EU FEED CIRCULARITY CATALOGUE

EXISTING LEGAL RESTRICTIONS TO ENHANCED ANIMAL FEED CIRCULARITY

Version 1.0 – 23 May 2025

This EU Feed Circularity Catalogue is the output of a cooperative work from the following EU organisations:

CEFIC, the European Chemical Industry Council, is the forum of large, medium and small chemical companies across Europe, which provide 1.2 million jobs and account for approximately about 13% of world chemicals production.

EFFOP, the European Fishmeal and Fish oil Producers, is the trade association of European marine ingredients producers, with members from 14 EU and EFTA countries. The European industry is a cornerstone of the circular blue economy, producing around 566.000 tons of fishmeal and 177.000 tons of fish oil per year, mainly used by the aquaculture and farming sectors. EFFOP provides technical expertise to the EU institutions and advocates for evidence-based feed policies

EFFPA, the European Former Foodstuff Processors Association, is a non-profit EU trade association, founded in 2014, representing former foodstuff processors producing feed for farm animals.

EFPRA, the European Fat Processors and Renderers Association, represents the European animal by-product processing sector. Its objective is to continually improve the safety, health and sustainability of European food production by efficiently processing animal fats and other animal by-products. The EFPRA members process more than 17 Million tonnes of animal by-products per year from the meat and livestock industry.

ESPP, the European Sustainable Phosphorus Platform, promotes nutrient recycling and sustainable phosphorus management in Europe. ESPP is a not-for-profit association, funded by its 50+ members, who are a range of different industries (water and waste, fertilisers, chemicals, cement, recycling, services), knowledge institutes and public establishments. www.phosphorusplatform.eu.

FEDIAF, the European Pet Food Association, is the united voice of the European Pet Food Industry. Our membership includes 15 European national pet food associations, together with five pet food manufacturers operating in Europe. This equates to around 95% of the industry.

FEFAC, the European Feed Manufacturers' Federation, represents the manufacturers of compound feed and premixtures for food producing animals, with member associations in 22 EU Member States and associate members in the UK, Norway, Switzerland, and Turkey.

IPIFF, the International Platform of Insects for Food and Feed, is an EU non-profit organisation representing the insect production sector's interests towards EU policymakers, stakeholders, and citizens. It promotes using insects and insect-derived products as top-tier nutrient sources for human consumption and animal feed.

Summary

Livestock and petfood chains provide an essential contribution to the optimised functioning and circularity of the food chain by valorising secondary resources which cannot be used in human foods[1] . More than ever, circularity has become strategic for animal feed business operators, backed by a high-level of safety guaranteed by an effective legal framework, controls and traceability.

> However, a **number of regulatory obstacles are currently limiting livestock feed circularity**.

Eight industry sector federations and stakeholder organisations have worked together to develop a catalogue of measures aimed at creating a supportive legislative environment that stimulates and increases feed circularity without compromising safety. We detail these proposals in the attached report, illustrated by a non-exhaustive list of examples of regulatory restrictions faced by the feed chain to access certain materials and which deserve, in our view, a re-examination of their justification.

We consider that this catalogue of measures has the potential to increase the use of different secondary nutrient streams in animal feed. These measures would reduce competition for land use with food production, reduce imports of feed materials and reduce livestock system net greenhouse gas emissions, whilst maintaining **safety, traceability and farmer and consumer confidence**.

This would support an effective **Nutrient Circular Economy**, so contributing to **food sovereignty, competitiveness and farm system resilience.** It would also relieve farmers' dependency on imported animal feed proteins and mineral phosphates (Phosphate Rock is listed in the EU Critical Raw Materials Act EU2024/1252 and improvement of EU autonomy in protein feed is an objective of the EU Vision on Agriculture).

This catalogue of measures could be the basis for the development of an EU Feed Circularity Roadmap and should be considered in the EU Critical Raw Materials Act, in upcoming reviews of the Animal By-Products, Animal Feed Regulations and other EU policies.

Disclaimer

The content of this report is the result of the joint work from the signatory European organisations concerned by the circular feed chain and is not an expression of an official position from individual associations regarding one or other measure/case study. It does not preclude individual associations to promote their own sustainability agenda according to their specificities, circumstances and priorities. As such, this report should be seen as a non-exhaustive list of considerations, principles and ideas suggested as a point of entry for further discussions within the stakeholders' community and with national and EU authorities."

[1] E.g. inedible, non-food-grade or non-saleable crop, crop or food processing or ex-food materials.

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1. Introduction: scope and limitation of exercise

The Green Deal, launched by the previous and confirmed by the new European Commission, places sustainability as a lead objective, for the European economy and for food systems specifically. The 2024-2029 mandate Competitiveness Compass and Clean Industrial Deal, place competitive strength at the heart of the Commission's objectives and emphasise the importance of circularity in achieving this, announcing an EU Circular Economy Act for 2026. The Competitiveness Compass is underpinned by three pillars

- Closing the innovation gap with the EU's main competitors
- Linking decarbonisation and competitiveness
- Reducing dependencies and increasing security

Increasing circularity and boosting the circular bioeconomy contribute to these objectives. Minimising waste and (re-)using residual flows in a way that enables the safe conversion of these resources back into a new product's lifecycle or supply chain are key principles of a circular bioeconomy. The livestock sector uses and produces biomass, which provides, besides food, essential nutrients for fertilisation of crops and bio-based materials for a multitude of industries (e.g. clothing, cosmetics, medicines) (see Figure 1). In feed production, the key contribution to the circular bioeconomy translates into the upcycling of nutrients from secondary materials derived from the food and non-food production sectors through feed for food-producing animals and petfood[2].

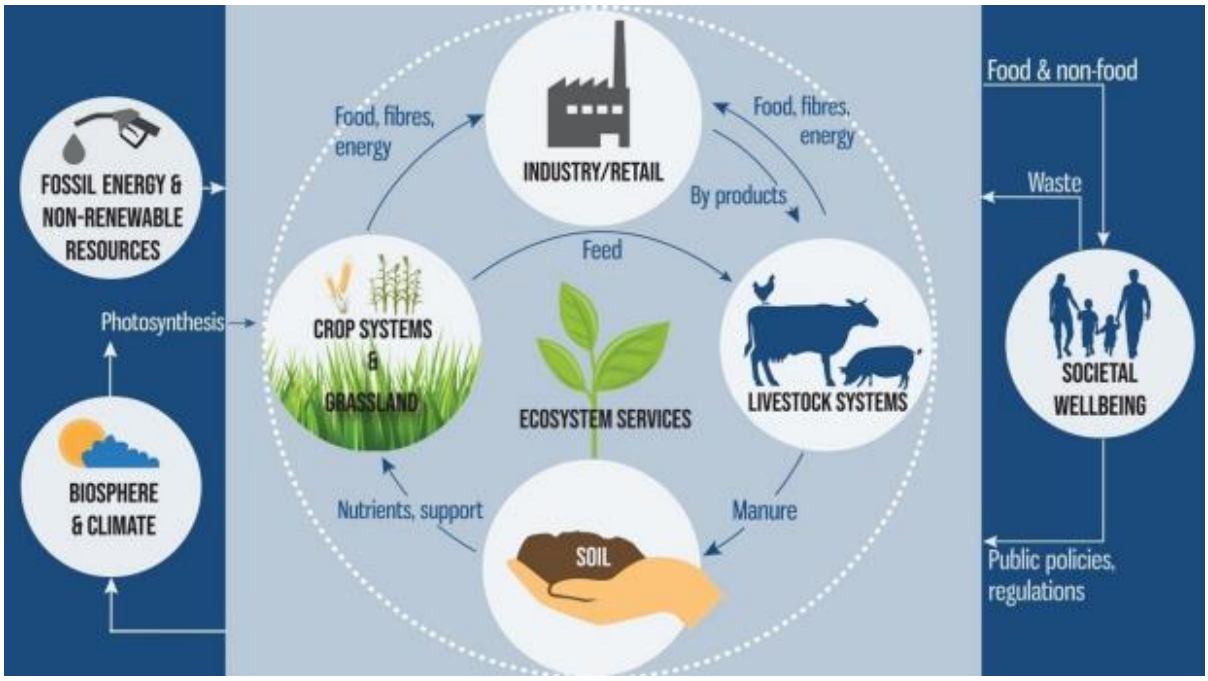

Figure 1: Livestock's role in realizing a European sustainable circular Bioeconomy (ATF vision paper 2019[3])

The strategic dialogue on the future of EU agriculture[4] published in September 2024 emphasised the need to promote "innovative circular economy approaches, such as circular feed solutions based on the use of more co-products, byproducts, as well as the conversion of waste for food and feed, especially in monogastric livestock systems". The Vision on

[2] Circular Feed: Optimised nutrient recovery through animal nutrition – FEFAC 2022
[3] Animal Task Force vision paper – 2019
[4] Report on the Strategic Dialogue on the future of EU agriculture – EU Commission - 2024

Agriculture from February 2025 further underlined the importance of boosting circularity to support food security and sovereignty. Additional visions on Livestock Production and Aquaculture have been announced in the Vision of Agriculture, where circularity must be included as a key enabler for making production resilient and future-proof. Also the long-anticipated updated EU Protein Strategy should not only consider producing more protein crops in the EU but also look for untapped existing or potential protein resources from the circular economy, including of animal origin.

Increased availability of circular feed can contribute to numerous policy expectations:

- Ensuring that animal feed production complements, rather than competes with food for human consumption;
- Reduce animal feed import dependency / increase food system autonomy;
- Contribute to the decarbonisation of animal production;
- Achieve the food waste reduction targets;
- Increase the use of alternative feed (protein) materials;
- Closing of nutrient cycles, especially relevant for critical raw materials like phosphates.

Increasing feed circularity requires understanding the reasons why a by-product or a secondary material[5] with high nutritional value is not used today as animal feed. It must be assessed whether legal restrictions are still legitimate and proportionate, as possibly in some cases these restrictions were decided a long time ago in different circumstances. Supplying the feed chain also requires operators to adhere to a circular feed culture, i.e. understanding the sustainability benefits of keeping nutrients in the food chain via animal feeding while at the same time ensuring safety, complying with the legal requirements imposed by the feed hygiene legislation (safety, responsibility traceability) and meeting social expectations (e.g. transparency).

> However, improving circularity means that **operators with circularity ambitions often face regulatory obstacles** and administrative burden, thereby **affecting competitiveness** and discouraging these operators finding a second life for their secondary materials.

Several relevant circular economy organisations decided to join forces through a Circular Feed Platform with a view to map existing legal provisions that restrict the feed use of certain resources or the upgrade / recovery of nutrients from waste. They set out to evaluate the extent to which a revision of the restrictions can be argued and how it could contribute to increased feed circularity whilst meeting the high EU standards for feed and food safety. Beyond the sustainability and circularity considerations, a number of other parameters may indeed justify such a re-assessment, starting with new scientific evidence regarding the nature of hazard and exposure, technological developments that may contribute to minimise the risk (e.g. feed additive, detoxification process, etc.), new control tools to secure an efficient supervision by authorities (methods of analysis, digitisation) and also evolutions in social perception of the risk.

This exercise seeks to build on the constructive work initiated by the Heads of Food Safety Agencies in their publication “Towards sustainable Food Systems” from September 2023 and more specifically the catalogue of measures included therein.’

[5] “Secondary raw materials” are recycled materials that can be used in manufacturing processes instead of or alongside virgin raw materials.

2. General principles for a legislative framework supporting feed circularity

2.1. Existing principles to maintain

Principle 1: Feed & Food Safety must remain the overarching principle and the backbone of any circular feed policy. Safety must be backed-up where appropriate by traceability and responsibility, and must be accompanied by appropriate control measures to ensure user and public confidence.

Feed safety is governed by two types of legal measures:

- Product related measures: 3 categories of feed ingredients can be singled out:
  - Feed ingredients subject to an approval procedure: this concerns feed additives covered by Regulation (EC) No 1831/2003 and genetically modified feed covered by Regulation (EC) No 1829/2003.
  - Feed ingredients whose use is restricted or prohibited: this concerns materials listed in Annex III of Regulation (EU) 767/2009 and animal-by-products derived products prohibited by Regulation (EC) No 1069/2009 and Regulation (EC) No 999/2001 on TSE.
  - Other materials whose feed use is permitted as long as not classified as waste and compliant with legal standards set for contaminants and pesticide residues in feed.
- Producer related measures: operators producing, handling or storing material for use as feed shall be registered / approved as feed business operators. They hold primary responsibility for the safety of the feed they place on the EU market in accordance with the General Food Law (Regulation (EC) No 178/2002) and Feed Hygiene Regulation (EC) No 183/2005. In particular, an approval procedure required for the most at-risk operation is foreseen to secure that they are performed under strict supervision by authorities. An approval procedure is also foreseen for certain types of operations under the Animal By-Products Regulation.

Principle 2: Science must be the basis for any prohibition of access to a feed resource.

An EFSA risk assessment should remain the basis for materials subject to an authorisation procedure, for materials subject to market access restrictions as for materials for which acceptable levels of contaminants must be set. The criteria for authorisation should consider sustainability, resilience, economics and autonomy and respect the scientific evaluation of the risk. The ability of processes to reduce risks should also be evaluated scientifically, as is the case with detoxification processes for undesirable substances or treatments for feed materials of animal origin.

However, the EFSA process could be rationalised and accelerated in some cases. For example, wherever possible, rather than assessing one specific material / process / use, the assessment should be as wide and technology-neutral as possible, subject to specifying additional data or verification requirements for variant materials / processes / uses. This could both accelerate circularity and optimise EFSA resources.

2.2. Existing principles to better implement

Principle 3: Coherence should be ensured between the different legal acts and policies and be based on the Waste Hierarchy and the Food & Waste Use Hierarchy.

The Waste Hierarchy, as backbone of the Waste Framework Directive[6], and the Food & Waste Use Hierarchy as promoted by the Joint Research Center[7]establish a number of excellent concepts and priorities that are not sufficiently used when designing public policies and legislation. Preventing waste remains a fundamental objective, however, the concept whereby any material should be regarded as a waste unless it can be proven that it is a resource may discourage operators from taking steps to preserve the resource status. Likewise, the existing orientations under the renewable energy policies encouraging the use of residual biomass for production of biogas must provide safeguards that production practices are not in conflict with the (food) waste hierarchy and thereby avoid encouraging the use for biogas production of materials safely used as feed for many decades already.

Figure 2: Waste hierarchy (EU Commission)

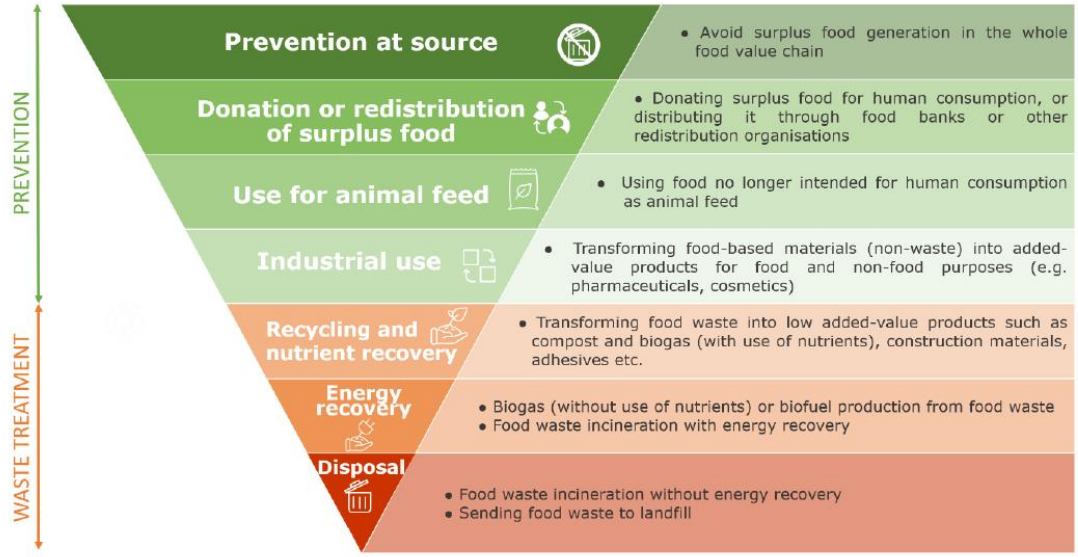

Figure 3: Food and waste use hierarchy (Joint Research Center)

[6] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste

[7] Building evidence on food waste prevention interventions – JRC - 2024

Another source of concern for operators, which also leads to wastage of resources is the case of multi sources substances. According to the Pesticide Regulation (EC) 396/2005, any substance listed as a pesticide, whether authorized or not, may not be present in food / feed products beyond the MRL, even when the presence of the residues is not due to pesticide application (for example natural presence of the substance in the product) and the levels are safe. This leads to the downgrading/discarding of products (both food and feed) due to non compliance with the MRL. With the development of biopesticides, such scenarios may only occur more frequently.

Principle 4: Coherence should be secured between the General Food Law, waste legislation, ABP regulation and other sectorial legislations (including end-of-waste status, supervision by authorities)

A proper functioning of a circular-based policy should secure coherence between different sectoral policies involved, avoid overlaps and gaps and also establish clear rules to facilitate an appropriate transition from one legal framework to another under well-structured supervision by competent control authorities. A number of feed safety related crises in the past stem from border line between Waste Framework Directive and Feed Hygiene Regulation, with operators breaching the legislation on feed either deliberately or by ignorance, taking also benefits of unclear allocation of responsibilities across control authorities responsible for environmental legislation and for feed / food safety.

Principle 5: Accelerate, harmonise and clarify conditions for delivery of "End-of-Waste" status.

De facto prohibitions of use in feed of certain wastes irrespective of processing, is a major restriction to circularity for certain nutrients. For all secondary materials intended for recycling, waste status can imply significant obstacles to transport, site permitting, etc. EU EoW status is today not achievable for most secondary materials. National case-by-case EoW is in many cases incoherent, not transparent. New approaches are needed to improve coherence, communication and mutual recognition of national EoW and to facilitate logistics and valorisation of secondary raw materials whilst ensuring traceability and safety.

Principle 6: Discrepancies among Member States in the enforcement of the EU legislation should be minimised via EU guidance and administrative burden for operators to comply with EU feed legislation should be simplified without compromising feed safety.

Although circularity is a concept that favours local sourcing, business models for the valorisation as feed of by-products requires often cross-border transport and experience shows differences in the administrative requirements for transport, including unharmonized format and requirements for the transport of e.g. former foodstuffs between neighbouring countries. This may affect in particular the conditions for transport of material whose destination may change (e.g. former foodstuffs or fish oil).

The national requirements for registration as feed business operators are also different across the EU Member States. In certain countries, a procedure for registration as feed business operator is required, whereas in other countries, food businesses are automatically considered as feed businesses. This second option is not only an administrative simplification, in particular for food businesses like bakeries or vegetable producers but it also preserves the image of certain food businesses which do not want to be seen as active suppliers of the feed sector for reasons of image. At the same time, it remains also essential that suppliers to the feed chain are aware and committed to complying with feed legislation requirements and also feed safety culture. The development of EU guidance for the facilitation of implementation of feed safety management systems including HACCP-based principles would encourage further small food businesses to seek valorisation of their co-products by-products as feed rather than other destinations ranked lower in the waste hierarchy.

The way to determine the applicable Maximum Residue Limits for pesticide residues for composite products containing ingredients falling or not in the scope of the EU Pesticides

MRLs legislation (e.g. feed additives, feed ingredients of fish origin) is also a case of unharmonized enforcement across the EU, resulting in a wastage of safe products in certain countries, whereas they would be regarded as perfectly compliant in others. Here again guidance for further harmonization would be helpful.

Transparency concerning different Member States decisions and requirements would be a first step, for example by establishment of public online registers, documenting all MS decisions on EoW and related information (operators, products, conditions, etc).

2.3. Principles to apply

Principle 7: A methodology should be developed to measure feed circularity and allow operators to evaluate their practices.

The adoption of more circular practices requires the possibility for operators to measure their baseline level of circularity and evaluate the potential for improvement via alternative practices. At this point, there is no methodology to measure feed circularity, which is a clear limitation for those operators willing to engage in more circular practice. The JRC in its report on "EU food system monitoring framework - from concepts to indicators" published in November 2024, announced its intention "to work on an indicator related to the circular material use rate, such as one that tracks the reuse of food processing by-products as feed", which is highly welcomed.

Principle 8: Existing food/feed and ABP legislation and other relevant legislation should be checked for its contribution to circularity and any impact assessment of new legal initiatives should include circularity as a key evaluation criterion.

The "better regulation" concept has been in force at EU level for 20 years, involving an impact assessment of any new legislative initiative or a fitness check of existing legislation based on 5 criteria (effectiveness, efficiency, coherence, relevance and EU added value) and aspects such as social or economic impact. Circularity was until now not systematically considered when evaluating EU legislation, despite clear incoherences between policy objectives and sectorial legislation. A typical example is the EU renewable energy legislation, with incentives to use certain "waste" and "residues", which in practice can be biomass flows, traditionally used as feed. Another example is the multiple-status issue for substances (e.g. pesticide and/or biocide and/or feed additive etc.) leading sometimes to non-compliance and disposal of consignments even when the substance at stake is naturally present at a safe level in the feed.

The planned EU Circular Economy Act should provide for a fitness check of existing EU feed legislation and other related acts against the circularity aspect, to identify areas where more circularity could be achieved in particular, in the Animal By-Products legislation which was designed at a time of abundant resources and in a TSE context (high risk, lacking information) which has changed considerably today. It should also require a progress report on the implementation of the TSE Roadmap II from 2010, which was expected to address some of the case studies mentioned later in this catalogue but has not delivered in practice.

Principle 9: Easily actionable contingency provisions should be foreseen on the ground of food/feed security.

The trade disruption resulting from COVID-19 pandemic and the aggression of Ukraine by Russia have shown that the EU food and feed supply chains were highly resilient but also highly vulnerable to incidents, putting potentially food/feed security at risk. The EU preparedness strategy should foresee the systematic insertion in relevant legal texts setting safety standards (e.g. contaminants, pesticide residues) provisions to allow a revision of standards as appropriate and taking into account an evaluation of the impact on food/feed safety. Guidance for activation of such contingency measures should be drafted.

3. Non-exhaustive overview of legislation-related restrictions to feed circularity

Several legal acts specify conditions for the manufacturing, storage, transport, placing on the market and use of feed (so-called “feed legislation”):

- Regulation (EC) No 999/2001 of the European Parliament and of the Council laying down rules for the prevention, control and eradication of certain transmissible spongiform encephalopathies
- Directive 2002/32/EC of the European Parliament and of the Council on Undesirable substances in animal feed.
- Regulation (EC) No 1829/2003 of the European Parliament and of the Council on genetically modified food and feed
- Regulation (EC) No 1831/2003 of the European Parliament and of the Council on additives for use in animal nutrition
- Regulation (EC) 396/2005 of the European Parliament and of the Council on maximum residue levels of pesticides in or on food and feed of plant and animal origin
- Regulation (EC) No 183/2005) of the European Parliament and of the Council laying down requirements for feed hygiene
- Regulation (EC) No 767/2009 of the European Parliament and of the Council on the placing on the market and use of feed
- Regulation (EC) No 1069/2009 of the European Parliament and of the Council laying down health rules as regards animal by-products and derived products not intended for human consumption and its implementing rules (Regulation (EC) No 142/2011);
- Regulation (EU) 2019/4 of the European Parliament and of the Council on the manufacture, placing on the market and use of medicated feed

Some other legal acts may also interfere with the feed legislation. This concerns in particular:

- Directive 2008/98/EC of the European Parliament and of the Council on waste
- Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products
- Regulation (EC) No 852/2004of the European Parliament and of the Council on the hygiene of foodstuffs
- Directive (EU) 2024/3019 of the European Parliament and of the Council concerning urban wastewater treatment

A screening of these legal acts has been performed to identify those measures that prohibit or restrict access to certain resources as feed and whose lifting or alleviation may improve feed circularity. Those measures are listed in a table overview below and elaborated in more depth in Annex I in terms of context, e.g. legal origin of the restrictions / prohibitions, reasons why the need to maintain the restrictions as such may be re-assessed, feed safety considerations, possible barriers etc. These measures are classified in 2 categories, i.e. i) restrictions/prohibitions related to the use of material from animal origin, and ii) other restrictions/prohibitions. They are listed randomly under each category and not by order of their potential to increase feed circularity, in absence of clear methodology. However, whenever possible, an evaluation of the circularity potential of a revision of the restrictions is provided taking in particular into account several circularity indicators, including Food vs. Feed competition, Proximity to Feed Mill, Land Use Ratio or Nutrient Efficiency (see Annex 1). An evaluation of the time needed to possibly revise the measure and time needed for translation of the amendment of the measure into practical increase in feed circularity is also provided.

3.1. Restrictions/prohibitions related to the use of material from animal origin

Annex I ref number	Topic	Nature of the issue	Suggested action	Time for revision / time for translation into practice	Circularity potential
1	Use of catering waste for feeding intermediate organisms	Ban on the use of catering waste for feeding any farmed animals (except fur animals)	Risk assessment and, as appropriate, revision of Article 11(1)(b) of Regulation 1069/2009.	Long/Medium	Very high
2	Use of former foodstuffs containing meat and/or fish for feeding insects	Ban on the use of former foodstuffs containing meat and/or fish for feeding insects.	Risk assessment and, as appropriate, revision of Annex X, Chapter II, Section 10 of Regulation (EU) No 142/2011	Medium/Short	Very high
3	Authorisation of intra-species re-use of animal proteins in feed	Feeding porcine PAPs to pigs and avian PAPs to poultry is prohibited, with no tolerance, discouraging feed manufacturers to use these PAPs.	Reconsideration of the scientific justification of the intra-species recycling ban and, as appropriate, revision of Article 11(1)(a) of Regulation 1069/2009.	Long/Short	High
4	Use of ruminant PAP in non-ruminant feed	Ruminant PAPs are fully prohibited for use in feed for farmed animals	Assessment of the risk of feeding non-ruminants farmed animals with ruminant PAPs and, as appropriate, revision of Annex IV of Regulation 999/2001.	Long/Medium	Very high
5	Cat 2 MBM (method 1) for export as feed to third countries	Cat 2 MBM processed according to method 1 may not be exported to Third Countries, although they meet the global WOAH standard.	Reconsideration of the prohibition to align with WOAH standards and, as appropriate, modification of Chapter V of Annex XIV of Regulation 142/2011.	Long/Short	High

Annex I ref number	Topic	Nature of the issue	Suggested action	Time for revision / time for translation into practice	Circularity potential
6	Use of former foodstuffs containing ruminant gelatine in feed for ruminants	Gelatine derived from ruminants is prohibited for feeding ruminants	Assessment of the risk of feeding ruminant gelatine to ruminants and, as appropriate, revision of Annex IV of Regulation 999/2001.	Long/Short	Medium
7	Use of fishmeal in feed intended to ruminants	Fishmeal may not be used for feeding ruminants	Assessment of the risk of feeding fishmeal to ruminants and, as appropriate, revision of Article Annex IV of Regulation 999/2001.	Medium/Short	Medium
8	Inclusion of processed proteins derived from edible gelatine, collagen and animal fat production under the definition of PAP	Proteins obtained as co-products from the production of gelatine, collagen and animal fat by food business establishment are not eligible to the status of PAPs unless re-processed in an ABP approved establishment	Re-assess the benefit of an ABP-treatment for co-products from the production of gelatine, collagen and animal fat and, as appropriate, grant a derogation as is the case today for former foodstuffs containing eggs, milk and honey (Annex X, section 10 of Regulation (EU) No 142/2011).	Medium/Short	Medium
9	Operational thresholds for controls of compliance with “feed ban” provisions	The 0-tolerance for the presence of porcine PAPs in pig feed and avian PAPs in poultry feed, jointly with consequential measures requiring separation of production lines, is the main reason for the unsuccessful lifting of the prohibition of avian PAPs in pig feed and porcine PAPs in poultry feed.	Review of the impact on feed safety of a recalibration the limit of detection regarding the presence of porcine DNA in pig feed and avian DNA in poultry feed and, as appropriate, revision of Regulation (EC) No 152/2009 and the SOP for species detection.	Medium/Short	Very High

Annex I ref number	Topic	Nature of the issue	Suggested action	Time for revision / time for translation into practice	Circularity potential
10	Maintaining Category 3 status for ABP containing technically removable foreign bodies	Classification as category 2 for animal by-products that have been declared unfit for human consumption due to the presence of foreign bodies. Cannot be used as feed.	Assessment of efficiency of technologies for removal of foreign bodies and, as appropriate, revision of art.9(d) and 10 of Regulation 1069/2009	Long/Short	Medium
11	Expand the definition of fish meal and fish oil	The definitions do not include all wild harvested aquatic invertebrates	Revision of points 7 and 9 in Annex I of Regulation (EU) No 142/2011	Medium/Medium	Medium
12	Use in feeds of purified mineral nutrients from incineration ashes	Slurry and manure (cat2) are not allowed in feed + faeces/urine are forbidden in feed, as are digestates of manure or Cat2 ABP materials and sewage.	Assessment of efficiency of technologies for purification of mineral nutrients recovered from slurry and manure and, as appropriate, amendment of Annex III of Regulation 767/2009 and art.9 and 10 of Regulation 1069/2009	Long / Medium	Very High
13	Use of dicalcium phosphate (DCP) from bones in ruminant feed	DCP from bones is not allowed for ruminant feed.	Lifting of the feed ban on dicalcium phosphate from bones in ruminant feed.	Medium/short	Medium

Case study 1: Use of catering waste for feeding intermediate organisms

Currently, the use of catering waste for feeding farmed animals (except for fur animals) is prohibited due to biosecurity concerns. This study aims to assess the risks and potential regulatory revisions that would enable catering waste to be safely used in feeding intermediate organisms such as insects, black soldier flies, or other approved species. The objective is to support sustainable waste management, enhance circular bioeconomy practices, and reduce food waste while ensuring safety and compliance with EU regulations.

Case study 2: Use of meat & fish containing former foodstuffs for feeding insects

The current EU regulations prohibit the use of former foodstuffs containing meat and fish in insect farming. However, insect species such as black soldier flies and yellow mealworms have shown potential for safely processing such materials. This case study seeks to assess the safety measures to enable regulatory changes that would allow the controlled use of these foodstuffs. Such a revision could significantly enhance circularity, reduce food waste, and support the development of a sustainable alternative protein source.

Case study 3: Authorisation of intraspecies re-use of animal proteins in feed

Following the BSE crisis, the EU ordered in 2002 a ban on feeding an animal species with proteins from the same species as a precautionary measure. This provision was maintained when recasting the Animal By-Products Regulation in 2009 (article 11, par. 1 a) of Regulation (EC) 1069/ 2009). In practice, this ban imposes all operators along the chain to adopt protective measures to avoid risk of presence of proteins from one species in feed destined to the same species. This means in particular that ABP-processors may not be willing to take the risk when collecting ABP from small operators like butchers who processes small quantities of meat from different species. Withdrawing this prohibition for non-ruminants further to a risk assessment by EFSA would not only considerably simplify the handling of PAPs along the chain and simplify official controls but would also enable using to its full extent the EU produced ABP in feed, thus minimising the EU dependency upon third countries for the supply of feed proteins.

Case study 4: Use of ruminant PAP in non-ruminant feed

Only certain PAPs derived from non-ruminant animals can be used in feed for certain farmed animals other than ruminants. Ruminant PAPs are not only banned in ruminant feed but also in feed for other animal species. This ban was ordered as a precautionary measure. While the two TSE road maps from 2005 and 2010 recommended a regular re-assessment of the feed ban, this has occurred only occasionally over the past 10 years. It is therefore appropriate to initiate a re-assessment of certain feed ban provisions, including with regard to the risks with the use of ruminant PAPs in feed for non-ruminant food producing animals such as fish, poultry and pig. Such re-assessment would be justified by the fact that ruminant PAPs are used in many Third Countries without reported increase in incidence of classical BSE, the fact that almost all EU Member States hold a negligible BSE-risk status and that experience has now been gained that the type of risk management measures applied to accompany the partial lifting of the feed ban in 2021 allow preventing cross-contamination of ruminant feed with PAPs.

Case study 5: Cat 2 MBM (method 1) for export as feed to third countries

The EU legislation on Animal By-Products classifies them into 3 Categories of Animal By-products depending on the level of risk. Only Category 3 materials may be used for feeding food producing animals. Category 2 Meat and Bone Meal are produced from materials not meeting the EU food safety standards, but whose risk may be controlled when applying the Pressure Sterilisation process (so-called method 1). Such Category 2 MBM are not authorised for feed use in the EU but the safety requirements for their production in the EU exceed those set by the World Organisation for Animal Health (WOAH) for MBM to be used as feed at global level. Many third countries align their standards with WOAH, meaning that the EU produced Category 2 MBM are usually of a higher safety standard than those produced in these countries and their export

outside the EU should therefore permitted. Lifting the ban on exports of Category 2 MBM as feed, currently enshrined in article 21 of Regulation (EC) 142/2011, would allow maintaining within the global feed and food chain, a valuable source of nutrients (amino acids and phosphorous) and thereby contribute to increasing the circularity of the global bioeconomy.

Case study 6: Use of former foodstuffs containing ruminant gelatine- in feed for ruminants

Article 7, paragraph 1, of Regulation (EC) No 999/2001 mentions the prohibition for feeding ruminants with proteins from any animal species, including ruminant gelatine. Former foodstuffs containing ruminant gelatine (candy, pastry) can indeed be used in feed for non-ruminant animals, but due to a lack of a guaranteed, dedicated non-ruminant production chain, these former foodstuffs are not widely used. Reauthorising the use of ruminant gelatine in ruminant feed, in line with the EFSA opinion "Potential BSE risk posed by the use of ruminant collagen and gelatine in feed for non-ruminant farmed animals from 28 October 2020, would enable these former foodstuffs to become available for feed production.

Case study 7: Use of fishmeal in feed intended to ruminants

Fishmeal is a valuable source of protein, but its use in ruminant feed is prohibited under the TSE Regulation. As EFSA has previously indicated, the potential health risks associated with the feeding of fishmeal to ruminants in relation to TSE transmission are minimal or non-existent. Indeed, fishmeal is produced entirely from fish and the industry adheres to strict and highly effective HACCP control systems – no processed animal protein other than fish can be used in the production process. Fishmeal production does not require any agricultural land, making it a highly efficient protein source from a land use perspective. In addition to its low LCA, fishmeal is recognized as a superior protein source due to its rich and balanced amino acid profile. Lifting the ban on the use of fishmeal and compound feed containing fishmeal in ruminant feed on the basis of an updated scientific opinion from EFSA would therefore contribute to increased circularity.

Case study 8: Inclusion of processed proteins derived from edible gelatine, collagen and animal fat production under the definition of PAP

The production of gelatine and collagen fit for human consumption and edible animal fat production produces certain animal proteins in a side stream. They are called gelatine/collagen process derived proteins and greaves meal. Very often these proteins undergo one of the acknowledged methods 1-5 & 7, as described in annex IV of Regulation (EU) No 142/2011. Still legally speaking, to be eligible as PAPs and usable in feed for food producing animals, these co-products should be „re-processed" in accordance with the ABP legislation, although this second processing would not bring any additional safety. By granting legal certainty, that gelatine/collagen process derived proteins and greaves meal can be considered as PAP, these highly digestible and safe proteins could further strengthen the objectives of the strategic autonomy.

Case study 9: Operational thresholds for controls of compliance with "feed ban" provisions

The enforcement of the intra-species recycling ban and the ban on the use of ruminant PAPs for feeding farmed animals is performed via DNA-based PCR methods, which are extremely sensitive. On the other hand, the method is not designed to allow measuring the quantity of non-permitted material. As a result, a 0-tolerance is applied for controls of compliance and a separation of production lines all along the chain is required to avoid any risk of cross-contamination. These constraints combined with a legal insecurity has discouraged operators of the feed chain

to re-use avian PAPs in pig feed and porcine PAPs in poultry feed. Granting a risk-assessed technical tolerance would allow making full use of the potential of species-specific PAPs, an excellent source of protein that would be produced and used in the EU.

Case study 10: Maintaining Category 3 status for ABP containing technically removable foreign bodies

Regulation (EC) No 1069/2009, laying down health rules as regards animal by-products and derived products not intended for human consumption, lists “products of animal origin which have been declared unfit for human consumption due to the presence of foreign bodies in those products” as a reason for the classification as a Category 2 Animal By-Product. Former foodstuff processors commonly apply technologies to remove foreign bodies when they represent a physical hazard, thereby also removing any risk for animal health when used in feed. The status of a Category 3 Animal By-Product when the technical means exist to safely remove a foreign body should be clarified, avoiding the unnecessary administrative reclassification to Category 2 Animal By-Product that would prevent the valorisation in animal feed for food-producing animals.

Case study 11: Expand the definition of fish meal and fish oil

The current definitions of fishmeal and fish oil in Annex I of Commission Regulation (EU) No 142/2011 only allow the use of farmed aquatic invertebrates in their production. The inclusion of low-trophic aquatic invertebrates (such as tunicates, echinoderms and annelids) in the definitions would allow the aquaculture and feed industries to tap into currently underutilized marine resources. The food safety and prion transmission risk profile of marine tunicates, annelids and echinoderms is comparable to that of zooplankton, other marine crustaceans and molluscs, i.e. negligible. Tunicates, echinoderms and annelids are a source of protein and essential marine fatty acids, with a low carbon footprint. Some of these species are suitable for human consumption, but their commercial use as food is limited, resulting in minimal competition between feed and food markets. Amending the definitions of fishmeal and fish oil would make it legally possible to exploit the full potential of emerging sustainable and circular marine biomass resources.

Case study 12: Use in feeds of purified mineral nutrients from incineration ashes

The Animal Feed Regulation (EC) No 767/2009, Annex III, points 1 and 5, effectively prohibit the use in animal feed of nutrients recovered from sewage or manure “irrespective of any form of treatment” or any processing. This hinders the nutrient Circular Economy by preventing the use of safe, high quality mineral nutrients recovered by chemical extraction and purification from sewage sludge or manure or similar incineration ashes. Such purified mineral nutrients are biologically safe (incineration), free of organic contaminants (incineration) and offer lower heavy metal levels (in particular, cadmium) than mineral nutrients from virgin phosphate rock.

Case study 13: Use of dicalcium phosphate from bones in ruminant feed

Dicalcium phosphate (DCP) is a co-product of the manufacturing of edible gelatine or collagen from bones (both bovine and/or porcine bones). Being of animal origin, Dicalcium phosphate (DCP) is so far only allowed for pigs and poultry. Authorising DCP from organic origin, co-product of the gelatine or collagen fit for human consumption manufacturing process, for all farmed animals, will improve the security of supply of feed phosphates and contribute to the circularity goals of the feed chain.

3.2. Other restrictions

Annex I ref number	Topic	Nature of the issue	Suggested action	Time for revision / time for translation into practice	Circularity potential
14	Biomass grown in or fertilised by wastes	Ban on use as feed of biomass obtained from waste water treatment whatever the process performed. Status of biomass grown in or with wastewaters is unclear.	Clarification of the current status of biomass grown on or with waste water and, if appropriate, amendment of Annex III of Regulation 767/2009 and establishment of end-of-waste status.	Short / Short	Very High
15	Risk-based management of contaminants overload	Max limits set for contaminants on feed materials based on 95 percentile, i.e. 5% of resources excluded for feed use per contaminant. If several contaminants, potentially more. Detoxification is permitted under conditions. Mixing (blending) is prohibited for both undesirable substances and pesticide residues.	Risk assessment of the efficacy of mixing / blending depending on types of contaminants (dispersion in consignments, type of contaminant, relevance of safety of products of animal origin and, if appropriate, amendment of Regulation 396/2005 and Directive 2002/32 and or switch from maximum limits to guidance values.	Long / Medium	Very High
16	Maintaining Footnote 1 of Regulation (EC) No 396/2005	The ability to apply a risk assessment approach for the evaluation of the safety of products meant for feed use and containing pesticide residues may be withdrawn, meaning potentially hundreds of thousands tons of products diverted from feed destination.	Maintenance of footnote 1 and clarification of the scope of its application via guidance.	Short / Short	Very High
17	Use of microbial biomass from genetically modified micro-organisms	Conditions for the risk assessment of genetically modified biomass is based on unrealistic worst-case scenarios, leading to non-conclusive opinions. The potential biomass concerned is estimated at several hundreds of thousands tons in the EU.	Upgrade of EFSA worst case scenarios for the assessment of the feed safety risk of GMM biomass.	Medium / Short	High

Case study 14: Biomass grown in or fertilised by wastes

Current EU ABP and waste regulations are unclear as to the status of biomass (and of materials extracted therefrom) grown in or fertilised by wastes. For example, crops grown on a field on which manure or sewage biosolids were used as fertiliser can be fed directly to animals, but algae grown in treated sewage liquor or in manure digestate may be considered a "waste" and could be considered excluded from animal feed (by Animal Feed Regulation 767/2009, Annex III). This concerns a wide range of different biomass production routes: crops or fodder grown on fields fertilised using wastes or manure; algae, duckweed or other plants grown using waste liquors or digestates as substrates; plants grown in wastewater treatment discharge ponds; cultivated bacteria or monocellular protein … Plants or algae growing in or fertilised with waste may retain contaminants or pathogens, so there is a real need to verify that the final animal feed product is safe. The current regulatory framework however fails to address this (waste status unclear and no mechanism to define End-of-Waste). The absence of regulatory certainty prevents investment, process development and roll-out.

Case study 15: Risk-based management of contaminants overload

The EU legislations on undesirable substances (article 5 of Directive 2002/32) and on pesticide residues (article 19 of Regulation 396/2005) prohibit the mixing of non-compliant consignments with other consignments with the objective of lowering the amount of the substance below a maximum limit (ML) / maximum residue limit (MRL) and, consequently, the placing of the mixture on the market for feed use. The consignments that may not be used as feed may represent several millions of tonnes of nutrients that are disposed of outside the feed and food chain. An evaluation of the possibility for the mixing process to the deliver the same guarantees than detoxification process as regards the safety for use of the final mixture should be performed for different combination "contaminant – feed materials", paving the way for targeted authorisations.

Case study 16: Maintaining Footnote 1 of Regulation (EC) No 396/2005

Footnote 1 of Annex 1 of Regulation (EC) No 396/2005 provides that the safety of residues of pesticides in materials destined exclusively to feed by nature and characteristics should be evaluated based on an ad-hoc risk assessment, pending setting specific MRLs. Due to inconsistencies in enforcement across the EU, the EU Commission is considering withdrawing this footnote. Deleting Footnote 1 without first establishing specific MRLs for these products would create legal uncertainty and would be in contradiction with several key EU priority objectives such as minimising waste, food security and competitiveness without benefit in terms of feed safety. It would also contribute to reduce circularity in the food chain by excluding from the feed and food chain high value biomass.

Case study 17: Use of microbial biomass from genetically modified micro-organisms

Microbial biomass obtained as co-products of fermentation is a very suitable source of highly digestible proteins for feed use. However, the competitiveness of the EU fermentation industry lies in the use of genetically modified micro-organisms and the possibility of using the microbial biomass, which requires an authorisation in accordance with Regulation (EC) No 1829/2003 on GM feed and food. At this point in time, no such authorisation has been delivered, due to the inability of EFSA to conclude on the safety of microbial biomass but not because of the GM nature of the micro-organisms. The consequence is that hundreds of thousands of tonnes of microbial biomass are every year exported outside the EU. The risk assessment methodology used by EFSA to evaluate the safety of microbial biomass, in particular the worst-case scenarios for the exposure assessment, should be reconsidered.

Annex 1: Qualitative Criteria for Evaluating the Circularity Potential of Animal Feed

There is no agreed-upon methodology to qualify and even less to quantify the level of circularity of a feed. Below are some criteria that have been considered for the different scenarios specified in the case studies, alongside other indicators, including the substitution of secondary materials for primary materials (in particular imported feeds, and the Critical Raw Material Phosphate Rock).

Food/feed grade status: 'Food grade' means that the quality of the material is such that it meets the expectations of the human consumption market. The concept of 'human inedible feed', as defined by FAO, is linked to this (see "Shaping the Future of Livestock", FAO, 2018, page 5). The notion of food/feed grade status, however, provides a better understanding of the quality of the biomass used by the feed industry, rather than what is regarded as consumable by a human being. When a product is feed grade, it is not considered suitable for the human consumption market, either due to its quality or simply because there is no demand for it.

Most raw materials used in feed production are not food-grade. Typically, ingredients sold for direct human consumption command a higher market price than if they go to feed, so the market drives in this direction. However, there are cases of food grade feed ingredients being sold to a feed operator, although this is normally the result of surpluses for which there is insufficient demand from the human consumption market. Nonetheless, a feed ingredient of feed grade has higher circularity potential than a feed ingredient of food grade.

Proximity to the feed mill: The concept of a circular economy has a geographic dimension, in which the closer the origin of the raw material is to the point of final use (i.e., localness), the 'more circular' it is, in general. This proximity is illustrated by the fact that feed mills are located close to their livestock farmer customers, who, as a starting point, favour the use of local resources. In the case of European feed production, the sourcing of feed ingredients from the European continent is a means to boost the European circular economy and thus European feed autonomy. The proximity of the feed material to the feed mill is an element included in the scope of the Product Environmental Footprint Category Rules (PEFCR) on feed for food-producing animals, in which the emissions related to feedstuff transport are part of the environmental footprint of compound feed production, even though the overall impact on GHG reduction may be limited.

Land use ratio: The principles of a circular economy point towards the use of secondary raw materials, meaning they are produced from other (industrial) processes that are themselves geared towards the production of something else. In terms of agronomic resource depletion, the key element is arable land; the less that is dedicated to the production of a feed ingredient, the more that ingredient is a product of the circular economy and, in principle, the lower the carbon footprint.

The principles of economic allocation from LCA-based methodologies, such as the PEFCRs on feed for food-producing animals, could help to quantify a low carbon footprint for the land use ratio of a feed ingredient because they would indicate the extent to which the feed component of a crop is the economic driver for cultivation. This does not exclude the possibility that, even if the feed component is a key driver of crop cultivation, feed production still plays a role in adding value to the bioeconomy and contributes to sustainable land use. It is, for example, known that feed crops are often grown on land that cannot deliver the nutrients necessary for food grade production (in particular, grass), and feed crops also have a role in good agricultural practices as a rotation crop.

Nutrient efficiency: When considering the circularity of a feed ingredient, the nutritional characteristics matter. These determine the extent to which the nutrients can be expected to contribute to the nutritional profile of the animal product (bearing in mind, of course, that the farm animal, farm system, other feed inputs all play a crucial role), which depends also on their digestibility. In other words, the circularity of a feed ingredient is also determined by the extent to which the nutrients can be absorbed by the farm animal and are not lost through manure. For example, an increasing focus on nitrogen and phosphorus losses would focus attention on the digestion and excretion of these key nutrients by livestock.

Annex 2: Case Studies related to Legal Restrictions on Access to Materials as Animal Feed

1. Use of catering waste for feeding intermediate organisms

Summary of the problem

Regulation (EC) No 1069/2009, Article 11(1)(b), currently prohibits the use of catering waste for feeding farmed animals (except fur animals) due to biosecurity risks. This restriction was decided in the wake of the Outbreak of Foot and Mouth Disease in 2001 which was suspected to have its origin with the feeding of unproperly treated catering waste to pigs and extended to all farmed animals. This restriction limits opportunities for circular economy solutions where catering waste could be safely upcycled through intermediate organisms such as insects.

More widely, the production of insect-based animal feed on several substrates that are currently not authorised as feed for farmed animals would still be a stellar example of circular feed, as the intra-organism upcycling allows for the nutrient recovery of nutrient rich biomass that would otherwise have been lost from the food chain. (FEFAC Circular Feed Brochure, 2022).

Context and Circular Economy Potential

Catering waste constitutes a significant proportion of food waste in the EU, contributing to environmental burdens such as landfill accumulation and greenhouse gas emissions. Intermediate organisms like *Hermetia illucens* (black soldier fly) or yellow mealworm species or earthworms as well as bacteria and algae can effectively upcycle catering waste into high-value biomass, supporting sustainable feed production. The integration of these processes aligns with the EU Circular Economy Action Plan and the Farm to Fork Strategy, promoting innovative waste management practices while reducing reliance on conventional feed sources.

Safety and Food Chain Value

Scientific studies, as highlighted in the SAFE Insects Policy Roadmap, emphasize the significant benefits of using insect larvae, such as *Hermetia illucens*, in the bioconversion of catering waste. These insects exhibit a natural ability to reduce microbial pathogens by up to 99%, greatly enhancing microbiological safety. Additionally, they contribute to the natural decontamination of chemical contaminants, resulting in biomass with contaminant levels well within current feed safety limits. This bioconversion process not only supports sustainable waste management by recycling organic waste and reducing greenhouse gas emissions but also produces a nutrient-rich protein source containing essential amino acids suitable for feed ingredients. Moreover, insect farming requires substantially less water and land compared to traditional livestock, aligning with circular economy and environmental sustainability goals. Regulatory frameworks, supported by scientific evidence, suggest that with appropriate processing, monitoring, and traceability measures, insect-derived feed ingredients from catering waste can safely meet existing safety standards, enabling a viable and eco-friendly alternative protein source.

Regulatory Obstacle and Proposed Solutions

- **Current Regulation:** Article 11(1)(b) of Regulation (EC) No 1069/2009 bans the use of catering waste in farmed animal feed (except for fur animals).
- **Proposed Revision:** Introduce risk-based exemptions for the use of catering waste in controlled intermediate organism systems based on an EFSA risk assessment, with appropriate risk management measures with processing and hygiene standards as appropriate and tolerance for the presence of ruminant proteins.

2. Use of Former Foodstuffs Containing Meat and/or Fish for Feeding Insects

Summary of the problem

Former foodstuffs, as defined by Regulation (EU) No 68/2013, refer to foodstuffs that are no longer intended for human consumption for practical or logistical reasons or due to problems of manufacturing or packaging defects or other defects and which do not present any health risks when used as feed. According to Regulation (EC) No 1069/2009, Article 10(f), these can include products of animal origin or foodstuffs containing such products, provided they pose no risk to public or animal health. Regulation (EU) No 142/2011, Annex X, Chapter II, Section 10, allows the use of certain **Category 3** materials in animal feed, provided that these have undergone processing in accordance with EU food hygiene standards, such as milk, eggs and their derived products, or honey. At the same time, Regulation (EU) No 142/2011, Annex X, Chapter II, Section 10 currently still prohibits the use of former foodstuffs containing **meat and fish**—including ready meals, canned meat or fish, and derived products—in farmed animal feed (IPIFF Good Hygiene Practices, 2024).

However, farmed insects, such as black soldier fly larvae and mealworms species, can efficiently upcycle these products into suitable feed materials, thereby reducing food waste while producing high-quality protein and lipids for animal feed applications.

This case study underscores the need for regulatory adaptations to facilitate the bioeconomy and maximise the circularity potential of insect while maintaining stringent safety controls. These policy changes could unlock significant sustainability benefits, reducing food waste and enhancing resource efficiency in the EU feed sector. This case study aims to discuss a possible regulatory pathway and timeline towards the future EU authorisation for feeding farmed insects with meat and fish containing former foodstuffs.

Context and Circular Economy Potential

Former foodstuffs containing meat and fish represent a significant resource in the EU's food system. Using such inputs in insect farming would reduce the food waste burden, and improve the circularity of our food systems by allowing direct access by the European livestock, aquaculture and pet food sectors of valuable biomasses. In turn, such reform would contribute to optimising the carbon footprint of insect-derived products. Redirecting these materials towards insect farming could strengthen sustainable feed production, reducing dependence on imported protein sources (e.g. soy and fishmeal) while contributing to the EU's Green Deal and Zero Waste objectives. These products are economically competitive, being (occasionally) used in energy recovery (low competition materials). If those could be used as insect rearing substrates, this could greatly reduce input costs of European insect producers. Insect-derived proteins and products offer comparable or superior nutritional attributes to conventional feed ingredients (especially when compared with high protein content materials), making them a viable alternative.

Safety and Food Chain Value

Ongoing research and risk assessments indicate that properly managed and processed insect farming systems effectively address feed safety and health risks implied by the presence of potential pathogens present in former foodstuffs. (*Benestad et al., (2024; Malzahn et al,2024)*; *Olesen et al 2022)*. Existing studies, including the EFSA risk opinion published in 2015, suggest that the likelihood of prion transmission from insects reared on substrates containing former foodstuffs of animal origin to non-ruminant livestock is minimal, indicating a negligible risk of new bovine spongiform encephalopathy (BSE) cases[8]. Existing studies

[8] EFSA BIOHAZ Panel (2021). *Scientific Opinion on the safety of the animal feed chain regarding the BSE-related risk posed by insects reared on substrates including former foodstuff of animal origin*. EFSA Journal, 19(10), 6879.

suggest that the likelihood of prion transmission from insects reared on such substrates to non-ruminant livestock is minimal, indicating a negligible risk of new bovine spongiform encephalopathy (BSE) cases. Research has also shown that heavy metals remained below the EU feed regulations (Safe Insects Policy Road Map,2025).

Thermal and microbial inactivation during digestion, combined with post-harvest processing such as heat treatment and defatting, ensure product safety. Additionally, proper risk management procedures and compliance with HACCP procedures further mitigate heavy metal and microbiological risks, ensuring compliance with EU feed and food safety standards.

Regulatory Obstacle and Proposed Solutions

- **Current Regulation:** Annex X, Chapter II, Section 10 of Regulation (EU) No 142/2011 restricts the possibilities to feed farmed animals (excluding fur animals) with foodstuffs containing products of animal origin to non-meat and fish containing materials
- **Proposed Revision:** Amend the aforementioned Regulation (e.g. by amending annex X, chapter II, section 10) to allow controlled use of these materials as feed for farmed insects, under specified processing conditions, ensuring pathogen inactivation and traceability.

Van der Fels-Klerx, H.J., Camenzuli, L., Belluco, S., Meijer, N., & Ricci, A. (2018). *Food safety issues related to uses of insects for feed and food*. Comprehensive Reviews in Food Science and Food Safety, 17(5), 1172–1183.
EFSA BIOHAZ Panel (2015). *Scientific Opinion on the risk profile related to production and consumption of insects as food and feed*. EFSA Journal, 13(10), 4257.

3. Authorisation of intraspecies re-use of animal proteins in feed

Summary of problem

Following the BSE crisis, the EU set harmonised rules for the processing of animal by-products (ABPs) in the first European Animal-By-Product-Regulation (EC) No 1774/2002 (ABPR). At the time, BSE cases were attributed to the use of infectious ruminant material in cattle feed and this led to a precautionary prohibition of feeding an animal species with proteins from the same species. Another reason for this precautionary approach is that proteins that have not undergone safe processing can cause a disease outbreak if fed to the same species. This provision was maintained when recasting the ABPR in 2009 (article 11, par. 1 a) of Regulation (EC) 1069/ 2009). This measure is not widely implemented outside Europe as far as non-ruminant species are concerned.

In practice, this prohibition impacts the whole of the supply chain, requiring separation of facilities at slaughterhouses, rendering lines, transport and feed mills depending on the processed animal species. Mandatory testing and surveillance at every step of the chain is administratively onerous. The zero-tolerance policy and the use of an extremely sensitive DNA-based PCR method for these official controls puts the whole chain at risk of non-compliance: just a few fragments of DNA of a species in a feed destined to the same species, due to unavoidable cross-contamination upstream in the chain DNA can be detected with this method. The slow lifting of the ban on feeding avian PAPs to pig and vice versa is largely due to these constraints deriving from the intra-species recycling ban[9].

These restrictions mean that smaller slaughterhouses, butchers and retailers are unable to get maximum valorisation from their ABPs in feed applications since collecting small volumes from many sources is too risky for renderers producing single-species processed animal protein (PAP). This puts meat chain SMEs at a disadvantage, as their profitability relies on maximising 5th quarter valorisation, which can vary from 30-45%, depending on the species.

Many potential feed grade animal proteins cannot be used in feed due to traces of other species which limits their use to pet food or fertiliser.

A third of EU PAP production is exported to countries which do not impose a ban on intra-species re-use in feed. This restricts the EU feed protein independence and maintains its reliance on feed protein imports from third countries, to supplement its own plant-based feed protein supply.

Instead of using natural resources with the optimum amino acid profile, more man-made amino acids are used in feed, the bulk of which are imported from China which brings associated carbon emissions.

It is now appropriate to reconsider the proportionality of this measure and its scientific justification, based on the adverse impacts of the ban on intra-species re-use in feed and the fact that, outside the EU, not a single outbreak of an animal disease has been attributed directly to the use of animal proteins from a species for feed animals of the same species over the last 40-50 years, despite the processing standards outside the EU usually being less stringent than in the EU.

Context and Circular Economy potential

ABPs are sourced from the whole meat supply chain and if not processed into safe, valuable, sustainable products, this natural resource is lost and must be disposed of as waste. Utilising proteins from category 3 ABPs in feed maximises the valorisation of the animal. Due to their higher protein content and high digestibility compared to plant-based feed materials, EU PAPs

[9] In 2024, it is estimated that no more than 10 feed establishments out of 3,000 use avian or porcine PAPs.

can help reduce the EU dependency on less sustainable protein imports, securing the EU meat supply chain and lowering its carbon footprint.

There is no competition for PAPs between feed and food. ABPs are by definition by-products that are not fit for, or not destined for, human consumption; therefore, ABPs and products thereof cannot return into the food chain.

Rendering plants are mostly in rural areas close to the slaughterhouse and cutting plants where the ABPs are sourced, and the farms where animals are raised and fed. This enables PAPs in feed to close the circular bioeconomy loop on a local level. This efficient use of land gives PAPs a **high land use ratio** (i.e., high output relative to land used). Additionally, because PAPs have a **very high protein content** (ranging from 50% to 95%), they can **replace larger volumes of plant-based proteins**, which typically have lower protein density.

Furthermore, it is widely acknowledged in the animal nutritionist's community that animal proteins of one species provide the perfect amino acid profile for the same species - the amino acid profile of poultry / pork PAP fits best for poultry / pork diets, respectively. The use of a single species PAP best meets the needs of the animals of that species and maximises the use of proteins / amino acids for feed.

Safety and food chain value

Globally, WOAH does not recommend a ban on intra species re-use in feed and even in countries like in Brazil, South-West US, South-East Asia, China etc. with high production of pig and poultry, the national Feed and Food Safety Authorities do not restrict the use of animal proteins unlike the EU.

For the production of PAP, all category 3 raw materials are sourced from animals slaughtered for and fit for human consumption. The categorisation of the ABPs is established for over 20 years and widely understood in the EU meat supply chain. All EU ABPs processing plants are approved by Competent Authorities and guarantee the safety of the derived products. The infection of an animal with pathogenic agents from the same species is prevented by the stringent application of safe sourcing and safe treatment of the ABPs.

Regulatory obstacles and proposed solutions

The lifting of the ban on feeding non-ruminants species with proteins of the same species would require a withdrawal of Art 11 point 1 a) of Regulation (EC) 1069/ 2009 by ordinary procedure, as well as an adaptation of Annex IV of the TSE Regulation (EC) No 999/2001 accordingly. Such a procedure would likely require a consultation of EFSA.

It would leave untouched the ban on feeding processed animal proteins to ruminants, which is provided for in Article 7 of the TSE Regulation (EC) No 999/2001, in line with the WOAH recommendation.

4. Use of ruminant PAP in non-ruminant feed

Summary of the problem

Annex IV of Regulation (EC) No 999/2001[10], last amended by Regulation (EU) 1372/2021 provides for a prohibition of the use of ruminant PAP in non-ruminant feed. Only certain PAPs derived from non-ruminant animals can be used in feed for certain farmed animals other than ruminants. These measures are usually known as “feed ban” measures. The general ban on PAPs in ruminant feed is not questioned in this paper.

While the two TSE road maps from 2005 and 2010 recommended a regular re-assessment of the feed ban, this has been the case only occasionally during the past 10 years. It is therefore appropriate to initiate a re-assessment of certain feed ban provisions, including the risk with the use of ruminant PAPs in feed for non-ruminant food producing animals such as fish, poultry and pig.

While former EFSA opinions based their risk assessments on the possible cross contamination at the level of ABP processing plants, feed mills and transports handling material of multiple species, this new risk assessment should take into account the detailed strict rules for feeding PAPs as laid down in the TSE-regulation and the experience gained with the partial lifting of the feed ban in 2021[11]. The assessment may focus only on the risk in feed mills producing non-ruminant feed, which would be the only ones authorised to use these PAPS, considering the total ban on the use of PAPs in ruminant feed and the general approach adopted by the risk managers for the partial lifting of the feed ban in 2021.

Based on the experience gained and considering the control measures in place along the PAP-feed chain and considering the negligible BSE-risk status of almost all of the EU, a favorable EFSA opinion may be reasonably expected.

Context and Circular Economy potential

Ruminant PAPs may not be fed to food producing animals. They are directed, either as “pure” ruminant PAPs or mixed with PAPs from other animal species, to use as pet food, fertiliser, export or even incineration. Smaller amounts of greaves meal and blood meals, blood products from ruminant sources and avian or porcine PAPs which contain traces of ruminant DNA may not be used either in feed for food producing animals.

The use of PAP containing ruminant species in feed would allow optimising the feed use of European Animal By-Products and enhance the sustainability of the EU bio-economy and the circularity of the feed sector. It would also strengthen the EU feed protein autonomy and reduce the need to import feed from third countries and the related carbon foot print.

There is no competition for PAPs between feed and food. ABPs are by definition by-products that are not fit for or not destined for human consumption so ABPs and products thereof cannot return into the food chain.

Rendering plants are mostly in rural areas close to the slaughterhouse and cutting plants where the ABPs are sourced, and the farms where animals are raised and fed. This enables PAPs in feed to close the circular bioeconomy loop on a local level. This also means the land use ratio of PAPs is high while their high protein content, which varies between 50 and 95% enables PAPs to replace more plant proteins by volume. Like poultry and porcine PAP, ruminant PAP contains a lot of essential amino acids and highly digestible phosphorus. Its use in feed is worldwide accepted.

[10] The same Regulation provides in its article 7 that the feeding to ruminants of protein derived from animals is prohibited, which is not questioned in this paper.
[11] Regulation (EU) 1372/2021 provided for a re-authorisation of avian PAPs in pig feed, porcine PAPs in poultry feed and insect PAPs in pig and poultry feed.

Safety and food chain value

Given the fact that the number of positive testing of relevant classical BSE cases in the EU is close to zero for all Member States and for many years, the risk that contaminated tissues of ruminants would enter the feed chain should be negligible. All EU Member States hold the status of negligible BSE risk country under the WOAH classification, with the exception of Greece which currently holds the “controlled BSE risk” status, but should be soon upgraded as negligible BSE-risk country.

The processing standards laid down in the ABP implementing Regulation (EC) 142/2011 provide additional guarantees of elimination of the TSE agent if present.

A lot of experience has been gained concerning the minimisation of the risk of contamination of ruminant feed with PAPs in the wake of the lifting of the ban on the use of porcine PAPs in poultry feed and avian PAPs in pig feed and the restrictions imposed as risk management measures, in particular regarding the separation of facilities and transport means. This should provide sufficient confidence that the same measures would bring the same level of security in case of re-use of ruminant PAPs in feed for non-ruminant food producing farmed animals.

In many countries outside the EU, even those which had indigenous BSE cases like the US or Canada, the use of ruminant proteins in feed for non-ruminants is permitted, although with often no categorisation of raw materials, no removal of Specified Risk Materials, no dedicated processing or transport and no specialisation of feed mills required. Still, no increase in classical BSE cases has been reported in these countries, showing that it may be possible to use safe ruminant PAPs in non-ruminant feed without endangering the health of the EU cattle population.

Regulatory obstacles and proposed solutions

A modification of the Annex IV of Regulation (EC) No 999/2001 would allow the safe use of ruminant PAP in non-ruminant feed. Besides pure ruminant PAP, specific risk management measures for the use of PAPS from mixed species, but free of one species (e.g. avian-free PAP for poultry feed or pork-free PAP for pig feed), should be established, in line with the spirit of article 11 point 1a) of Regulation (EC) No 1069/2009.

5. Export of cat 2 MBM (method 1) as feed to third countries

Summary of problem

Regulation (EC) No 1069/2009 on Animal By-Products separates animal by-products in three categories. Category 1 contains materials presenting a risk that cannot be reduced by classical heat treatment in rendering systems. These category 1 materials shall be removed out of the feed and food chain, i.e. disposed of or used as energy substitutes or for biofuel production.

Category 3 includes materials obtained from healthy slaughtered animals being declared safe and fit for feed use. These “feed-grade” materials can be used after processing for a huge variety of purposes like feed, fertiliser, pet food, biofuels, oleochemical industry (e.g. detergents, soaps and lubricants) etc.

Category 2 materials are materials that can be processed into safe products by classical heat treatments in category 2 rendering plants. For further use in fertiliser, biofuels or oleochemical products, the raw materials must be processed by method 1 (according to annex IV of Regulation (EC) No 142/2011). This so-called pressure sterilisation is the highest processing standard in the Regulation. It requires a downsizing to 50 mm and a heat treatment at 133°C at 3 bar for 20 minutes.

Despite the fact that Category 2 materials can be processed into safe products, they are excluded from the feed chain as they do not comply with the European food law, following the principle that all products must be safe “from farm to fork” at all stages. As Category 2 may contain materials from animals which died on farms or materials which are not fit for feed use (Category 3) at the slaughterhouse, Category 2 materials cannot be used as feed for farmed animals in the EU.

Nevertheless, the produced fats and proteins (so-called Category 2 Meat and Bone Meal[12]) do fully comply with the minimum requirements laid down in the definition given by WOAH (World Organisation of Animal Health) to MBM suitable for feed use according to its Terrestrial Animal Health Code. Category 2 MBM produced according to the EU standard should therefore be considered as exceeding the minimum standard applicable in most third countries and their export to these countries should be permitted as a contribution to the global feed protein supply. Indeed, most third countries do not require processing standards aligned with EU method 1 (pressure sterilisation) and their definition of Specified Risk Material (SRM) often contains less animal tissues than the SRM definition in the EU. Using category 2 MBM as feed in countries which acknowledged this as safe, can be a significant step to globally reduce the carbon foot print of feed and land use change and avoid wastage of precious nutrients.

Context and Circular Economy potential

A lifting of the ban on export of Category 2 MBM would not directly support the feed chain in the EU, but can reduce the environment foot print of the global meat chain. Moreover, today a lot of Category 2 materials are collected and processed together with Category 1 materials, due to limited outlet in the EU. In 2023, approximately one third of the volume of Category 2 materials available on the EU market was processed by the 25 dedicated Category 2 processing lines operated by EFPRA members. According to the waste hierarchy, the use of Category 2 MBM in feed is preferable to use as fertiliser or disposal / combustion as Category 1. Therefore, an opening of the export market would encourage EU renderers to invest more in such production lines and keep resources of high nutritional value within the global feed and food chain, and therefore contribution to the global circular economy.

The average protein content of Category 2 MBM exceeds 60%. This higher protein content compared to Category 3 Processed Animal Proteins is due to the nature of Category 2 Animal

[12] Although not explicitly mentioned in the definition of Meat and Bone Meal in Regulation (EC- NO 142/2011), Meat and Bone Meal from Category 2 materials do in general not include manure.

by-products, which include whole animals, i.e. including meat which would normally be removed if the animals would have been slaughtered for food production. These meat proteins contain essential amino acids and phosphorus.

According to the EU definition, Category 2 MBM is produced from material not fit for human consumption. Therefore there is no competition between food and feed. Additionally, its upgrading from fertilizer use to feed use can indirectly improve the carbon foot print of the meat production at global level.

By nature, export markets are not local. However, for third countries dependent on the global market for their feed protein supply, importing feed materials highly concentrated in proteins like Category 2 MBM would mean minimising the volumes of traded materials compared to imports of ingredients with lower protein value such as soybean meal. Category 2 MBM can indeed replace 1,5 times the volume of soy proteins.

Safety and food chain value

Category 2 MBM are fully compliant with the minimum safety standards of WOAH. The obligation to undergo a pressure sterilisation treatment and the absence of high-risk materials such as SRM and Category 1 materials guarantee an even higher safety for this MBM than other MBMs produced worldwide according to WOAH standards. Even if they cannot be used in the EU as feed, Category 2 MBM can play an important role in the global food chain and help reducing the pressure on demand for plant-based feed protein and therefore on land use.

Regulatory obstacle and proposed solutions

A re-authorisation of exports of Category 2 MBM for use as feed would require an amendment of Article 21 of Regulation (EC) No 142/2011. Similar to the export of ruminant containing PAP, a direct shipment from the rendering plant to the border inspection point would provide additional guarantees of compliance of such export with EU requirements. recommended. Additional requirements regarding e.g. the clear exclusion of manure from the type of by-products eligible for production of Cat 2 MBM meant for export to Third Countries for feed use may be required.

6. Use of former foodstuffs containing ruminant gelatine in feed for ruminants

Summary of problem

Former foodstuff processing entails the conversion to feed of foodstuffs no longer destined to human consumption due to commercial reasons. Foodstuffs like candy and cakes can contain gelatine, where food manufacturers may prefer to use ruminant origin over porcine gelatine, in light of religious convictions of some consumers or for technical product quality reasons. Article 7, paragraph 1, of Regulation (EC) No 999/2001 mentions the prohibition for feeding ruminants with proteins from any animal species. This includes ruminant gelatine. Regulation (EC) No 999/2001 Annex IV Chapter II allows the use of ruminant gelatine to feed non-ruminants species. However, because of the zero tolerance for the presence of ruminant gelatine in ruminant feed, former foodstuff processors prefer not to process former foodstuffs containing ruminant gelatine to avoid the risk of cross-contamination with feed destined to ruminants. Dedicated production is complicated because most former foodstuff processors only have one, multi-species production line, and also compound feed manufacturer clients use processed former foodstuffs as an ingredient for production of ruminant and non-ruminant feed. Additionally, former foodstuff processors often do not know the final animal species outlet for their final product, as compound feed manufacturers keep the flexibility to incorporate the processed former foodstuffs where it is most suitable at that moment.

Context and Circular Economy potential

There are significant quantities of ruminant-gelatine containing foodstuffs no longer destined to human consumption that could be repurposed as feed for food-producing animals. At food production level, this repurposing can enable food waste prevention. At feed production level, former foodstuffs serve as an alternative ingredient to land-requiring feedstuffs, such as cereal grains. Increased use of former foodstuffs in animal feed, with its upcycling of nutrients in the food chain, therefore ensures the further integration of the livestock sector into the circular bioeconomy.

Foodstuffs become former foodstuffs destined to feed because the commercial value for the human consumption market was lost. It concerns predominantly unfinished products and intermediates, which were produced from food grade / high quality raw materials, but which are not consumable by people in their conditions from a practical or taste perspective. There are also finished, surplus foodstuffs, where a food manufacturer will on first instance look for food bank donation possibilities. From a quality perspective former foodstuffs are of food grade nature, however from a practical and logistical point of view the animal feed outlet becomes the option with highest food chain potential.

Former foodstuffs predominantly originate from food manufacturers and retailers in relatively close proximity to the former foodstuff processing facilities and are sold to local compound feed manufacturers. Their use in feed contributes therefore to local circular economy.

Processed former foodstuffs are made from high quality raw materials and have a high nutrition value for animals. This is also due to the composition of processed former foodstuffs, containing starch and oils, which typically would still need to be blended into cereal-based raw materials used in feed such as wheat or maize.

Safety and food chain value

For the approval of ruminant gelatine in feed for non-ruminant animals, the European Commission requested EFSA to assess the BSE contamination risk to ruminants due to alleged cross-contamination. On 28 October 2020 EFSA published its opinion “Potential BSE risk posed by the use of ruminant collagen and gelatine in feed for non-ruminant farmed animals”. The assessment considered that, even in the scenario where the estimated

undetected BSE cases in the EU were used for the production of collagen or gelatine (either using raw materials fit for human consumption or Category 3 ABP raw materials), the probability that no new case of BSE in the cattle population would be generated through any of the risk pathways is 99–100% (almost certain).

In this context, it must be understood that ruminant gelatine on average is estimated to be included as an ingredient as a small fraction (± 2%) in the production of candy or pastry, with the exception of certain types of confectionery (up to 8% gelatine). Industry estimates suggest that candy or pastry represent about 5-10% of the total share of former foodstuffs used for feed. The extent to which they can contain ruminant gelatine depends on the region, where in regions with 'large' pig populations and 'low' consumer concerns as regards the presence of porcine gelatine in food, it is estimated that less than 20% of the candy/pastry contains ruminant gelatine. Processed former foodstuffs are at maximum incorporated to a 5-10% inclusion rate in a compound feed ration. Under no circumstances is ruminant gelatine fed in bulk to farm animals.

Despite the approval of ruminant gelatine in feed for non-ruminants in 2021, food manufacturers and retailers are still requested to keep separate ruminant-containing foodstuffs no longer destined to human consumption, due to the lack of potential for a dedicated production chain. In the scenario where these material flows end up in feed for ruminant farm animals, this would trigger a recall, which is disproportionate. In addition, the detectability of ruminant gelatine, as regards being able to distinguish it from fully permissible ruminant protein such as milk, is a methodological challenge, meaning controls rely mostly on labelling information.

Regulatory obstacle and proposed solutions

The derogation granted in Regulation (EC) No 999/2001 Annex IV Chapter II for the feed use of ruminant gelatine to non-ruminants needs to be extended to ruminants via an implementing act. EFSA might need to be requested to assess the BSE risk for ruminants based on the intentional incorporation of ruminant gelatine, based on the same risk pathways as for the opinion published in 2020. The effect on the market will be immediate once the legislation is reviewed as this relaxation does not suppose any investment in logistics.

7. Use of fishmeal in feed intended to ruminants

Summary of problem

Fishmeal is a highly valuable and digestible protein source with a well-balanced amino acid profile. However, its use in ruminant feed is prohibited under the TSE Regulation (Regulation (EC) No 999/2001 Annex IV), despite minimal health risks as assessed by EFSA. Reconsidering whether this restriction is still justified in light of current scientific evidence would be a first step towards an alignment of regulations with a circular economy approach, allowing for the optimized use of sustainable protein sources while maintaining high safety standards.

Feed Circularity potential

Proportionate measures based on sound science are of paramount importance to ensure the non-recurrence of BSE or the emergence of a new TSE agent in farmed animal populations. Since the total EU-wide suspension of the use of processed animal protein (PAP) in feed for all food-producing animals in 2001, some measures have already been reviewed, and current knowledge and best practices may allow the authorities to go further in the review process.

The fish caught for fishmeal are mainly small, oily, short-lived, fast-growing fish with little demand for human consumption. In addition, approximately 40% of the raw material used to produce fishmeal in Europe comes from by-products of the fish processing industry that are no longer fit for direct human consumption. Therefore, the use of these fish by-products to produce feed ingredients offers the highest food chain potential.

Fishmeal is recognized as a superior protein source because of its rich and balanced amino acid profile. Containing all the essential amino acids required for optimal growth and development, fishmeal provides a complete and highly digestible protein source. The digestibility of fishmeal protein is a critical factor in ensuring that the amino acids are efficiently absorbed and utilized by the animal, promoting growth and improving metabolic efficiency while minimising nutrient losses.

Finally, fishmeal production does not require any agricultural land, making it a highly efficient protein source from a land use perspective. In addition, the increasing use of by-products results in a low Life Cycle Assessment (LCA) value for European fishmeal.

Safety and food chain value

The TSE Roadmap 2 identified the potential to revise feed bans in line with scientific evidence. In its opinion, EFSA stated[13] that the potential health risks associated with feeding fishmeal to ruminants in respect of TSE transmission are minimal or non-existent. In addition, modern Hazard Analysis and Critical Points (HACCP) plans in fishmeal production ensure high safety standards, further supporting regulatory updates.

Regulatory pathway and proposed solutions

Commission Regulation (EC) No 956/2008 amending Regulation (EC) No 999/2001 allows the feeding of young ruminants with fishmeal, but the use of fishmeal in feed for ruminants is still prohibited.

[13] Opinion of the Scientific Panel on Biological Hazards on a request from the European Parliament on the assessment of the health risks of feeding of ruminants with fishmeal in relation to the risk of TSE, *The EFSA Journal* (2007), 443, 1-26 (https://doi.org/10.2903/j.efsa.2007.443)

8. Inclusion of processed proteins derived from edible gelatine, collagen and animal fat production under the definition of PAP

Summary of problem

- In short:
  - Only Category 3 Animal By-Products processed into Processed Animal Proteins (PAPs) in accordance with the requirements of the ABP legislation may be used for feeding food producing animals.
  - Co-products from gelatine/collagen fit for human consumption and edible fat processing are often processed in accordance with the processing standards required by the ABP legislation for the production of PAPs.
  - Still legally speaking, to be eligible as PAPs and usable in feed for food producing animals, these co-products should be „re-processed“ in accordance with the ABP legislation, although this second processing would not bring any additional safety.
- Background

The production of gelatine and collagen fit for human consumption and edible fats is a complex industrial process for which the raw materials as well as the production processes (e.g. with defined HACCP controlled heat treatments) are well defined by Regulation (EC) No 853/2004, Annex III, Section XII, Section XIV and Section XV, respectively. Besides the main products, certain types of proteins products are produced in a side stream. These are called gelatine/collagen process derived proteins and greaves meal. Very often these proteins undergo one of the acknowledged methods 1-5 & 7, as described in annex IV of Regulation (EU) No 142/2011.

These protein products are all processed from raw materials originating from animals which were found fit for human consumption following ante- and post-mortem inspection and not from category 3 material. As a result, these proteins do not fall under the definition of PAP. The regulation (EU) No 142/2011 needs to be amended to valorise these proteins sources for animal feed.

The use of these “edible” processed proteins from food grade material, i.e. safer sourcing than category 3, should not be more limited than the other PAP.

The TSE regulation (EC) No 999/2001 allows only certain PAP’s to be used in feed. All the above-described processed proteins are therefore not permitted for use as feed for farmed animals. Their use is currently limited to pet food (where they are handled like raw ABP according to art 10(e) of Regulation (EU) No 1069/2009). To use these processed proteins in farmed animal feed or fertiliser, they would need a reprocessing as an ABP in a category 3 plant. Their acknowledgement as PAP (if processed with one of the methods according to annex IV of Regulation (EU) 142/2011) would allow a better use in farmed feed, pet food as well as in fertilisers.

Context and Circular Economy potential

Due to their digestibility these three above mentioned processed proteins have a high potential in feed for non-ruminant animals. Any processed protein that is used as feed instead of fertiliser, can reduce the import of plant and animal proteins from third countries and save energy. Additionally, to the protein content, they supply other nutrients like phosphorus and micro-nutrients. The use of these highly digestible feed will generally result in lower nutrient losses in manure and thus reduce the environmental impact of feed digestion.

Some processed proteins cannot be used in food because of missing properties like colour and taste. A competition between food and feed is therefore negligible. Most of them are already used outside the food chain.

The processing of slaughter by-products for the production of gelatine fit for human consumption, collagen fit for human consumption and edible fat, is very often located in areas where enough raw materials from slaughterhouse and cutting plants can be guaranteed. Both are consequently established in areas where animals are raised and produced. So, it can be assumed that animal production and processing of animal products are locally connected, and transport distances are low.

As the above-mentioned processed proteins are like PAPs produced from by-products from the meat chain, their land use ratio is high. Additionally, greaves meal for example has a protein content of 70-80%. It can therefore replace nearly twice the volume of soy.

The above-mentioned processed proteins are all high-quality feed ingredients. The digestibility of proteins and phosphorus in these three processed proteins is high. Another heat treatment step to transform them into a PAP would destroy at least the protein quality and its digestibility.

Safety and food chain value

For the production of gelatine fit for human consumption, collagen fit for human consumption and edible fat, all raw materials must be derived from animals which have been slaughtered in a slaughterhouse and whose carcases have been found fit for human consumption following ante-mortem and post-mortem inspection. In general, the transport to the processing plant is cooled. In the other case the transport fulfils the maximum transport duration defined in Annex III of Regulation (EC) No 853/2004 (sections XII, XIV and XV). The plant itself is approved under food hygiene rules, i.e. according to the Regulation (EU) No 853/2004. At the reception the raw material is visually inspected and sorted. The raw material undergoes several processing steps, before the extraction/separation of gelatine, collagen and fat. These processing steps may include high temperatures, addition of acids and/or alkaline treatments sufficient to inactivate transmissible animal disease if present. All the above exceeds the processing requirements of ABPs in terms of quality and freshness of the raw material (safer sourcing).

Regulatory obstacle and proposed solutions

For example, in an edible fat melting plant, the food grade fat can be directly downgraded to a Category 3 fat and sold to feed (or other markets) without any further processing in a Category 3 plant. Therefore, if food grade proteins are processed under food grade requirements and following the ABP-regulation processing conditions at the same time, the food operator shall be given the chance to declare these processed proteins as PAP.

9. Operational thresholds for controls of compliance with "feed ban" provisions

Problem definition:

- Legal situation

Article 7 of Regulation (EC) No 999/2001 (TSE Regulation) provides for a ban on feeding animals with proteins of ruminant origin, with some exceptions. Article 11 of Regulation (EU) 1069/2009 (ABR Regulation) provides for a ban on feeding of terrestrial animal of a given species (except fur animals) with processed animal proteins (PAPs) of the same species.

Compliance with this prohibition is controlled according to standard operating procedures involving a combination of analysis by microscopy and PCR methods, as appropriate. The microscopy method is used to identify the presence of bone spicules as an indicator of the presence of PAPs of land animal species in feed that is not expected to contain any. In case the results of the microscopic test are negative, the feed is regarded as compliant with the feed ban provisions. In case the result is positive or in case the feed is known to contain PAPs of land animal species, an analysis of the presence of DNA is performed based on a PCR method, to identify the species of origin of the bone spicules. The PCR method is extremely sensitive and allows the detection of minutes amounts of DNA (i.e. 10 DNA target strings), which, in absence of tolerance, is considered as a non-compliance. This concerns the presence of ruminant DNA in any feed for food producing animals and the presence of porcine DNA in pig feed and avian DNA in poultry feed. The sensitivity of the method is so that it may also detect the presence of DNA from animal origin that could be present via feed ingredients lawfully present, e.g. milk, feed materials from vegetable origins such as grain crops or PAPs from another species (by-products from poultry fed with Porcine PAP might include traces of pork DNA in feathers, intestine etc. ending up in avian PAPs).

Considering the absence of tolerance and the fact that cross-contamination between batches of feed for different animal species produced on the same production line is unavoidable, the legislator conditioned the use of porcine PAPs, avian PAPs, insect PAPs and fish meal to separation of production lines so that a production line used to produce feed containing PAPs from a given species may not produce a feed for a species for which the use if the PAP is not permitted.

Due to these restrictions and that, even when applying best practices all along the chain, the risk of a positive result is real (i.e. presence of ruminant DNA in avian or porcine PAPs or fish meal or feed containing them, presence of porcine DNA in porcine PAPs or pig feed, presence of avian DNA in avian PAPs or poultry feed, presence of DNA from any species in ruminant feed), operators prefer renouncing to production and / or usage of species-specific PAPs. This explains why, since 2021 (date of re-authorisation of feeding of pigs with avian PAPs and poultry with porcine PAPs), only a very limited quantity of porcine PAPs and avian PAPs meeting the requirements of Annex IV of Regulation (EC) 999/2001 is available on the EU market whereas the potential is of several hundreds of thousands of tons. Only a dozen of compound feed manufacturers use these PAPs in the EU, mostly porcine PAPs for feeding poultry.

- Destination of porcine / avian PAPs not used in poultry / pig feed

PAPs made of by-products from porcine and avian origin not meeting the Porcine / Avian PAPs standards may be used for feeding fish and pets. However, the supply exceeds the demand from both outlets, meaning that the rest is being exported to Third Countries or disposed of outside the feed chain.

Feed circularity potential

A more proportionate interpretation of the so-called "technical-zero" would stimulate the re-use of avian and porcine PAPs by feed manufacturers. Due to their high digestibility porcine

and avian PAPs are perfectly designed for optimal use in feed for resp. poultry and pigs. Any processed protein that is used as feed instead of being exported or used as fertiliser, can contribute to minimise EU dependency in proteins and reduce the volumes of import of plant proteins from third countries, thereby saving also energy. With protein contents ranging from 50 to 95%, animal proteins can replace a larger volume of plant protein, mostly soybean meal. In addition to protein, they provide other nutrients like phosphorus and micro-nutrients. The use of highly digestible feed will generally lead to less excreta, and thus reduce the environmental impact to air and soil.

Safety and food value chain

There is no scientific justification for a 0-tolerance regarding the presence of carry-over residues of processed animal proteins from a given non-ruminant species into feed destined to the same species. While the detection of ruminant DNA is based on an EFSA risk assessment for infectious BSE agents, the intra-species recycling ban is indeed not supported by an assessment of the risk with the presence of proteins from a non-ruminant species in feed for the same species but by a precautionary approach. By the way, rendered fats, including ruminant fats, are not subject to the ban on intra-species recycling and a tolerance of 0.15% is set for the presence of insoluble impurities, which may include proteins. No limit is set for the presence of soluble proteins.

Processed animal proteins can only be produced from category 3 materials and are required to be processed according to a predefined list of processes that have been proved to eliminate pathogenic viruses.

Regarding TSE, based on the contents of two scientific opinions issued by the Panel on Biological Hazards (BIOHAZ) of the European Food Safety Authority (‘the Authority’) on 24 January 2007 and on 17 November 2007 respectively, the TSE Road Map 2 acknowledges that no TSE have been identified as occurring in non-ruminant farmed animals under natural conditions.

The Quantitative Risk Assessment performed by EFSA in 2018 estimated a total BSE infectivity four times lower than that estimated in 2011, with less than one new case of BSE expected to arise each year. The same QRA made an attempt to evaluate the probability of a feed containing ruminant PAP not to be detected in case of an increase of the cut-off value for concluding to a non-compliant result of analysis when applying the ruminant DNA based PCR method, but did also stress that testing for the presence of ruminant DNA using the current ruminant qPCR method does not enable discrimination between bovine material that has been added legitimately, and contamination with unauthorised material. It cannot determine either if BSE infectivity is associated with any ruminant material that is detected. In other countries worldwide, ruminant PAPs are still permitted for feeding non-ruminants, without any reported increased incidence of BSE by WOAH.

Regulatory pathway and proposed solution

Annex VI of Regulation (EC) No 159/2009 regarding the methods of analysis for the determination of constituents of animal origin for the official control of feed as well as the Standard Operating Procedures drafted by the EURL-AP could be reviewed to establish a technical threshold for the interpretation of the results of analysis performed with the DNA-based PCR methods to take into account the unavoidable cross-contamination occurring at difference stages of the chain, even when applying best techniques.

Once a technical threshold / tolerance is set, Annex IV of Regulation (EC) No 999/2001 should be reviewed to facilitate the production of porcine and avian PAPs and allow their use in multipurpose feed mills.

The introduction of such technical thresholds may not require an EFSA risk assessment as this is a risk management decision. However, an update of the QRA may be requested as well as a review of recent technical developments in the use of PCR analysis for quantification purpose.

10. Maintaining Category 3 status for ABP containing technically removable foreign bodies

Summary of problem

Regulation (EC) No 1069/2009, laying down health rules as regards animal by-products and derived products not intended for human consumption, provides for the classification of different types of animal by-products in 3 categories. Category 3 includes animal by-products and derived products that are deemed fit for human consumption, but not used for human consumption for commercial reasons (consumers preference, surplus, etc.). Only category 3 animal by-products are eligible for use in feed for food-producing animals, category 1 and 2 are not. Among the material falling under category 2, article 9(d) lists "products of animal origin which have been declared unfit for human consumption due to the presence of foreign bodies in those products".

Managing the presence of foreign bodies is a permanent mission of any processor of agricultural products, in particular primary processors of crops handled in bulk. We can find a lot of examples where the foreign bodies must be taken away from the raw material (sugar beets, potatoes, vegetables: separation of stones, earth, leaves, plastic, metal from the raw material coming from the field). Technologies to remove these impurities with the help of magnets, non-ferro separators and sieving are widely used and emerging technologies such as optical sorting with AI technology are increasingly incorporated in processes, also by former foodstuff processors.

In general, this is well-understood, but occasionally there are individual auditors who refer to Article 9(d) of Regulation (EC) No 1069/2009 as a reason to consider the foodstuffs as 'unsafe' and needing to be downgraded to category 2 at food manufacturer level, meaning it would no longer be eligible to reach the former foodstuff processor as a feed material requiring processing. This argument cannot be made when the presence of the foreign body is related to a consignment of former foodstuffs composed exclusively of ingredients of non-animal origin (i.e. not falling und the scope of the ABP legislation). There is no objective, safety-related reason why a difference should be made between former foodstuff containing products of animal origin such as milk, eggs or honey and former foodstuffs or purely plant-based origin.

Context and Circular Economy potential

The removal of physical hazards such as foreign bodies from former foodstuffs is a well-established part of the former foodstuff processing sector. Solving this issue would therefore rather be a consolidation of existing and broadly accepted practices, rather than opening new possibilities. However, there is a persistent legal uncertainty when individual auditors can interpret the presence any foreign body (paper, metal, stone, plastic) in the consignment as a reason for downgrading of material to category 2 animal by-products, which would cause the former foodstuff processing sector to lose a very large share of its business activity. In terms of circularity, this would also mean a huge loss for the compound feed and livestock sector, increasing reliance on land-requiring feed materials.

Foodstuffs become former foodstuffs destined to feed because the commercial value for the human consumption market was lost. It concerns predominantly intermediate/unfinished products which were produced from food grade / high quality raw materials, but which are not consumable by people in their conditions from a practical or taste perspective. There are also finished, surplus foodstuffs, where a food manufacturer will on first instance look for food bank donation possibilities. From a quality perspective former foodstuffs are of food grade nature, however from a practical and logistical point of view the animal feed outlet becomes the option with highest food chain potential.

Former foodstuffs predominantly originate from food manufacturers and retailers in relatively close proximity to the former foodstuff processing facilities and are sold to local compound

feed manufacturers. Their use in feed contributes therefore to local circular economy. Processed former foodstuffs are made from high quality raw materials and have a high animal nutrition. This is also due to the composition of processed former foodstuffs, containing starch and oils, which typically would still need to be blended into cereal-based raw materials used in feed such as wheat or maize.

Safety and food chain value

The origin of the restriction comes from a combination of historic food safety concerns and public health protection principles, and does not consider the technological efficiency to safely remove foreign bodies from consignments of former foodstuffs destined to feed, therefore not leaving any risk to animal or human health. The presence of animal by-products is essentially not a factor of importance in this interpretation. What is regarded as achievable for former foodstuffs of purely vegetable origin (where no such downgrading exists in law) should be regarded as achievable for former foodstuffs containing products of animal origin.

For the food chain, the incorrect interpretation of Article 9(d) can lead to confusion and uncertainty about the potential of using former foodstuffs in feed.

Regulatory obstacle and proposed solutions

Article 9(d) of Regulation (EC) No 1069/2009 should be amended to make note that the 'de facto' presence of foreign bodies is not a reason for category 2 animal by-products classification. A rephrased entry could be "products of animal origin which have been declared unfit for human consumption due to the presence of foreign bodies in those products, *unless the technological capacity exists to safely remove them*". This modification would require ordinary procedure. Harmonised guidance drafted at EU level could be drafted meanwhile.

11. Expand the definition of fish meal and fish oil

Summary of the problem

Marine ingredients such as fishmeal and fish oil provide sustainable sources of highly digestible protein and omega-3 fatty acids for feeding farmed fish. The current definitions of fishmeal and fish oil in Annex I of Commission Regulation (EU) No 142/2011 allow the use of farmed aquatic invertebrates in their production. A broader revision of these definitions would enable the feed sector to make greater use of low-trophic aquatic proteins, whether wild or farmed, thereby reducing pressure on agricultural land and supporting the sustainable development of environmentally friendly European aquaculture.

Context and Circular Economy potential

Many echinoderms, such as sea urchins, feed on marine algae, while other echinoderms, such as starfish, prey on molluscs. Bristle worms (annelids) consume plankton and various forms of organic matter, including algae and detritus. Marine tunicates are low-trophic filter feeders, similar to molluscs, and together these aquatic invertebrates provide valuable ecosystem services while also being an excellent source of protein and essential marine fatty acids.

Including these low-trophic aquatic invertebrates (such as tunicates, echinoderms and annelids) in the definitions of fishmeal and fish oil is in line with circular economy principles. This approach improves resource efficiency by utilising biomass with high potential for feed production. Although some of these species are suitable for human consumption, their commercial use as food is limited, resulting in minimal competition between feed and food markets.

Furthermore, the production of fishmeal and fish oil from these organisms offers high land use efficiency; unlike terrestrial protein sources, marine organisms do not require agricultural land, thus reducing pressure on ecosystems and strengthening the sustainability of European aquaculture.

Safety and food chain value

Products derived from tunicates and echinoderms are currently placed on the market for human consumption (under the rules of Regulation (EC) No 853/2004) and these products, when withdrawn from the food market, and by-products derived from these species are classified as Category 3 material under Article 10 of Regulation (EC) No 1069/2009. They can therefore be used in animal feed when processed in accordance with Regulation (EC) No 142/2011.

Taking into account the biology of marine tunicates, annelids and echinoderms, and the fact that tunicates and echinoderms are fit for human consumption, the risk profile in terms of feed safety is comparable to that of zooplankton, other marine crustaceans and molluscs (including gastropods). This assessment also takes into account the negligible risk of prion transmission.

In addition, the filter-feeding nature of marine tunicates may raise concerns about the bioaccumulation of undesirable substances, but the regulatory framework and industrial processes developed by fishmeal manufacturers ensure that only raw materials from which manufacturers can produce high quality fishmeal complying with feed safety regulations are used.

Regulatory obstacle and proposed solutions

The Commission is invited to consider the following amendments to the definitions of fishmeal and fish oil in Regulation (EU) 142/2011 in order to ensure the legal possibility of using important sustainable marine biomass resources for feed purposes and to ensure consistency between the relevant legislation on the use of these emerging aquatic animal species for both food and feed purposes:

- “fishmeal” means processed animal protein derived from aquatic animals covered by Article 4(3) of Regulation (EU) 2016/429, aquaculture animals covered by Article 4(7) of Regulation (EU) 2016/429 and other aquatic invertebrates according to Regulation (EU) 2016/429, article 4(4).
- “fish oil” means oil derived from the processing of aquatic animals covered by Article 4(3) of Regulation (EU) 2016/429, aquaculture animals covered by Article 4(7) of Regulation (EU) 2016/429 and other aquatic invertebrates according to Regulation (EU) 2016/429, article 4(4).

This shift is consistent with the EU's sustainability goals under the Green Deal, reinforcing the role of the blue economy in addressing climate change while promoting the responsible use of aquatic resources.

12. Use in feeds of purified mineral nutrients from incineration ashes

Summary of problem

The Animal Feed Regulation 767/2009, Annex III, points 1 and 5, effectively prohibit the use in animal feed of nutrients recovered from sewage or manure "irrespective of any form of treatment" or any processing. This hinders the nutrient Circular Economy by preventing the use of safe, high quality mineral nutrients recovered by chemical extraction and purification from sewage sludge or manure or similar incineration ashes. Such purified mineral nutrients are biologically safe (incineration), free of organic contaminants (incineration) and offer lower heavy metal levels (in particular, cadmium) than mineral nutrients from virgin phosphate rock.

Context and Circular Economy potential

Mineral phosphates are essential nutrients for livestock rearing when the digestible phosphorous content of feed materials is insufficient to meet animal's dietary requirements for optimal health and growth.

Under the revised EU Urban Waste Water Treatment Directive (2024/3019 of 27th November 2024), the EU will define phosphorus reuse and recycling rates from sewage within three years.

Around half of the EU's sewage sludge today goes to incineration. This represents around 100 000 t of phosphorous per year (tP), that is approximately the total annual EU consumption of mineral phosphates in animal feeds.

There is even more phosphorus in manure, some of which already goes to incineration to produce renewable electricity.

Processes are available to recover purified mineral phosphates chemicals from incineration ashes. These processes are today demonstrated at pilot scale with in some cases full-scale plants already operational or planned. Several companies propose such processes – for technical descriptions of processes and information on implementation: https://www.phosphorusplatform.eu/techcatalogue.

Safety and food chain value

The processes operational today recover phosphorus from incineration ashes directly as purified mineral phosphates of animal feed quality (calcium phosphates) or as phosphoric acid (the raw material input for existing "virgin" animal feed phosphate production sites). The recovered nutrients are therefore the same or similar chemicals as commercial "virgin" mineral feed phosphates.

This is confirmed by the animal feed trials carried out by the Swedish University of Agricultural Sciences and a large Swedish feed company in 2022 using calcium phosphates recovered from sewage sludge incineration ash (Feed phosphate for livestock).

Incineration ashes do not contain organic contaminants, because the very purpose of incineration is to eliminate these. Phosphorous recovery from ash processes includes specific purification processes to ensure removal of heavy metals[14]. The phosphorous recovery processes also reduce copper and zinc, which remain present in sewage sludge (from piping). Both are anyway trace-elements whose presence in animal feed is suitable at controlled doses. In all cases, verification of heavy metals in ash-recovered phosphates is simple (standard analysis, limited number of heavy metals to verify).

[14] Heavy metals, which were present in sewage sludge in the past, are tending to be less present as their use is increasingly substituted in many applications (mercury, cadmium, lead from paint dust …)

Sewage sludge is incinerated under Industrial Emissions Directive conditions (850°C, 2 seconds, elimination of >98% of organic carbon). The conditions defined in this Directive are intended to ensure that organic contaminants are eliminated and to avoid dioxin formation. Biological risk is further reduced by the chemical processing (acid leaching, neutralisation, purification). Biological risk should therefore not be a concern for ash-recovered phosphates. Analysis of recovered calcium phosphates from sewage sludge incineration ash shows dioxins < 0.1 ppb (legal limit in feed: 0.75 ppb).

This is confirmed by a risk analysis carried out in 2023 by the Swedish National Veterinary Authority (SVA) which concluded that pathogen risk is negligible in calcium phosphates recovered from sewage sludge incineration ash (SVA report 92:2023, ISSN 1654-7098).

The above information on safety and food chain value apply similarly to the following purified mineral nutrients chemically recovered from incineration ashes:

- nutrients other than phosphorus: potassium, calcium, micronutrients
- nutrients recovered from incineration of manures, food wastes, animal by-products: these contain lower levels of inorganic contaminants than sewage sludge and biological safety is ensured by incineration.

Regulatory obstacles

Regulation (EC) 767/2009 "on the placing on the market and use of feed" specifies in Annex III:

"materials whose placing on the market or use for animal nutritional purposes is restricted or prohibited as referred to in Article 6

1. Faeces, urine and separated digestive tract content resulting from the emptying or removal of digestive tract, irrespective of any form of treatment or admixture…

5. All waste obtained from the various phases of the treatment of the urban, domestic and industrial waste water, as defined in Article 2 of Council Directive 91/271/EEC of 21 May 1991 concerning urban waste water treatment, irrespective of any further processing of that waste and irrespective of the origin of the waste waters…

6. Solid urban waste, such as household waste."

It can be noted that the wordings are unclear, and it could be argued that ash from incineration of sewage sludge or manure has not simply undergone "*treatment*" or "*processing*". See legal analysis carried out for ESPP and EasyMining (Barry Love, 13 September 2022 here). However, the wording is such that prohibition is a likely interpretation by regulatory or legal authorities, so that no company or investor is likely to engage.

It can also be noted that the wordings in Regulation (EC) 767/2009, Annex III, are incoherent. Household waste after treatment or processing is NOT excluded in this Annex (e.g. food waste incineration ash). Non-manure animal by-product ash is not mentioned in this Regulation, but may be excluded by other regulations (ABP Regulation, TSE Regulation).

Proposed solution

The exclusions from animal feeds in Annex III of Regulation 767/2009 and in other regulations (ABP, TSE) of purified mineral nutrients recovered from wastes, waste waters or animal by-products should be reconsidered where, further to an EFSA risk assessment, it is demonstrated that the process undergone (incineration here) ensures the removal of organic contaminants and compliance with maximum limits for inorganic contaminants and so guarantees feed safety.

13. Use of Dicalcium phosphate (DCP) from bones in ruminant feed

Summary of the problem

- In short:
  - Dicalcium phosphate (DCP) from organic origin is a co-product of manufacturing edible gelatine or collagen from bones (both bovine and/or porcine bones).
  - Dicalcium phosphate (DCP) is of organic origin and is, so far, only allowed for pigs and poultry.
  - Authorising DCP from organic origin, co-product of the gelatine or collagen fit for human consumption manufacturing process, for all farmed animals, will improve the security of the feed phosphates supply and contribute to the reduction of the environment footprint of feed and to achieving of the feed chain's circularity goals.
- Background

DCP from organic origin is a co-product from the gelatine or collagen manufacturing process. The raw materials used to produce edible gelatine or collagen must comply with Regulation (EC) N° 853/2004 (specific hygiene rules for food of animal origin). The bones originate from healthy animals, which have been slaughtered in a slaughterhouse and whose carcasses have been found fit for human consumption following ante-mortem and post-mortem inspection. This also means that DCP from organic origin, as well as any other co-product from the gelatine or collagen manufacturing process, have the same raw material origin as edible gelatine and collagen.

DCP from organic origin also has a significantly higher bio-availability compared to inorganic (rock phosphate) sources, as recently measured following the international World Poultry Science Association (WPSA) protocol (as published by Rodehudscord, 2013). This research, performed at Wageningen University, was published in Poultry Science in May 2017.

The DCP from organic origin is currently only allowed as feed material for non-ruminants (Annex IV of TSE Regulation (EC) No 999/2001) and may only be used in feed mills not producing feed for ruminants. As most of the feed compounders have multispecies plants, they can therefore not use DCP from organic origin. As a consequence, most DCP from organic origin is used outside the feed and food chain, particularly as a fertiliser, which is the only alternative for use. At the same time, the feed compounders may only rely on mineral feed phosphates as a phosphorous source, whereas the global resources of rock phosphate (the raw material used to produce inorganic feed phosphates) are limited and Europe is heavily dependent on imports, in particular from geopolitically risky countries like China or Russia. Not allowing the feeding of ruminants with organic DCP is therefore a waste of valuable resources for the feed & food chain and also not in line with the circular economy principles.

Context and Circular Economy potential

Any DCP from organic origin used as feed instead of fertiliser can reduce the import of DCP from third countries and save energy. Using a DCP with a significantly higher bio-availability will be beneficial for the environment (lower risk of eutrophication).

DCP is mainly used in feed. Some small volumes are used as a food additive. Competition between food and feed is therefore negligible.

The processing of slaughter by-products for producing gelatine or collagen fit for human consumption is often done in areas where enough raw materials from slaughterhouses and cutting plants can be guaranteed. These are both, in turn, established where animals are raised and produced. So, it can be assumed that animal production and animal products

processing are locally connected, and transport distances are low.**Safety and food chain value**

Concerning the safety of DCP from organic origin, the feed ban was implemented due to the presumed risk of spreading BSE. The BSE safety of the DCP from edible gelatine or collagen production is based on:

- Safe raw material sourcing. All raw materials are in full compliance with the requirements for the gelatine or collagen manufacturing (Regulation (EC) N° 853/2004) and are in particular, derived from animals which have been slaughtered in a slaughterhouse and whose carcases have been found fit for human consumption following ante-mortem and post-mortem inspection.
- The manufacturing process for DCP from organic origin involves several processing steps[15] with high temperatures, addition of acids and/or alkaline treatments, sufficient to inactivate transmissible animal disease in the unlikely scenario where prions would be present.
- The EFSA risk analysis, adopted on 16 March 2006, considered the EU countries as being Geographical BSE Risk (GBR) III and IV countries. It concluded that DCP from GBR II and GBR III could not lead to fewer than 1 case of BSE per year. With the current prevalence of BSE, a revision of the feed ban for DCP from organic origin could be envisaged.
- Also, the recommendation of the World Organisation for Animal Health indicates that DCP from organic origin, as a co-product of the bone gelatine production, does not pose a risk. (WOAH TAHC chapter 11.4, article 11.4.18).

Regarding other microbiological risks, the transport of raw materials to the processing plant is performed in cooled conditions. In the other case, the transport fulfils the maximum transport duration defined in Annex III of Regulation (EC) No 853/2004 (section XIV and/or section XV). The plant itself is approved under food hygiene rules. At the reception the material is visually inspected and sorted. All the above overfulfils the processing of ABPs in quality and freshness of the raw material (safer sourcing).

Regulatory obstacles and proposed solutions

The use of DCP from organic origin for ruminants is prohibited by the TSE regulation (EC) No 999/2001. The feed ban on DCP, a co-product from the gelatine manufacturing process, should be lifted.

[15] **DCP from organic origin process steps**
(a) firstly, ensures that all bone is finely crushed and degreased with hot water and treated with dilute hydrochloric acid (at a minimum concentration of 4 % and a pH of less than 1,5) over a period of at least two days;
(b) secondly, following the part of the process above applies a treatment of the obtained phosphoric liquor with lime, resulting in a precipitate of dicalcium phosphate at pH 4 to 7;
(c) finally, air-dries the precipitate of dicalcium phosphate with inlet temperature of 65 °C to 325 °C and end temperature between 30 °C and 65 °C.

14.Biomass grown in or fertilised by wastes

Summary of problem

Current EU ABP and waste regulations are unclear as to the status of biomass (and of materials extracted therefrom) grown in or fertilised by wastes. For example, crops grown on a field on which manure or sewage biosolids were used as fertiliser can be fed directly to animals, but algae grown in treated sewage liquor or in manure digestate may be considered a “waste” and could be considered excluded from animal feed (by Regulation (EU) 767/2009, Annex III).

This concerns a wide range of different biomass production routes: crops or fodder grown on fields fertilised using wastes or manure; algae, duckweed or other plants grown using waste liquors or digestates as substrates; plants grown in wastewater treatment discharge ponds; cultivated bacteria or monocellular protein …

Plants or algae growing in or fertilised with waste may retain contaminants or pathogens, so there is a real need to verify that the final animal feed product is safe. The current regulatory framework however fails to address this (waste and ABP status unclear and no mechanism to define End-of-Waste). The absence of regulatory certainty prevents investment, process development and roll-out.

Context and Circular Economy potential

The EU aims to considerably develop biomass production (EU Bioeconomy Strategy 2018) and algae (EU Algae Initiative 2022 “to fully harness the potential of algae in Europe for healthier diets, lower CO2 emissions, and addressing water pollution”). To be sustainable, this biomass should be produced where possible with a feedstock composed of secondary nutrients, e.g. waste and waste-derived materials such as wastewaters, food waste, biorefinery or food industry side-streams, manure, digestates, composts …

In parallel, production of biomass for an industrial end-uses (e.g. biofuels, bio-based chemicals or fibres) will result in unused biomass materials rich in nutrients (e.g. phosphorus is undesirable in biofuels) which could be a valuable animal feed input.

Safety and food chain value

The safety of biomass (or extracts therefrom) grown in or fertilised by wastes must be assessed case-by-case, as retention of or accumulation of contaminants (heavy metals, organic chemicals) or pathogens is possible, and indeed is well documented in some cases. However, other studies show safe levels of contaminants and pathogens in specific cases, and there are examples of use without issues elsewhere in the world.

Regulatory obstacles

The Regulatory situation is detailed in the legal analysis prepared for ESPP by Barry Love, specialist in environmental law (“The Waste/Animal By Product (ABP) status of waste-derived algae with particular reference to the Animal Feeds Regulation” 2024) and this was discussed at a workshop with the European Commission, stakeholders and experts on 13th November 2024 (summary in ESPP eNews n°94).

This legal analysis and these discussions show the high current regulatory ambiguity concerning biomass grown using waste inputs (secondary nutrients):

- ABP Regulation 1069/2009 art. 13 specifies disposal routes for Cat.2 ABPs including manure. This allows spreading of raw manure on fields, but does not indicate spreading of processed manure (e.g. after solid-liquid separation, acidification to reduce ammonia losses, digestion, composting). So, crops grown on a field on which raw manure was used

as fertiliser are not concerned by waste status, but crops grown on a field on which acidified manure was used may be considered waste.

- Offgas if captured and used is a “waste”, so algae grown to capture CO_2 from industry may be considered waste. Algae grown in a system capturing pollutants from urban air however might not be a waste.
- Fodder crops grown on a field fertilised using sewage biosolids under a waste management plan are generally considered not to be waste, whereas algae grown in treated sewage in fish ponds could be considered waste.
- Waste status of biomass will generally also apply to any nutrient materials extracted or processed from this biomass.

The uncertain “waste status” of such biomass may not by regulation directly prevent its use in animal feed, but discourages its uptake by industry, feed wholesalers or farmers. Also, the comments above on “waste status” may apply similarly for ABP status where biomass production is fed by ABP inputs (raw or processed manure, food waste digestate, food industry streams …) and to interpretation of Regulation 767/2009, Annex III, points 1 and 5, effectively prohibiting the use in animal feed of nutrients recovered from sewage or manure “irrespective of any form of treatment” or any processing.

Proposed solution

Clarification of the legal status of biomass grown on waste (and extracts of such biomass) is needed and, if required, amendment of legislation identified as posing inappropriate obstacles or ambiguities.

This clarification could be achieved by taking forward some applied case studies (e.g. algae grown on sewage, manure, food waste, digestate …).

This could then lead to development under the EU BioEconomy Strategy of a ‘living’ EU Guidance Document indicating, for different routes for production of biomass fed by waste/ABP inputs (and for different processes producing extracts therefrom), the conditions for safety and consequently for regulatory ‘waste status’ / ‘ABP status’, and relevant contaminant and pathogen criteria to be analysed to demonstrate safety (for different applications: animal feed, fertiliser, cosmetics/food). An expert and stakeholder committee could be put in place to advise the European Commission on additional questions for consideration and on content and updates of this document.

15. Risk based management of contaminants overload

Summary of the problem:

- Legal situation

The EU legislations on undesirable substances (article 5 of Directive 2002/32) and on pesticide residues (article 19 of Regulation 396/2005) prohibit the mixing (blending) of non-compliant consignments with other consignments with the objective of lowering the amount of the substance below a maximum limit (ML) / maximum residue limit (MRL) and, consequently, the placing of the mixture on the market for feed use.

The maximum limits for undesirable substances in feed materials / feed additives are set based on occurrence data collected by EFSA, generally at a level below which 95% of the consignments for that feed material/feed additive are fit for use as feed for a specific contaminant. This in practice has the potential to exclude from the feed market more than 5% of the consignments of a given type of feed material, as a feed material may be exposed to contamination by different contaminants.

The prevalence of certain contaminants, in particular mycotoxins, may vary year-to-year due to agronomic conditions. The modification of maximum limits requires a long process that can take several months, starting with data collection, assessment by EFSA and delegated act.

- Destination of non-compliant materials

A procedure is foreseen to allow decontamination of feed ingredients (Regulation (EU) 2015/786). However, only a limited number of processes have been positively assessed and these processes are usually costly. In practice, non-compliant consignments are excluded from the feed and food chain and used as bioenergy source or disposed of as waste or re-exported to countries of origin when imported.

Safety and food value chain

Why the measure should be reconsidered? The prohibition of blending was established in 1999 in the wake of the dioxin crisis and at a time where food and feed were available in large quantities and security & sustainability were not on the top of the EU policy agenda. Before that time, “blending” was permitted if performed by approved feed business operators, i.e. under strict supervision of national control authorities. The ban on blending was extended to pesticides residues in 2005. Since then, minimisation of waste has become also an EU priority.

A case-by-case approach could be considered, depending on the nature of the contaminant, in particular whether for contaminants of concern for consumers of animal products due to transfer from feed to animal tissues, as well as on whether the contaminant is expected to be evenly spread in a consignment or not, the gap between the actual contamination level of the consignment and the ML/MRL, the availability of an efficient mixing technology and the implementation of a post mixing monitoring. Minimum efficacy criteria may be established, which operators would have to fulfil to earn approval along the Feed Hygiene Regulation provisions.

Another option could consist in managing the risk with certain contaminants with other instruments than maximum limits under the undesirable substances Directive. The concept of guidance values, established for fusarium toxins, offers more flexibility to operators to adopt corrective measures with a view to lower the exposure of animals to the contaminant, including via mixing.

Contribution to circularity

Since legal standards for contaminants in feed are usually higher than for food, the destination of consignments of products not compliant with MLs/MRLs is outside the feed and food chain, mostly as bioenergy sources for plant-based feed materials or discarded as waste. Maintaining these consignments in the feed chain would fulfil the objectives of the waste hierarchy and

therefore contribute to circular bioeconomy. The volumes of material at stake are difficult to evaluate but the “95-percentile” approach used to define legal standards suggests that more than the equivalent of 5% of the total quantity of feed ingredients used today may be concerned, i.e. up to 10 mio. t.

Food processing often triggers a concentration of contaminants in co-products, which may therefore be more exposed to non-compliance than unprocessed crops. Avoiding replacing co-products by unprocessed products fit for food use is typically a circular operation.

Feed business operators give always priority to using feed ingredients of high nutritional value and digestibility. Not being able to use consignments of feed of high nutritional value, yet not compliant, may oblige the feed manufacturer to seek substitutes of lower nutritional value, less digestible and therefore less efficient in terms of conversion into animal products and reduction of effluents.

Proposed solution

A revision of Directive 2002/32 and Regulation 396/2005 via the ordinary procedure should be considered to allow blending under strict, risk-controlled conditions. This should include predefined performance criteria depending on the type of contaminant, animal species of destination and level of contamination, based on EFSA recommendations, as appropriate. This may also involve research to fill the knowledge gaps. Specific approval of blending establishments under the Feed Hygiene Regulation should be envisaged to ensure appropriate risk management and proper supervision by authorities.

Changing regulatory instruments from maximum limits to guidance values may provide a faster solution.

Translation into practice will require investments in blending equipment and their approval by national authorities.

16. Maintaining Footnote 1 of Regulation (EC) No 396/2005

Summary of the problem

> Legal situation

In its Annex 1, Regulation (EC) 396/2005 establishes MRLs for crops used for food and feed as well as products of animal origin, classified by chapters. Category 12 dedicated to products destined exclusively for feed is still empty. Pending the completion of chapter 12, no MRL applies to products destined exclusively to feed, meaning that the safety of feed containing residues of pesticides exceeding the "food" MRL is assessed on a case by case in accordance with article 15 of the General Food Law. The processing of a number of crops listed in other chapters of Annex 1 generates next to the food product a co-product/by-product which, by its nature and characteristics, may only be used as feed. These co-products should actually fall under the scope of Category 12. This is the reason why the EU authorities have decided in 2005 to specify via a footnote to annex 1 that "MRLs do not apply to products or part of products that by their characteristics and nature are used exclusively as ingredients of animal feed, until separate MRLs are set in the specific category 1200000."

Examples of products eligible to Footnote 1 are rapeseed meal, sugar-beet pulps, dried distiller grains, citrus pulp pellets or fatty acid distillates to name a few[16]. These products are essential resources to meet the needs of the EU livestock population.

The EU authorities are now considering withdrawing this footnote 1, the reason being that it is not consistently implemented across the EU.

> Why should Footnote 1 be maintained?

Deleting Footnote 1 without first establishing specific MRLs for these products would create legal uncertainty and economic damage for feed material suppliers, compound feed & petfood manufacturers and feed users and could be conflicting with several key EU priority objectives as it would:

- Penalize the use of safe co-products because of conservative approaches from authorities in applying processing factors, despite the fact that the feed use of these co-products as an alternative to food grade crops is an important pathway to improve the sustainability of the livestock sector;
- Generate more waste and losses of essential nutrients;
- Weaken food/feed security and EU open strategic autonomy by creating additional hurdles to imports and increase dependency on fewer supplying countries.

Footnote 1 is one of these rare provisions that has the potential to mitigate the consequences of global commodities market turmoil without impacting public and animal health.

Safety for the food chain

The setting of MRLs involves a safety risk assessment addressing at the same time the safety for human health of direct consumption of a crop or part of a crop, the human health impact of the use of a crop/part of a crop for feeding food producing animals and animal health. Considering the fact that the life expectancy of animals, in particular food producing animals, is much shorter than human, the tolerable daily intake for animals is usually higher than for humans. This means that human health is in practice the driving criterion for setting MRLs for crops. It is therefore legitimate to consider that products destined exclusively for feed should be subject to specific, higher MRLs established based on animal health and contribution to human exposure via products of animal origin.

[16] Bikker et al. Feed materials by characteristics or nature exclusively used as animal feed: Evaluation of feed materials with an annual use above 50 kiloton in the Netherlands and some other relevant feed materials – Wageningen University – May 2024

As long as such MRLs are not set, an assessment of the risk performed in accordance with the General Food Law for products exceeding the “Food” MRL supports the safe use of the product. Several national authorities have developed online tools allowing operators and control authorities to perform such a risk assessment and define on this basis adequate risk management measures.

Contribution to circularity

Key objectives of the Green Deal are to optimize resource uses, to reduce nutrient losses, to minimize waste and to reduce feed/food competition by stimulating increased usage of co-products as feed. Not allowing the feed use of consignments of co-products that are deemed non-compliant with the pesticides MRL, although shown to be safe following a risk assessment, is clearly in contradiction with all these objectives.

In absence of statistic / record of cases where Footnote 1 was invoked and compliance was established based on a risk assessment, it is not possible to evaluate the volume of feed resources that would no longer be usable if footnote 1 was to be withdrawn.

Footnote 1 allows the safe use of inedible material exceeding the Food MRL. Restricting access to these materials would prompt increased demand and use of unprocessed crops, in particular crops meant for food use such as cereals or protein crops.

Feed business operators consistently prioritise the use of feed ingredients of high nutritional value and digestibility. The inability to use as feed safe consignments of high nutritional value, but non-compliant with the pesticides MRLS legislation, may force the feed business to look for substitutes of lower nutritional value and digestibility and therefore less efficient in terms of conversion into animal products and nutrient leakage.

Proposed solution

Maintaining Footnote 1 of Annex 1 of Regulation (EC) 396/2005 is suitable, until more proportionate MRLs are set in the specific category 1200000 for products or part of products that by their characteristics and nature are used exclusively as ingredients of animal feed. Meanwhile, guidance for a more harmonized enforcement of Footnote 1 would be useful.

17. Use of biomass from genetically modified micro-organisms used for production of feed additives by fermentation

Summary of the problem:

> Legal situation

The EU Regulation (EC) 1829/2003 on genetically modified food and feed provides that any genetically modified organism (GMO) as defined in Article 2(2) of Directive 2001/18/EC for feed use, feed containing or consisting of GMOs or feed produced from or containing ingredients produced from GMOs, may not be placed on the EU market unless it is covered by an authorisation, which is delivered based among others on a risk assessment performed by EFSA.

At this point in time, no genetically modified micro-organism (GMMO), parts thereof or product derived thereof has been authorised in the EU for feed use. Two applications for authorisation of biomass from GMMO were submitted in 2008, with opinions[17] delivered by EFSA in 2017. In its conclusions, EFSA did not identify risks to human and animal health or the environment from this biomass regarding the genetic modification of the strain. They however were not in a position to conclude on the safety for consumers of products from animals fed with this biomass.

There is clearly a discrimination here with biomass from non-GM microorganisms, not subject to an authorisation procedure, and which is nowadays safely used as feed ingredients. The Chapter 12 of the EU Catalogue of feed materials (Regulation (EU) 68/2013) includes many different products from non-GM microorganisms which are used safely as feed without a conclusive EFSA opinion.

> Destination of GM microbial biomass materials

The quantity of biomass from GMMOs used for fermentation purpose in the EU may be estimated at several hundreds of thousand tonnes. Much of this is exported to Third Countries as a valuable source of protein for feed use.

Contribution to circularity

The biomass from genetically modified micro-organisms used for the production of feed additives is a co-product from the fermentation industry produced in the EU. Where legally permitted, this biomass would be exclusively destined to feed use and therefore not in competition with food demand. Some microbial biomass from non-GM microorganisms may also be imported from third countries.

Biomass from GMMOs (used for the production of feed additives by fermentation) is typically rich in highly digestible proteins (ranging from 35 to 65%). Additionally, the cell walls of certain micro-organisms can offer functional benefits, such as supporting gut health.

Safety for feed use

Certain types of feed ingredients are subject to risk assessment due to the fact that they are either not normally used as feed (feed additives), are from animal products (animal-by-products and products derived thereof) or are produced from GMOs (GM feed). The purpose of the risk assessment for GMOs is to evaluate whether the genetic modification has an impact

[17] Safety and nutritional value of a dried killed bacterial biomass from *Escherichia coli* (FERM BP-10942) (PT73 (TM)) as a feed material for pigs, ruminants and salmonids
Safety and nutritional value of a dried killed bacterial biomass from *Escherichia coli* (FERM BP-10941) (PL73 (LM)) as a feed material for pigs, ruminants and salmonids

on the safety of the GM feed. Other feed safety elements not linked to the GM modifications do not require an EFSA risk assessment and remain under the responsibility of the placer on the market, as is the case for non-genetically modified feed.

The EU Commission has always the possibility, in case of doubt on the intrinsic safety of a feed material to mandate EFSA to perform a full risk assessment. In case the EFSA opinion is negative, the EU authorities add the product to Annex III of Regulation 767/2009 as a material whose use is prohibited in feed.

With this procedure, the feed safety elements other than those linked to the genetic modification remain under the scrutiny of EU authorities in case of a concern.

Proposed solution

The risk assessment performed by EFSA to support the authorization of a GM biomass for feed use should be limited to evaluating risks associated with the genetic modification of the production strain.

A few months should be enough for EFSA to revise the scope of its guidance document for the assessment of GM food and feed for example by excluding from the assessment risks that are not related to the GM-nature of the micro-organism or establishing a fast-track procedure for GM co-products under certain conditions.

Translation into practice would require submission of applications for authorization by the fermentation industry, an evaluation by EFSA and a decision adopted by implementing act. The entire process would take at least two years before authorisation could be granted.