2021-2022 Food Safety Request for Proposals

The Foundation for Meat and Poultry Research and Education (Foundation) is a non-profit research, education and information foundation established to study ways the meat and poultry industry can produce better, safer products and operate more efficiently. The Foundation funds a broad range of food safety, nutrition and consumer information projects.

Instructions on preproposal development and submission can be found [here](#). Please submit your preproposals online by 5 p.m. ET on Friday, August 20.

The Foundation invites pre-proposals on the following food safety research priorities:

**Pre-Harvest Food Safety**

**PRE_FS1** - Develop greater understanding of the ecology and epidemiology of STEC and *Salmonella*, in cattle, and *Salmonella* in hogs. Determine the mechanism for internal colonization and corresponding opportunities for control. Research should address any obstacles in commercial adoption, including, but not limited to, regulatory approval, non-economic barriers, etc., of the control method investigated.

**PRE_FS2** - Explore the premise that internalized contamination is present in cattle and hogs. Research should:
- Develop live animal intervention strategies to prevent or reduce *Salmonella* colonization within the lymphatic system.
- Investigate whether vaccination has an impact on, or correlation to, internalization.

**PRE_FS3** - Investigate the microbiome of hogs that shed *Salmonella*. Research should focus on variables that lead or allow hogs to become *Salmonella* shedders. Research should also address the role that different environmental factors (diet, probiotics, vaccines, antibiotic use, etc.) have on microbiome and shedder status. Research should build on existing research.

**PRE_FS4** - Develop economically viable strategies for pre-harvest interventions including changes in production practices and novel feed additives. Research should address any obstacles in commercial adoption, including, but not limited to, regulatory approval, non-economic barriers, etc. As well as the effect of investigated preharvest interventions on post-harvest safety.

**PRE_FS5** - Investigate the use of testing for *Salmonella* related antibodies identified in hogs antemortem and the relationship between results and internal colonization.

**PRE_FS6** - Investigate mitigation strategies for keeping *Salmonella* out of the lymphatic system of hogs.

**PRE_FS7** - Evaluate routes of *Salmonella* transmission during hog lairage. Research may include investigating potential incoming load of *Salmonella* in live hogs, spread amongst hogs during lairage, potential contamination from the lairage environment and more.
- Evaluate factors that contribute to higher *Salmonella* quantities after pigs leave lairage, relative to when pigs enter lairage. Research may include evaluating contamination factors from farm to lairage to entering the plant for harvest.
Post-Harvest Food Safety

POST_FS1 - Develop rapid detection technologies that are based on detecting the pathogenic serotypes and highly virulent subsets of STEC, and *Salmonella*. The technology should:
- Address virulence factors;
- Ensure detection of virulence factors are from one serotype or cell.
- The technologies and protocols should be clearly defined to enable direct comparison with existing technologies.

POST_FS2 - Develop rapid methods for quantitative *Salmonella*. Research should:
- Develop guidance on how to implement new technologies and methods, including the documentation required by industry to gain regulatory approval.
- Testing technology should be compatible with the N60, N60 Plus and MicroTally sampling methods.

POST_FS3 - Determine and evaluate factors that correlate to high event periods (HEP). Research should:
- Investigate if there are genetic markers or strains that travel together;
- Address other factors leading to HEP that may result in HEP;
- Assess potential unknowns; and
- Identify data gaps that may cause HEP.

POST_FS4 - Identify and validate antimicrobial interventions to reduce pathogen contamination of raw ground beef components and raw pork components intended for use in ground products. Interventions should be approved for use in the U.S. and ideally the major export markets for the specific variety meats.

POST_FS5 - Investigate efficient and sustainable application of antimicrobials to reduce pathogens on beef, pork and poultry products. Research may evaluate and determine the effectiveness of non-thermal and non-chemical intervention technologies to reduce pathogen loads on meat and/or poultry products. The proposals should evaluate:
- Water reduction and reuse, specifically efficacy during treatment period;
- Reuse of antimicrobial treatments, specifically efficacy during “lifespan” of reuse treatment, including decay rate of efficacy; and
- Type of application—both existing and novel technology.

POST_FS6 - Evaluate novel methods for reducing transfer of foodborne pathogens from cattle hides during production to the carcass and from the exterior of a sow carcass to finished products.

POST_FS7 - Develop a quantitative microbiological risk assessment model using currently existing data sources to evaluate the impact of *Salmonella* enumeration strategies on public health after consumption of contaminated pork in the US. Published studies on other commodities indicate levels of contamination can be even more important to public health than prevalence as they are directly related to the likelihood that the ingested dose exceeds the minimum infectious dose needed for disease development. Research may include evaluation of acceptable sensitivity (1 CFU/g, 1 CFU/kg, 10 CFU/g, etc.)

POST_FS8 - Determine the most effective location(s) from harvest to shipping to maximize reduction of microbial contamination in hog processing. Research should address or evaluate different interventions on products destined for ground pork.
POST_FS9 - Investigate levels of *Salmonella* throughout the lymphatic system of sows and how to control and reduce *Salmonella* in the lymphatic system of both market hogs and sows. Research may:
  - Identify specific lymph nodes of concern.
  - How to mitigate potential further contamination from lymph nodes to pork products.
  - Evaluate factors that may contribute to variation between different lymph nodes, across different production practices, regions and seasons.

POST_FS10 - Evaluate common production processes used during the production of uncured meat and poultry products (with emphasis on larger multiple muscle products) to better understand the appropriate lethality and cooling. Research should explore the addition of any ingredient that may influence the critical food safety parameters used during the production of products including those that are clean label, “natural” or organic products. Research should consider:
  - Validate cooking time, temperature, humidity parameters under various conditions/scenarios in products, including slow cook and slow come up times. *L. monocytogenes, S. aureus, C. perfringens*, outgrowth should be evaluated, and challenge studies would be appropriate, especially as it considers conditions such as overloaded ovens.
  - Validate cooling times as it relates to outgrowth and lethality under the same conditions as outlined above.
  - Evaluate and develop pathogen models for cooking and cooling uncured meat and poultry items (such as roast beef and poultry) that have slow come up times and experience a deviation.
  - Evaluate the effect of non-continuous cooling as it relates to slow come up time in these uncured products.

POST_FS11 - Develop mathematical model to evaluate the safety if cook dwell time more than 6 hours for uncured products as affected by interaction of meat pH (5.8-6.8), salt (0.5-2.0%) and moisture (68-76%). Research should evaluate growth in meat/poultry with low loads of background microbial loads and no phosphate in formulation as both of these factors are highly variable in actual processing and may significantly influence the growth.

POST_FS12 - Explore innovative pathogen control measures and parameters. Controls evaluated should address pathogens such as *L. monocytogenes, S. aureus, and C. perfringens* growth and survival. Research should focus on potential controls outside of those well documented in existing safe harbors (such as Appendices A and B) and scientific literature.

Environmental Safety Research

EFS1 - Evaluate genetic factors that allow *Salmonella* and *Listeria* to live and thrive in processing environments, on food contact surfaces and on products, including in specific niches (e.g. areas with high or low temperatures, etc.). Research should include how these pathogens survive, assess the virulence phenotypes of these pathogens and if environmental factors could alter virulence gene expression. Research would likely need to focus on the evaluation of the closed genomes of pathogens using next generation sequencing.

EFS2 - Develop new and novel environmental monitoring strategies, detection, and/or sampling methods to more effectively identify pathogen harborage sites. Research should provide the necessary critical parameters needed for validation and modeling.
  - Identify factors contributing to and influencing the ecology of facilities.
  - Identify and mitigate factors contributing to the development of harborage sites.
EFS3 - Identify methods to detect biofilm formation and removal as affected by different surfaces used in harvesting cattle and processing beef. Research should focus on methods to detect and measure biofilm presence; cleaners to remove biofilms; and be applicable in a commercial setting.

- Identify the potential for *Salmonella* harbors within the post-harvest processing environment and determine interventions to reduce or eliminate the presence of *Salmonella* in the identified harbors, which should be validated for effectiveness.