Health
Food Chain Safety
Environment

Annex 1: Research topics

Research topics RT projects

	TOPICS	Maximum duration (months)	Maximum grant
	Animal health		
1	Research into risk factors related to antibiotics benchmark colour code (AMURISK)	48	€ 440,000
2	Integrated animal disease control in veal calves, pigs and broilers (ANDICO)	48	€ 440,000
3	Salmonella in the environment of poultry farms (SALMENVI)	24	€ 220,000
4	The nutritional requirements of the honeybee (StrongBee)	36	€ 330,000
	Plant health		
5	Destruction methods of quarantine organisms (DESTRUQO)	24	€ 220,000
	Food safety		
6	Presence of ochratoxin A in ripened meat products and ripened cheeses in Belgium (OTACHAM)	18	€ 165,000
7	Nitrosamines in foodstuffs (TCNA-FOOD)	36	€ 330,000
8	Microbiological safety of plant-based alternatives to dairy products (PADAL)	36	€ 330,000
9	Plant toxins in foods derived from hemp (HEMPPLATOX)	15	€ 110,000

Research topics RI projects: Euphresco - plant health

	TOPICS	Maximum duration (months)	Maximum grant
	Plant health		
2024-A-463	The use of insect trap collection fluids for the surveillance of quarantine fungi in forests (FUN2TRAP)	24-36	€ 170,000
2024-A-468	Improved detection of regulated Torradoviruses (Detectorrado)	12-24	€ 80,000
2024-A-478	Towards spread and detection of *Diplodia bulgarica* in Europe	24-36	€ 80,000

1. Research into risk factors related to antibiotics benchmark colour code (AMURISK)

Context

Since 2017, antibiotic use in veal calves, pigs, broilers and laying hens is been recorded in the government's central database, SANITEL-MED. In accordance with the agreements laid down in the "Antibiotics Convenant", pigs (by category), veal calves (by herd), broilers and laying hens (by animal category) are benchmarked. The farmers and farm veterinarians involved have this information available on the basis of the benchmarking reports. Most of the broiler and laying hen farms lie within the green zone. For veal calves and pigs, there is more variation among the benchmark colour scores. This variation makes it interesting to study the underlying factors for low, medium or high antibiotic use on these Belgian farms in order to better guide farms toward reducing their antibiotic use. Farms with veal calves and broilers use more critically important antibiotics compared with other sectors. Again, identifying the underlying factors of the use of critically important antibiotics can help in identifying needs and guiding farms towards reducing use.

Research questions

- What are significant risk factors for high and low use of antibiotics on a herd of broilers, veal calves or pigs (presence of disease, biosecurity, purchasing policy, vaccination policy, health status, genetics/productivity, weaning age (pigs), age of supply, stocking density, relationship between different animal categories/age groups on a farm, effect of the veterinarian and possible coach, etc.)?
- What are significant risk factors for high and low use of critically important antibiotics on a herd of veal calves and broilers (presence of disease, biosecurity, purchasing policy, vaccination policy, health status, genetics/productivity, age of supply, stocking density, relationship between different animal categories/age groups on a farm, effect of the veterinarian and possible coach, etc.)?
- What is the impact of controlling these risk factors?
- What roadmap can be recommended, based on these risk factors, to guide a farm towards a better benchmark colour score?

To answer the research questions, the data made available by the farmer and farm veterinarian on the use of antibiotics, as registered in Sanitel-Med in accordance with the benchmarking reports will be used. No data is made available by the government.

The first two questions can be answered based on the results of surveys. The third question requires field research.

Maximum grant: € 440,000

Maximum duration: 48 months

2. Integrated animal disease control in veal calves, pigs and broilers (ANDICO)

Context

Infection prevention and control are an important component in combating the prevention and spread of antimicrobial resistance. Infections, such as Salmonella and Mycoplasma in veal calves, Streptococci and *Actinobacillus pleuropneumoniae* in pigs, and *Escherichia coli* and *Enterococcus* spp. in broilers, cause unfavourable health conditions on farms and a need for antibiotic use. By the same token, reducing the preventative use of antibiotics or reducing the use of broad-spectrum antibiotics may allow infections to break out or new infections to emerge more easily. As requirements concerning the use of antibiotics tighten, the need for an integrated approach to these infections within a sector is becoming increasingly apparent.
Veal calf farms but also piglet farms are additionally in a difficult situation because animals from different farms are put together at a young age. As a result, animals differ in terms of maternal immunity (colostrum, vaccination of young animals and breeders, infections on breeding farms, etc.), health status, needs, and so on.

Research questions

- What are the most common bacterial infections on veal calf farms, pig farms and broiler farms that prompt the use of antibiotics in Belgium (literature review / survey of farmers-veterinarians)? What co-infections play a role in the occurrence of these bacterial infections on Belgian farms?
- What are the risk factors for these infections throughout the production column?
- Which pathogens can be controlled in a technically and economically feasible way, taking into account the structure of the three sectors in Belgium?
- Based on the risk factors study and with technical and economic feasibility, what are the steps to be performed within the chain for the prevention, management/control of the most relevant pathogens? What is the feasibility of the steps to be implemented for control/control within a column and preventative measures at the farm level?
- What is the expected impact on the use of antibiotics in the prevention or control of one or more of these infections?

At the end of the project, a cross-sector workshop will be organized to stimulate cooperation between the different sectors.

Maximum grant: € 440,000

Maximum duration: 48 months

3. Salmonella in the environment of poultry farms (SALMENVI)

Context

For more than 20 years, a control programme for zoonotic salmonella in poultry and also feed sector has been applied in Belgium. With the intensive surveillance and vaccination programme, the prevalence of zoonotic salmonella in poultry has decreased significantly. However, prevalence has not continued to decline for several years now. In breeding poultry, laying hens and broilers, sporadic occurrences of salmonella have been observed, without the exact origin being traceable. In some cases, the farms concerned observe a high level of biosafety in their operations. A possible source is the presence of salmonella in the environment of poultry farms: the yard, footwear of personnel used outside the barn, machinery and equipment outside the barn, pests (rodents, insects), birds, companion animals, litter, etc. If greater clarity could be achieved as to the source, the biosafety recommendations could be adapted if necessary.

A study on farms where poultry are not yet infected with salmonella could shed light on the source of these new occurrences. Subsequently, biosafety recommendations could be adapted.

Research objectives

- To collect data relating to the presence of salmonella in the vicinity of poultry farms. Sampling must take place on a statistically sound number of poultry farms where salmonella contamination has not been detected recently. To allow comparison with isolates derived from poultry, food and feed, the serotype and profile of antimicrobial resistance should be determined, preferably using Whole Genome Sequencing (WGS).
- To formulate recommendations to prevent introduction of salmonella from the environment.

Maximum grant: € 220,000

Maximum duration: 24 months

4. The nutritional requirements of the honeybee (StrongBee)

Context

There are many environmental factors affecting the health of the honeybee (climate, diseases, beekeeper management techniques, feed deterioration, ...). If the sum of these factors weighs too heavily, it can lead to the death of the colony.

The quality and quantity of the bee's diet is essential. Bees fly out to bring enough nectar and pollen to their hive so the larvae can develop into adult bees. This requires several plants that provide them with these nutrients. Due to landscape degradation and climatic influences, the honeybee is unable to find the necessary nutrients, if at all, and the beekeeper will provide for supplementary feeding to the colonies during the wintering period to support the health of his hives. Today, this is often done unilaterally by offering sugar water or dough.

Amino acids have been found to be important for the proper development and the immunity of honeybees. De Groot's study[i] dating from 1953 is still cited in recent publications as a basic reference when it comes to the amino acid metabolism of bees. It is well-established that there are ten amino acids that are essential for the honeybee. Fat intake also enhances immunity. On the other hand, high-fat foods containing different fatty acids disrupt the gut microbiota in honeybees. The gut microbiota play a crucial role in nutrient absorption, and dysbacteriosis could affect metabolic processes in bees, causing weakening that could eventually lead to the death of the entire bee colony.

Thus, the nutrition supplied to the bees by the beekeeper, particularly the winter nutrition, seems crucial to help them overwintering. The optimal ratio of amino acids, fats and vitamins in feed according to the life stage of the bees is unknown. The final goal of the study is to formulate recommendations to beekeepers on the optimal composition of bee nutrition in order to strengthen the colonies' immunity.

Research objectives

1. Determining the amino acid, fat and vitamin requirements of
    - bees in different life stages (larvae, pupae, adults, with different functions in the hive)
    - individual tissues (including fat body, flight muscle, gut, nervous system) from healthy hives and from hives that are not doing well.

2. Identification of the synergy between the established amino acid and vitamin requirements and the absorption of fats by the fat body that stimulates immunity, in order to strengthen the health of the bees.

    Determining amino acid, vitamin and fat requirements whilst strengthening immunity during the season and late in the season, in preparation for winter without adversely affecting gut microbiota.

[i] De Groot AP. Protein and amino acid requirements of the honeybee (Apis mellifica L.). Physiol comp. Oecol. 1953;3:1–83.

3. Formulating recommendations for beekeepers on the nutritional composition of bee nutrition to enhance the hives' immunity.

In the framework of this research, the most widely used breeds in Belgium should be considered (Carnica and Buckfast). The proposed methodology must be supported by a thorough literature review.

Maximum grant: € 330,000

Maximum duration: 36 months

5. Destruction methods of quarantine organisms (DESTRUQO)

Context

To prevent the introduction of quarantine organisms into the European Union (EU), Regulation (EU) 2016/2031 on protective measures against plant pests introduces a more proactive approach involving in-depth surveillance of the territory, eradication measures in the event of confirmed outbreaks and import rules. For priority quarantine pests likely to enter and establish themselves on Belgian territory (Regulation (EU) 2019/1702), the FASFC must also draw up emergency plans (Article 25 of Regulation (EU) 2016/2031) so that it is ready to deploy the necessary measures to prevent their spread and eliminate them.

The appropriate eradication measures in accordance with the principles set out in Annex II of Regulation (EU) 2016/2031 must be imposed whenever a quarantine organism is found. These measures are either specified in the emergency measures adopted for certain quarantine organisms (e.g. Regulation (EU) 2023/1584 for *Popillia japonica*, Regulation (EU) 2023/1032 for tomato brown rugose fruit virus and Decision (EU) 2019/2032 for *Fusarium circinatum*), or must be determined on the basis of the available scientific and technical knowledge for rapid and effective eradication. In each case, the harmful organism must be destroyed and the host plants and other contaminated plant material or objects (e.g. wood or wood shavings, growing medium, etc.) must be treated to render the material at risk harmless. Destruction methods include for example burial, incineration, treatment with plant protection products or biocides, bio-waste treatment (composting, anaerobic digestion, thermal treatment),….

In view of the above, Belgium must be prepared for the emergence of quarantine organisms on its territory and, more specifically, of organisms known to be present on EU territory (Annex II, Part B of Regulation (EU) 2019/2072) as well as priority quarantine organisms. To take rapid action, the FASFC needs to know the minimum requirements necessary for destroying, eliminating or sterilising these organisms at a given efficacy. The FASFC must also take other factors into account when approving/validating phytosanitary treatments, including effects on human health and safety, animal health and environmental impact.

The aim of the project is to study the efficacy and practical feasibility of different treatments that eliminate and render harmless plant material contaminated by quarantine organisms already present in the EU and by priority quarantine organisms. A desktop study will verify which methods and parameters have already been studied and validated for certain organisms, and an inventory of these methods will be made. This project will develop treatment schemes for organisms for which this information is not available and test methods and procedures (e.g. in bioreactors). The study may be restricted to a selection of quarantine organisms (organism/host plant combination) but should cover as many types of organisms as possible. A selection of unregulated model organisms that are closely related to quarantine organisms (proxies, native pests) can be considered for testing in an experimental set-up. Mould treatments for wood packaging have already been studied in the RF 23/07 CHECKWOOD project and are therefore excluded from this project.

An EPPO Standard (PM 3/66) has recently been published (https://onlinelibrary.wiley.com/doi/epdf/10.1111/epp.12879) and provides examples of specific treatment conditions for a number of pests (including references). This EPPO Standard, together with ISPM 28, can be used as a starting point for the project. Options other than for example incineration could be considered. More environmentally-friendly, lower-cost

treatments are encouraged, as is a study of cases where the infested area extends into a Natura 2000 protected zone, for example.

Research objectives

- List the methods and parameters that have already been studied and validated for certain organisms.
- Develop a treatment scheme (specific parameters; physical, chemical or biological treatment) for plants, plant products, growing media and other infested objects to enable the destruction and elimination of quarantine organisms already present in the EU and priority quarantine organisms.
- Consider selecting unregulated model organisms that are closely related to quarantine organisms (proxies) and testing them in an experimental set-up.
- Consider more environmentally-friendly treatments, including anaerobic digestion.
- Test procedures and validate methods to ensure that the treatment process and final product comply with the requirement for being free from quarantine organisms.
- Based on the biological characteristics of model organisms and their hosts, extrapolate or model parameters to ensure that treatments completely destroy quarantine organisms already present in the EU and priority quarantine organisms.
- Determine and indicate the degree of efficacy, specificity and practical feasibility of each treatment.
- Specify the development stage of the pest targeted by the proposed treatment.
- Document phytosanitary treatments to show that data on efficacy in eliminating quarantine organisms has been established on the basis of the appropriate scientific procedures.

Maximum grant: € 220,000

Maximum duration: 24 months

6. Presence of ochratoxin A in ripened meat products and ripened cheeses in Belgium (OTACHAM)

Context

Ochratoxin A (OTA) is a mycotoxin, i.e. a toxin produced by fungi, in particular the species Aspergillus ochraceus and Penicillium verrucosum. This mycotoxin is present in many plant products worldwide, such as cereals, coffee beans, cocoa, spices and nuts, and is mainly produced during storage. The substance has also been found in products such as wine, beer and grape juice, as well as in animal products such as pork kidneys and cured ham.

In May 2020, EFSA published its revised *scientific opinion* on the public health risks associated with the presence of OTA in food. In this opinion, EFSA used new data on the substance's toxicology and the presence of OTA in food since the last assessment in 2006. The EFSA concludes that OTA is potentially genotoxic and can have carcinogenic effects on kidneys.

According to this advice, meat products such as cured ham, sausages and salami can also be contaminated during processing or storage (maturing and drying). EFSA also points out that several studies have shown the possible presence of OTA in ripened cheese. These studies attribute the presence of OTA as most likely due to fungal growth on the surface of the cheese. Although common fungi on the surface of cheese do not produce OTA, the uncontrolled growth of moulds during ripening can lead to the production of mycotoxins.

Recently, the research project RT 22/07 MYCOPROF, financed by the FPS Health, also identified the presence of OTA in parmesan as a significant risk that requires further research to better assess exposure to this mycotoxin through long-ripened cheeses. Although this category bears the highest risk for OTA contamination, scientific literature indicates that mould growth also affects blue cheeses (Gorgonzola, Roquefort, etc.), thus contributing to overall exposure.

Currently, Commission Regulation (EC) No. 2023/915 on maximum levels for certain contaminants in food does not set a maximum limit for the presence of this mycotoxin in ripened meat products or in the various types of ripened cheese. The data on the presence of OTA in these foods in the EFSA opinion and their consumption in the European Union, particularly in Spain and Italy, may represent an increased exposure for consumers who enjoy these products.

For this reason, the European Commission and the Member States are working on a recommendation on data collection, with the aim of gathering sufficient data to be able to establish risk management measures where necessary.

In view of the above, Belgium should plan a prospective study to complement national knowledge on this issue with up-to-date data. More specifically, research should be built along two pillars: on the one hand, to study the occurrence of OTA in the food industry in Belgium and describe the production process to establish the steps likely to encourage the presence of this mycotoxin and thus remedy it; on the other hand, to estimate the presence of OTA in products that are produced abroad but commercialised on the Belgian market, like prosciutto crudo, jamón ibérico/serrano and parmesan.

The availability of a sampling procedure is a priority to guarantee the implementation of any type of control activity. It is essential that the sampling methods used enable representative samples of the analysed foods to be collected, and therefore that they therefore comply with the conditions set out in the legislation in force for official inspections (where applicable). With this research project, we also want to validate the methods applied to the foodstuffs in question. In the specific case of hams, a sampling procedure proposed by the Spanish authorities is being discussed at the European level to develop a harmonised approach. By following the same procedure, Belgium could contribute to its validation, as Italy has done in a recent study.

The results of the project will be communicated to the FPS Health, Food Chain Safety and Environment and to the FASFC, which are the competent authorities concerning the discussions of future European regulations on maximum limits and official inspections. Relevant data will also be sent to EFSA using the SSD2 format, enabling EFSA to update its OTA exposure and risk assessment.

Research questions

- Develop and/or use a representative sampling method to determine the distribution of OTA in the food products to be analysed
- Obtain an overview on the presence of OTA in ripened meat products (cold cuts and raw, dried hams) and ripened cheeses
  - produced in Belgium
  - produced outside Belgium and available on the Belgian market
- Identification of the steps that are likely to promote the presence of ochratoxin-producing moulds in the absence of control of certain process parameters in food production
- Elaboration of recommendations for good manufacturing practices addressed to operators producing these products
- Provision of concentration data in SSD2 format, ready for submission to EFSA.

Maximum grant: € 165,000

Maximum duration: 18 months

7. Nitrosamines in foodstuffs (TCNA-FOOD)

Context

According to the European Food Safety Authority (EFSA) 2023 risk assessment, there is cause for concern for consumer health in terms of current dietary exposure to nitrosamines. To follow up this assessment with risk management, a further policy preparatory study is indicated.

The aim of this study is to identify the presence, sources, origin and (prevention of) formation of nitrosamines in foods.

The results of the research will serve as input to set maximum levels for nitrosamines at the European level in the Contaminants Regulation (Regulation (EU) 2023/915) to protect consumers. It may also lead to good practice guidance for prevention and reduction of nitrosamines in foodstuffs.

The EFSA has identified the following ten carcinogenic N-nitrosamines (TCNAs) as being relevant in food:

1. NDMA: N-nitrosodimethylamine
2. NMEA: N-nitrosomethylethylamine
3. NDEA: N-nitrosodiethylamine
4. NDPA: N-nitrosodipropylamine
5. NDBA: N-nitrosodibutylamine
6. NMA: N-nitrosomethylaniline
7. NSAR: N-nitrososarcosine
8. NMOR: N-nitrosomorpholine
9. NPIP: N-nitrosopiperidine
10. NPYR: N-nitrosopyrrolidine

The abovementioned 2023 EFSA opinion mentions the following research recommendations:

- Standardise a sensitive analytical method to quantify the 10 carcinogenic nitrosamines, i.e. both volatile and non-volatile nitrosamines in different foodstuffs
- Collect data on nitrosamines in processed foodstuffs other than processed meat (i.e. raw meat, vegetables, cereals, milk and dairy products, fermented foods, pickled preserves, spiced foods, etc.) and from products that have been heat-treated in various ways with and without the addition of nitrate and nitrite.

Belgian data are also needed to gain insight into the exposure of the Belgian population. Therefore, we also need concentration data for TCNAs in meat products and the possible relationship with recipe choices and processing.
In the earlier MEATNOX project (RF 11/6250, 2012-2015), observations were made regarding the formation of DNA adducts related to N-nitroso compounds upon digestion of different types of meat products.

There are also Belgian studies such as those by De Mey et al. 2014[ii] and Drabik-Markiewicz et al[iii]. The current project is obviously intended to be complementary to research already conducted and thus to obtain new information. The study should also be complementary to a study to be conducted for EFSA on the formation of nitrosamines. It is recommended to contact European laboratories working on the nitrosamines analysis in food in order to progress as efficiently as possible.

Research objectives

- To perform a literature review (method of analysis, concentration data of nitrosamines in food, identification of precursors and sources of precursors, mechanism of formation, factors influencing nitrosamine formation, effectiveness of prevention measures)
- To develop and validate a method for all TCNAs in all food groups that may be relevant to intake. The method must be reliable and sensitive (a maximum LOQ of 0.5 ppb per nitrosamine)
- To analyse at least 400 food samples available on the Belgian market. The sampling plan should take into account contamination risks and data gaps to be derived from findings in the literature review. The following food groups should at least be included: meat products, raw meat, beer, cereal products, milk and dairy products, fermented foods, processed vegetables, pickled preserves, spiced/peppered foods, compound foods with additional heating steps such as pizza.
  The measurements should be sufficient to estimate the intake of Belgian consumers and should cover individual samples to gain insight into the variation of contamination within food groups.
- To estimate the exposure of the Belgian population (age groups, percentiles of intake such as P95) to TCNAs, and contributions of food groups to the total intake.
- To develop a proposal of a guideline for prevention of formation and reduction of presence of nitrosamines in food, based on literature and input from the Guidance committee.

Should the European Commission develop a monitoring recommendation, the project should take into account the specifications of this European recommendation.

Food analyses should be performed early in the project so that these data are available for standards discussions at the European level. The concentration data from the market study should be delivered in the appropriate format to the FPS Health for transfer to the EFSA database. Samples should be well described (ingredients, processing, …).

Maximum grant: € 330,000

Maximum duration: 36 months

[ii] De Mey et al, The occurrence of N-nitrosamines, residual nitrite and biogenic amines in commercial dry fermented sausages and evaluation of their occasional relation. Meat Science 96 (2014) 821-828.
[iii] Drabik-Markiewicz et al, Evaluation of the influence of proline, hydroxyproline or pyrrolidine in the presence of sodium nitrite on N-nitrosamine formation when
heating cured meat. Analytica Chimica Acta 657 (2010) 123-130.

8. Microbiological safety of plant-based alternatives to dairy products (PADAL)

Context

The shift in consumer diets from animal protein to plant-based alternatives has resulted in rapid growth in the supply of new dairy and meat alternatives. Although the raw materials (e.g. soy, lentils, beans) are not new to the food industry, the way they are processed and used in these plant-based alternatives is proving to pose new challenges[iv]. For example, the recent RISK_LMO_RTE project found, based on sampling and challenge testing, that several types of "new" plant-based ready-to-eat foods pose a high to very high risk for presence and growth of *Listeria monocytogenes*[v].

Moreover, the European Union One Health 2021 Zoonoses Report[vi] linked several outbreaks to plant-based alternatives to animal products. For example, outbreaks of listeriosis and salmonellosis were reported in several Member States and linked to a cheese alternative based on almond, walnut and cashew nut[vii].

There are still knowledge gaps concerning microbiological risks, especially with regard to plant-based alternatives to dairy products (e.g. plant-based drinks, cheeses (both hard and soft), plant-based alternative to yogurt[viii]). The long survival time of foodborne pathogens on nuts, the potential microbiological growth when nuts are soaked, the lower pasteurisation temperatures, and the rapid growth of foodborne pathogens in plant-based drinks compared to animal milk, among other factors, create a need for research. The study by Kyrylenko *et al.* (2023) examined the levels and types of microbiological contaminants in various plant ingredients (e.g. peas, beans, etc.) used for dairy alternatives. This study highlights the importance of spore formers in these raw materials.

Research objectives

- Identification of the main (types of) dairy alternatives (e.g. plant-based drinks, cheeses (both hard and soft), plant-based alternatives for yogurt, cream and dairy desserts) and raw materials (e.g. cereals (oats, spelt, rice, etc.), nuts and seeds, pulses, fava beans...) on the Belgian market
- Identification of relevant pathogens by type of dairy alternative and raw material, with special attention to spore formers
- Sampling and analysis of products on the Belgian market (complementary to available FASFC monitoring data)

[iv] Kyrylenko et al. 2023. Levels and types of microbial contaminants in different plant-based ingredients used in dairy alternatives. International journal of food microbiology, 407,110392. https://doi.org/10.1016/j.ijfoodmicro.2023.110392

[v] https://www.health.belgium.be/fr/mise-en-place-dun-profil-de-risque-de-listeria-monocytogenes-dans-des-denrees-alimentaites-pretes

[vi] European Food Safety Authority and European Centre for Disease Prevention and Control, 2022. The EU One Health 2021 Zoonoses Report. EFSA Journal 2022;20(12): 7666, 273 pp.

[vii] BSFM symposium presentation – Lieve Herman 12/10/2023 "EFSA/FAVV reports with details on EU zoonosis and AMR report, aged meat, vacuum food preparation"

[viii] Part et al. 2023. Microbiological, chemical and sensorial characterisation of commercially available plant-based yoghurt alternatives. 2023. Future Foods, 7, 100212.

- Mapping key process stages to produce these (types of) dairy alternatives. Investigation of behaviour (growth / inactivation / survival / toxin production) of foodborne pathogens throughout the process steps (taking into account heat resistance of spores present in powdered ingredients (which have already undergone heat treatment) and may clump, thus further increasing heat resistance; lower pasteurisation temperatures/times due to heat-sensitive proteins, growth during soaking of e.g. nuts, …)
  This should involve challenge tests, possibly in combination with predictive models.

- Estimation of the risk of relevant foodborne pathogens and identification of critical parameters for the mitigation of this risk.

Maximum grant: € 330,000

Maximum duration: 36 months

9. Plant toxins in foods derived from hemp (HEMPPLATOX)

Context

Hemp seeds and derivatives are marketed as food products. In 2015, the Scientific Panel on Contaminants in the Food Chain of the European Food Safety Authority (EFSA) issued a scientific opinion on human health risks associated with the presence of tetrahydrocannabinol (THC) in milk and other foods of animal origin. THC, specifically Δ9-THC, is the most relevant component of the hemp plant *Cannabis sativa*. EFSA established an acute reference dose (ARfD) of 1 µg Δ9-THC/kg body weight.

European Commission Recommendation (EU) 2016/2115 of 1 December 2016 on the monitoring of the presence of Δ9-tetrahydrocannabinol, its precursors and other cannabinoids in food has not been implemented in Belgium to date.

In its Advice 25-2017, the Scientific Committee of the FASFC proposed action thresholds for THC in food of animal origin.

On 7 January 2020, EFSA published a scientific report assessing acute human exposure to Δ9-THC taking into account the data on its presence as generated in accordance with Recommendation (EU) 2016/2115. According to certain estimates of acute exposure, the ARfD of 1 µg/kg body weight was exceeded. Although exposure estimates are expected to overestimate acute exposure to Δ9-THC in the Union, current exposure to Δ9-THC poses a potential health risk.

Since the publication of Commission Regulation (EU) 2022/1393 of 11 August 2022 amending Regulation (EC) No 1881/2006 as regards maximum levels of delta-9-tetrahydrocannabinol (Δ9-THC) in hemp seeds and products derived therefrom, there are European standards for THC equivalents (Δ9-THC and Δ-9-THCA) in hemp seeds and hemp seed oil, applicable as from 1 January 2023. Currently, the standards are contained in Regulation (EU) 2023/915 on maximum levels for certain contaminants in foodstuffs and repealing Regulation (EC) No 1881/2006.

However, there are not yet specific standards for all derived consumer products. It is not clear whether consumers are already adequately protected by current standards. Since this is an acute reference dose, intake via a serving of a consumer product is relevant. This study could provide a basis for deciding whether standards development for compound foods with hemp seed ingredients is important.

There is also a demand for data for delta-8-THC so that we can make informed decisions on whether or not to include this substance in the standards for THC equivalents.

There is significant added value in including even more cannabinoids in the project, especially psychoactive substances and their precursors. A range of substances were listed in Recommendation 2016/2115. According to more recent literature, other substances have been found as well[ix].

In terms of the method of analysis, contacts with the EURL are desirable. The method should yield reliable results.

The sampling method should provide analysis results that are representative of the sampled lot. Therefore, the sample must be large enough to accommodate heterogeneity within the lot. The

[ix] (Cinzia et al, Analysis of cannabinoids in commercial hemp seed oil and decarboxylation kinetics studies of cannabidiolic acid (CBDA), Journal of Pharmaceutical and Biomedical Analysis 149 (2018) 532-540)

official sampling method as described in Regulation 2023/2783 laying down sampling procedures and methods of analysis for monitoring plant toxin levels in foodstuffs and Regulation 2023/2782 laying down sampling procedures and methods of analysis for monitoring mycotoxin levels in foodstuffs should be respected. The entire sample should be homogenised during sample preparation.

Following the European Contaminants Regulation, there are plans for amendments to the Royal Decree of 31 August 2021 on the production of and trade in foodstuffs composed of or containing plants or plant preparations. The current situation is explained on the FPS website.

This project is a policy-preparing study, for the possible extension of standards to other cannabinoids and the possible establishment of specific safe standards for compound foods containing hemp, and the evaluation of the safety of current standards for Belgian consumers. It is not meant to be a control action with respect to existing standards. Nonetheless, exceedances of the current standards, if identified, should be notified to FASFC.

In this project, estimates of acute intake of THC equivalents (Δ9-THC and Δ-9-THCA) can be done based on analytical measurement results, portion sizes and acute consumption figures as resulted from the survey, for comparison with EFSA's acute reference dose. It would be interesting to calculate the impact of any inclusion of delta-8-THC in the exposure assessement. No estimates need to be made for other substances. EFSA may use the data later, when a risk assessment is performed for other cannabinoids.

Research objectives

1) Determine delta-9-THC, delta-8-THC and THCA and other cannabinoids (see also Recommendation (EU) 2016/2115, as well as other cannabinoids that may be psychoactive, or their precursors) in a representative number of (compound) foods based on hemp seeds or derivatives. A validated analytical method with a limit of quantification (LOQ) no higher than 0.1 mg/kg per substance and low enough to identify an acute risk should be used (an upperbound estimate of a negative sample should not lead to an exceedance of the acute reference dose). For beverages, an LOQ of 0.02 mg/kg is aimed for. A minimum of 60 samples should be analysed, of which about half are compound foods and the other half are products that already have a standard for THC equivalents in the Annex to Regulation 2023/915. The portion size of the food containing hemp should be noted in grams, e.g. the weight of a burger with hemp sampled and analysed.
2) Conduct a survey of consumers of different age groups who use hemp oil or hemp seeds or derivatives in the kitchen and consume them as food to estimate the acute intake of THC equivalents from a serving of food containing hemp products. For this, it is necessary to know per consumer (with a known body weight) how much is typically and maximally consumed in one day of the hemp oil, hemp seeds, etc.

   The survey should be conducted among people living in Flanders, Brussels and Wallonia.
3) Estimation of acute intake of THC equivalents based on portion sizes of the included foods and the maximum consumption figures for one day as resulted from the survey, for scenarios of different age groups, and comparison with EFSA's acute reference dose.

The data should be submitted in EFSA's SSD2 format to the FPS HFCSE.

Maximum grant: € 110,000

Maximum duration: 15 months

2024-A-463 The use of insect trap collection fluids for the surveillance of quarantine fungi in forests (FUN2TRAP)

Short description

Early detection is crucial for an effective outbreak management of quarantine organisms. For most quarantine fungi, the surveillance is based on visual inspection, followed by sampling in case of symptoms. Since the effectiveness of visual inspection is considerably lower in forests and natural areas compared to in orchards and arable crops, spore traps are used in addition.
Insects surveillance is often done by pheromone traps loaded with collection fluids. In Canada and Australia, experience has learned that these fluids can also be used for the surveillance of fungal quarantine species, both insect-associated fungi as fungi spread by air borne spores (Tremblay et al. 2019; Bérubé et al. 2022; Trollip et al. 2023).
The use of a single trap for multiple organisms, fungi and insects, could significantly reduce labour and material costs. The aim of this topic is to test the feasibility of detecting EU quarantine fungi in collection fluids from traps that are currently used by NPPO for quarantine insect surveillance. If found successful, protocols can be developed for the implementation of this technique.
Potential outcomes:

- Types of insect traps, fluid containers and collection fluids that are most effective for the detection of fungi
- Comparison of the effectiveness with spore traps used specifically for fungi
- Development of an established method of sampling and processing
- Development of cost-effective detection technique(s) adapted to quarantine fungi found in traps in defined environments
- Validation of the technique

Description of the end product

- Protocols to use collection fluids of insect traps for the detection of quarantine fungi: sampling method, sample treatment and molecular detection method
- Validation of the detection technique

Provisional other funders

- Canadian Food Inspection Agency-Plant Research & Strategies, Canada (contact: Ms Brittany Day, brittany.day@canada.ca)
- Federal Ministry of Agriculture, Forestry, Regions and Water Management, Austria (contact: Mr Alois Egartner, alois.egartner@ages.at)
- National Plant Protection Organization, Netherlands Food and Consumer Products Safety Authority, the Netherlands (contact: Mr Maikel Aveskamp, M.M.Aveskamp@nvwa.nl; s.vanderlinde@nvwa.nl)
- Forestry Commission, United Kingdom (contact: Ms Joan Webber, joan.webber@forestresearch.gov.uk)
- Ministry of Agriculture Forestry and Food, Slovenia (contact: Ms Erika Oresek, erika.oresek@gov.si)

Provisional project duration

24-36 months

2024-A-468 Improved detection of regulated Torradoviruses (Detectorrado)

Short description

Torradoviruses are a recently described genus, with 8 member species. Of these, two species are regulated Quarantine pathogens in the UK, Switzerland and the EU (*Torradovirus marchitezum* and Tomato chocolate virus), with a further species having quarantine status in the UK and Switzerland (*Torradovirus lycopersici*/tomato torrado virus). Additionally, a potato infecting torradovirus (potato rugose stunting virus) has recently been described in Peru and intercepted entry to the USA and the Netherlands. At a recent EPPO virology panel the limited validation data for the detection of these viruses by existing assays was highlighted as a potential issue for proceeding with drafting a detection standard. Additionally, specific real-time RT-PCR tests are being developed for the detection of the viruses from the genus which are covered by regulations in the EPPO region, and the recent potato infecting torradovirus. The project would aim to validate both an existing generic torradovirus assay, and novel specific assays for the regulated torradoviruses. Within the project control isolates would be sought and artificial controls would also be designed. Following validation and evaluation of these assays a Test performance study would be conducted with the partners with a view to providing essential validation data to support drafting an EPPO standard for detection of these viruses.

Description of the end product

The outputs of this project would be the provision of validation data to support the implementation and use of both generic and specific tests intended for inclusion in a future EPPO diagnostic standard. These viruses are tested for as part of multi-annual surveys, and this would allow a more streamlined approach to the current testing regimes. These quarantine viruses of tomatoes and potato could severely impact on the production of those crops in the UK and the EPPO region, and early interception and diagnosis would prevent spread should they occur.

Provisional other funders

- Department for Environment Food and Rural Affairs, United Kingdom (contact: Mr Pete Seymour, Peter.Seymour@defra.gov.uk)
- Bioreba AG, Switzerland (contact: Mr Marco Keiser, kaiser@bioreba.ch)
- US Department of Agriculture, Animal and Plant Health Inspection Service, United States of America (contact: Ms Heike Meissner, heike.e.meissner@usda.gov; vessela.a.mavrodieva@usda.gov)
- Federal Ministry of Agriculture, Forestry, Regions and Water Management, Austria (contact: Mr Alois Egartner, alois.egartner@ages.at)
- Council for agronomic research and economic analysis, Italy (contact: Mr Sauro Simoni, sauro.simoni@crea.gov.it; antonio.tiberini@crea.gov.it)
- Ministry of Agriculture Forestry and Food, Slovenia (contact: Ms Erika Oresek, erika.oresek@gov.si)
- French Agency for Food, Environmental and Occupational Health & Safety, France (contact: Ms Géraldine Anthoine, geraldine.anthoine@anses.fr)
- Ministry of Agriculture, Plant Biosecurity, Plant Protection and Inspection Services, Israel (contact: Ms Shlomit Zioni, shlomitz@moag.gov.il)

Provisional project duration

12-24 months

2024-A-478 Towards spread and detection of *Diplodia bulgarica* in Europe

Short description

Diplodia bulgarica causes black canker on hosts in the family Rosaceae, but mainly on apple and pear with economically important impact. In the EU, *D. bulgarica* has been reported from Bulgaria and Germany. This currently known distribution must be taken with caution, and this pest may be widely distributed in Europe but has not been detected because of lacking or insufficient research. In addition, plants for planting represent the main pathway of the further spread and there is ongoing trade of host planting material within EU member states. Besides *D. bulgarica*, reported as predominant species in Germany, other Diplodia species (e.g. *D. intermedia*, *D. malorum*, *D. mutila*, *D. seriata*) and other members of the Botryosphaeriaceae family affect apple and pear even though causing similar symptoms. Gaining an understanding of current distribution of *D. bulgarica* in the EU and facilitating its detection and identification will increase awareness of the disease in the MSs.

Description of the end product

The project will provide information about the dissemination of *D. bulgarica* in Europe and the Mediterranean and support the development of sound detection measures.

Provisional other funders

- Federal Ministry of Food and Agriculture, Germany (contact: Ms Silke Steinmöller, silke.steinmoeller@julius-kuehn.de)
- Federal Ministry of Agriculture, Forestry, Regions and Water Management, Austria (contact: Mr Alois Egartner, alois.egartner@ages.at)
- Council for agronomic research and economic analysis, Italy (contact: Mr Sauro Simoni, sauro.simoni@crea.gov.it; massimo.pilotti@crea.gov.it; angela.brunetti@crea.gov.it)
- BENAKI PHYTPATHOLOGICAL INSTITUTE, Greece (contact: Ms Irene Vloutoglou, i.vloutoglou@bpi.gr; e.kalogeropoulou@bpi.gr)
- Ministry of Food Agriculture and Forestry, General Directorate of Food and Control, Turkey (contact: Mr Suat Kaymak, suatkaymak@tarimorman.gov.tr)
- Ministry of Agriculture, Plant Biosecurity, Plant Protection and Inspection Services, Israel (contact: Ms Shlomit Zioni, shlomitz@moag.gov.il)

Provisional project duration

24-36 months