as wheat protein and barley hulls are listed in the Catalogue of Feed Materials (EC 68/2013) and thus could be used as a substrate on which to rear fly larvae.

Producing insects by feeding them manure is also not allowed according to the EC Regulation 767/2009. This regulation states that 'faeces, urine and separated digestive tract content resulting from the emptying or removal of digestive tract, irrespective of any form of treatment or admixture' is prohibited to place on the animal feed market.

Time for amendments

Considering all the legislation involved, we can certainly state that there are still many gaps and loose ends when it comes to using insects in compound

feed. At the same time, current insect producers face the explicit choice: continue business as is (focusing on pet shops and novelty (human) food) or shift to bulk production as large-scale suppliers of the feed and food industries. Only then insect meal can be a good alternative for other protein sources (especially when you look at cost price). For them it is important to know what to expect regarding legislation. The TSE and by-product regulations are the most important ones, and due to the significant increase in interest in the topic, the use of insect protein in animal feed is on the agenda of the relevant authorities (DG Sanco). For example, a modification to an annex in the TSE regulation 999/2001 has been drafted which would see 'processed animal protein derived from insects' being treated in an analogous manner to fishmeal. Whilst this has not yet been adopted, it is a positive step nonetheless. But what about animal welfare and environmental rules for insect breeders? These topics seem not so relevant, but they are when the sector wants to grow into large-scale insect rearing facilities.

Netherlands takes the lead

To facilitate amendments happening in legislation, many parties are actively lobbying among politicians and other parties involved. The Netherlands is among the countries, that are taking the lead in formulating recommendations and gathering knowledge on the use of insects in feed. Marian Peters from the association of Dutch insect producers (Venik) is one of the drivers for this cooperation (*see box to the right*).

On a European level, the project team from PROteINSECT is engaging with policy makers in order to support the introduction of enabling legislation. Also the IPIFF, a non-profit organisation founded in 2013 which represents the interests of private players in the insect industry around the world, is helping to make steps in the legislation and other frameworks that are needed for insect producers. IPIFF has made a regulatory roadmap for insect products in feed and food applications. The document further clarifies the underlying regulatory barriers, including the IPIFF strategy to work with DG Sanco and member state governments (*Table 1*).

Marian Peters: "Workable framework needed for producers"



Marian Peters is a Dutch food entrepreneur and 'spider in the web'. She is the voice of the Dutch insect farmers and has been lobbying and cooperating with insects producers and politicians for many years to work on a good framework for this new type of business. She also founded Venik, the Dutch association of insect producers. "Having an association really helped to convince certain politicians that we are a real upcoming business. And it even resulted in the Green Deal 'Insects for feed, food and pharma', in which different Dutch stakeholders (including the producers and the government) are working together on clarification of the current bottlenecks in legislation and to come with recommendations and action points," Peters explained. "We also created the InsectCentre to bring the parties together." According to Peters there are still many gaps in the legislation. "Actually it would be better and easier to make a separate legislation for insects, but that is not possible. So we have to work with the current rules set for livestock rearing and feeding. But there are some crooked things when you

look at it. For example the animal welfare issue. Insects in daily life are often seen as pests and contaminants. But as soon they are farmed for food and feed, animal welfare rules about husbandry and killing come into play." But according to Peters there is still a lack of knowledge about this topic. "To ensure that insects are farmed with no pain, injury and disease, but also without discomfort, we need to ask ourselves to what extent the subjective concepts of pain and discomfort are applicable to insects." Another big issue, according to Peters, is the cost price. "The business is still small and only if we can scale-up, can we lower the cost price to make it an interesting alternative for current protein sources in animal feed. And to make this happen we need a good workable framework."

Companies are keen to start

This article is primarily focused on the EU situation, but it appears that international recommendations specific to the use of insects in food and feed are yet to be developed as there are no standards in the Codex Alimentarius (the international reference standard for food and feed established by the FAO and the WHO) that specifically refer to the use of insects in animal feed or food. Until then, insect producers are

making their business ready to enter the animal feed market with their insect meal. A great example comes from the Netherlands, where animal feed company Coppens and Dutch insect producer Protix Biosystems signed an agreement to include insect meal in livestock feed, as soon as legislation allows. And this is just one example of a company which is keen to enter the animal feed market with a protein made from mini-livestock. **AAF**

Table 1 - Current state on the use of insect meal in animal feed and action points defined by IPIFF.

Product	Target market	Strategy to tackle regulatory limitations
Insect PAP when insects are fed with 100% vegetable feedstock	Aquaculture/Livestock	Currently under discussion with DG Sanco
Insect PAP when insects are fed with former foodstuffs including meat and fish	Petfood	Start open discussion with DG Sanco for release
Insect PAP when insects are fed with former foodstuffs including meat and fish	Aquaculture	Develop dossier strategy with DG Sanco and EFSA for risk analysis and strategy for allowance
Insect derived products when insects are fed with manure	Non-feed markets, but application in other industries	To be discussed. Exclusion of manure as feedstock by co-developing other markets creates transparency to avoid risk averseness on manure as potential livestock.

Source: IPIFF