

March 1, 2019

REQUEST FOR RESEARCH PROPOSALS

On behalf of Idaho's cattle producers, the Idaho Beef Council is soliciting research proposals in the following areas:

- PRE-HARVEST BEEF SAFETY
- HUMAN NUTRITION
- PRODUCT QUALITY & TECHNICAL SERVICES
- POST-HARVEST
- SUSTAINABILITY
- OTHER RESEARCH SUPPORTIVE OF THE BEEF INDUSTRY

To be considered for funding, please submit proposal with the following information:

- Indication of which area (listed above) this research will address
- Description of institution or other facilities available for this study
- Other organizations involved with project
 - Provide the names and locations of organizations, which will be collaborating with you, and the nature of the collaboration on this project such as services provided.
- Project Information (Maximum limit of 15 pages for this section).
 - Project Title
 - Present knowledge of subject – literature review
 - Description of earlier research by Principal Investigator (PI) in this area or closely related field. Cite important publications authored by the PI (not more than 5) on this or closely related subjects.
 - Statement of problem and specific objectives of the study; be descriptive, quantitative and provide an estimate of the time frame for accomplishment of each.
 - Design of experiment/materials and methods. Provide details of project protocol, techniques involved, sampling regime and the required analyses.
 - Total time required for completion of objectives, statistical analyses and written manuscript/final report.
 - Percent of time to be spent on the project by: Principal Investigator, Associate Investigator, Technician, Student, etc.
 - Time schedule of, person responsible for, and method of periodic status reports to the industry, Idaho Beef Council and others.
- Provide a 1-2 page biographical sketch or curriculum vitae (NIH format acceptable). This may be in addition to the 15-page limit noted above.
- Budget proposal outlining capital outlay, personnel and materials, computer/publications, travel, miscellaneous costs.
 - Please note the following budget restrictions: indirect / overhead costs, principal investigator salary, student fees, tuition and major equipment purchases are not allowed.
- Statement of other sources of support/co-funding

- Statement of how the proposed research will be of economic benefit to the beef industry.
- Signature of principal investigator, department head and contract/grants official
- Contact information including mailing address, telephone and e-mail information
- Indication if you would like to present this proposal at IBC Board meeting April 17, 2019.
- Summary Sheet (1 page):
 - Date submitted
 - Principal investigator
 - Project title
 - Objectives of research proposal
 - Description of Research proposal
 - Short-term benefit of the research to beef industry
 - Long-term benefit of the research to the beef industry
 - Estimated cost for FY20
 - Total cost (if multi-year)
 - Amount requested from IBC in FY20
 - Estimated timetable of research

Applications for fiscal year 20 (FY20) are due **on or before April 1, 2019** in both Word and PDF format. Please use either Calibri 11.5 or Times New Roman 12 point font. The Idaho Beef Council fiscal year is July 1, 2019 through June 30, 2020.

Please note, due to the fact The Idaho Beef Council must close its books in August for a financial and compliance audit:

- Awarded research funds can only be spent July 1, 2019 through June 30, 2020.
- All expenses incurred July 1, 2019 through June 30, 2020 must be invoiced by July 30, 2020.
- Final reports summarizing research are due by July 30, 2020.

Research objectives should be clearly defined, and studies should be well-controlled. Proposals should clearly identify the relevance and potential benefit to the beef industry. To the extent possible, nutrition studies should be conducted with humans, and for whatever age group selected, a clearly defined population should be identified. Nutrition study design should utilize dietary beef among the treatment groups.

Research will be funded beginning July 1, 2019 through June 30, 2020. Please note, you must provide evidence that the appropriate animal/human institution review committee has reviewed the proposal. Projects will not be funded until appropriate review qualifications have been met.

If a proposal is selected for funding, **all awarded dollars must be spent by June 30, 2020 and final report and invoice received by July 30, 2020.** Funding may be renewed for a second year upon approval of a funding proposal for the second year. Budgets may vary widely, however, a well-justified and efficient budget, in both project cost and duration must be presented. We are aware that academic institutions have financial obligations for administering the research grants awarded to the faculty members. However, overhead costs, principal investigator salaries, student fees, fringe benefits, tuition and equipment purchases will not be considered as part of the funds made available for this research.

Leveraged funding through collaborations with industry, foundations, government and other sources with matching funds is encouraged. In addition, collaboration with additional researchers is encouraged where appropriate.

Proposals will be reviewed by the National Cattlemen’s Beef Association, industry experts and the Idaho Beef Council Board of Directors. Proposals will be evaluated for uniqueness, relevance, soundness, potential for

success, budget appropriateness and potential benefit to the industry and return on checkoff investment. The Cattlemen's Beef Board will also review the proposals for eligibility of checkoff funding. Applicants will be notified of funding decisions by May 15, 2019 and contracts will be issued in June 2019. Please note, applicants who are awarded funding will be given 30 days to sign the research contract. Contracts not signed within 30 days may forfeit funding. As the funding source, the Idaho Beef Council issues the research contract. This is a standard beef industry contract used by State Beef Councils and changes to it will not be permitted. To view the contract in advance please contact the Idaho Beef Council.

Applicants are invited to present their proposals in person at the April 17, 2019 board meeting to be held in Boise. **If you wish to present your proposal at the meeting, you must notify the Idaho Beef Council office with your proposal submission to be included on the agenda.** All research proposal presenters will be given 15 minutes on the agenda. Presenting your proposal in person is not required for funding. Funding is dependent upon receipt of a fully executed contract and will start July 1, 2019.

Please review the application form and note the information and format required, as well as the page and budget restrictions. For any questions, please contact TK Kuwahara, Executive Director, by phone at 208-376-6004 or email to tkuwahara@idbeef.org.

Please share the enclosed guidelines and application materials with all appropriate individuals at your institution or elsewhere. This announcement and the application form can also be found online at: www.idbeef.org.

The deadline for completed applications (a signed original and electronic copy) is April 1, 2019. Please submit applications to:

**Idaho Beef Council
1951 W. Frederic Lane
Boise, Idaho 83705
beefcouncil@idbeef.org**

The Idaho Beef Council's research program is funded by Idaho's Beef Producers through the \$1.50-per-head beef checkoff. For more information please visit the Idaho Beef Council website at www.idbeef.org.

The following research areas have been identified as the highest priority for support. Applicants should indicate the area for which their application is being submitted. Applications that do not address the defined priorities will be considered for funding if they have direct relevance to the beef industry and demonstrate innovative thinking and sound scientific design.

FY20 IDAHO BEEF COUNCIL RESEARCH PRIORITIES

PRE-HARVEST BEEF SAFETY

Goal: Protect beef demand through critical science and targeted outreach programs

Research



Engagement

Disseminate written content and visual tools
 Share results with scientific, industry & influencers
 Monitor real or perceived threats

Intended Outcome: Science-based evidence that informs thought leaders to improve the real or perceived safety of beef

PRODUCT QUALITY & TECHNICAL SERVICES

Research Goal: Utilize science to solve complex issues associated with product quality and consistency, and improve the unique taste attributes of beef that drive it's demand.

Palatability & Consistency Research	Technical Services
<p>Flavor Identified as a high-level research priority through 2020 with the goal of understanding flavor complexity and optimizing flavor consistency. Achieved through a targeted research model.</p> <p><u>Considerations:</u></p> <ul style="list-style-type: none"> • Key flavor attributes and sensory evaluation • Precursor compounds • Industry steps pre- and post-harvest [i.e., feeding, aging (traditional- and long-aging, wet and dry), cooking methods, degree of doneness, etc.] • Cuts beyond middle meats and different beef types or quality levels • Positive and negative/off flavors 	<p>Tenderness & Juiciness Explore beef tenderness and juiciness attributes and how they develop and change across products because of pre- and post-harvest industry steps. Research goal is to improve consistency of these attributes. Achieved through RFP model.</p> <p><u>Considerations:</u></p> <ul style="list-style-type: none"> • Industry steps pre- and post-harvest [i.e., feeding, aging (traditional- and long-aging, wet and dry) cooking methods, degree of doneness, etc.] • Cuts beyond middle meats and different beef types or quality levels • Marbling • Carcass and cut size increases
<p>Disseminate science-based research results to key industry stakeholders via creation and distribution of technical materials and tools. Monitor ongoing meat science research, trends, information gaps and research needs.</p> <p>Serve as key resource for expertise and education on the beef carcass, muscles and cuts, fabrication methods (traditional and novel) and beef technologies such as aging, packaging, nomenclature, cut substitutions, etc.</p> <p><u>Audience Examples:</u></p> <ul style="list-style-type: none"> • Scientific community • Packers & processors • Other Checkoff programs • State and channel partners 	

Technical Services Goal: Serve the industry through expertise and leadership on beef carcass muscles, cuts, product attributes and fabrication solutions.

HUMAN NUTRITION

Goal: Establish beef as a foundational food for health

Research Pillars

Healthy Dietary Patterns with Beef

Beef enhances a variety of healthy dietary patterns.

- Unique Needs Across the Lifecycle, Special Populations
- Evidence in Perspective
 - Patterns vs. Specific Foods
 - Beef Consumption
 - Beef Lipids

Physical Performance

Beef is energizing, for strength of body and mind.

- Mental Energy & Cognitive Performance
- Everyday Physical Performance/ Ability
- Diet Quality and Nourishment
- Body Composition

Satisfaction

Beef can play a significant role in helping manage weight, improving adherence to and enjoyment of a healthy diet.

- Appetite/Healthy Weight
- Healthy Diet Compliance
- Enjoyment and Pleasure

SUSTAINABILITY

Goal: Support and promote the value of beef through substantiated science and collaborative engagement

Research

Benchmark & Improve Sustainability

Support scientific advancement of the life cycle assessment to measure beef sustainability using social, economic, and environmental indicators

- ♦ Define & communicate sustainable beef production
 - ♦ Life cycle assessment updates
 - ♦ Collection of region specific data
- ♦ Demonstrate continuous improvement

Build Trust

Demonstrate the industry's commitment to sustainable beef by leveraging successes & opportunities across the beef value chain

- ♦ Identify improvement opportunities
- ♦ Advocate for diversity in production methods
 - ♦ Demonstrate the sustainability of beef
 - ♦ Sustainable diets for health

Engagement

Assure stakeholders/influencers of the beef industry's commitment to continually improving the sustainability of beef

- ♦ Disseminate written content and visual tools
- ♦ Share results with scientific, industry & influencers
 - ♦ Monitor real or perceived threats

Intended Outcome: Provide science-based evidence to inform and engage industry stakeholders on the true sustainability of beef

POST-HARVEST

These priorities address: *Salmonella* in beef products; Shiga toxin-producing *Escherichia coli* (O157:H7, O26, O103, O111, O121, O45, and O145, as well as emerging serotypes) in fresh beef products; *Listeria monocytogenes* on ready-to-eat (RTE) beef products; as well as other food safety issues.

1. Explore the premise that internalized contamination is present in food production animals.
 - When appropriate, determine if all lymph nodes, or only major lymph nodes, are an issue, and address mitigation techniques (*e.g.* lymph node removal, antimicrobial application) for the identified sources of internalized contamination. Are these techniques implementable under normal commercial conditions?
 - Investigate whether vaccination has an impact on, or correlation to, internalization.
2. Develop detection technologies that are based on detecting the pathogenic serotypes of STEC, *Salmonella*, *L. monocytogenes*, and other foodborne pathogens. The technology should:
 - Address virulence factors;
 - Address the heterogeneity of commercial samples; and
 - 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.
3. Evaluate real-time or near real-time *Listeria* sampling and testing technologies.
4. Develop improved and validated quantitative methods for *L. monocytogenes* detection in beef and environmental samples.
5. Develop methods for quantitative *Salmonella* enumeration or methods based on virulence factors rather than serotypes and demonstrate how these methods can be used to improve public health. Research should:
 - Address any obstacles in commercial adoption, including, but not limited to, regulatory approval, non-economic barriers, *etc.*

Innovative Pathogen Intervention Technologies

6. Determine the lowest level/concentration of commonly used and novel antimicrobial treatments that are effective in reducing foodborne pathogens on beef products. Research should address effectiveness in hot and cold carcasses; primals; parts; and trim; and,
 - Address existing FSIS and FDA regulations (*e.g.* FSIS Supplementary Guidance, FDA approval status);
 - Define the meaning of bacteriostatic and bactericidal in the context of existing regulations;
 - Include an evaluation of the impact on sensory attributes, cost and application method.
7. Evaluate and determine the effectiveness of non-thermal and non-chemical intervention technologies to reduce pathogen loads on beef products.
8. Determine the most effective location(s) in the production chain for ground beef to apply interventions to maximize reduction of microbial contamination.
 - Consider if the application of pre-harvest interventions in a food safety system reduces foodborne pathogen contamination in ground beef products, and if carcass washes and/or other post-harvest interventions in a food safety system reduce pathogen contamination in ground beef products.

9. Identify likely sources of contamination, risk factors, and how to systematically intervene at the production facility to reduce the levels of foodborne pathogens present on carcasses and beef products. Research should:
 - When appropriate, identify if current production methods influence pathogen load;
 - Identify and/or develop and validate novel or improved interventions; address any obstacles in commercial adoption, including, but not limited to, regulatory approval, non-economic barriers, *etc.*; and evaluate interventions known to be cost-effective and consumer-accepted.
 - Compare effectiveness of carcass washing and trimming for reduction on carcasses; and
 - Evaluate the efficacy of non-water-based antimicrobial treatments in reducing pathogens on trimmings or ground beef products. Research should address the impact of the intervention on the organoleptic properties and shelf-life and demonstrate that treated product would still qualify for any standard of identity requirements.

10. Determine the effectiveness of existing or new intervention technologies on multiple serovars of *Salmonella*. Research should:
 - Determine if there are markers or factors that make certain serovars more resistant or
 - Susceptible to interventions.
 - Provide justification for serovars included in the proposal.

11. Validate existing and commonly used intervention technologies for *L. monocytogenes* and how they impact *Salmonella* survival in fully-cooked RTE beef products, specifically dried, cured and non-fermented products. Research should:
 - Address additives, ingredients and thermal processes; and
 - Provide the necessary critical parameters needed for validation and modeling.

12. Conduct side by side comparisons of listericidal and/or listeriostatic efficacy of commercially available antimicrobial agents in different RTE beef formulations with the goal of achieving enough data to generate a model (*e.g.* such as <http://dmripredict.dk/Default.aspx>).
 - RTE beef systems to evaluate include whole muscle, uncured beef (*e.g.* roast beef).
 - Antimicrobials to evaluate include, but are not limited to 56% lactate, 4% sodium diacetate (10+ year historical market reference); vinegar and dried vinegar powders (brand A, B, and C); lemon juice and vinegar; lactate and potassium acetate at varying ratios; lactate, diacetate, potassium acetate at varying ratios; sodium propionate; others.

13. Evaluate common production processes used during the production of uncured beef products to better understand the lethality of certain thermal processes and cooling procedures that are currently being extrapolated from Appendices A and B. The research should explore the addition of any ingredient that may influence the critical food safety parameters used during the production of clean label, “natural” or organic products. Research should:
 - 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*, *Salmonella* 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 the effect of non-continuous cooling as it relates to slow come up time in these uncured products.

14. Evaluate ingredients, antimicrobial treatments, or other non-thermal intervention technologies used to inhibit microbial (*STEC, Salmonella, Listeria* and/or *Campylobacter*) growth that can be used in the

production of clean label, “natural” or organic products, including RTE and fresh beef. Research should:

- Explore the addition of ingredients, antimicrobial treatments, or other non-thermal intervention technologies that reduce the time/treatment exposure levels needed or that eliminate the survivor “tail.” When appropriate, the synergistic combinations of the ingredients, antimicrobial treatments, and non-thermal technologies should be evaluated.
- Fresh beef products could include enhanced products, patties, links, *etc.*

15. Identify and validate interventions to reduce pathogen contamination of beef head or cheek meat.
16. Identify and validate antimicrobial interventions to reduce pathogen contamination of beef edible variety meats. Interventions should be approved for use in the U.S. and ideally the major export markets for the specific variety meats.
17. Investigate efficient and sustainable application of antimicrobials to reduce pathogens on beef products including primals. 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.