

Using the Agrifood Database

The database is designed to grant access to the information collected and the specific evaluation criteria for each of the 160 projects that were included in the “Analysis of Early Stage Agrifood Nanotechnology Research and Development” study. The information collected includes abstracts and objectives describing the projects which were taken from the primary sources (i.e. USDA, FDA, PTO, etc.). The database also included the specific categorizations of these projects such as the topics and techniques used in the project that were done by the two researchers. The definitions for the criteria used can be found in the accompanying report.

The database allows two ways to interact with the data. First, each project can be viewed in its entirety as individual records. Second, several topical reports have been generated around specific criteria including Risks and Benefits, Sectors and Research Areas, Topics and Techniques, Toxicity and Endpoints, and Time to Commercialization.

NOTE: A Windows computer with Microsoft Access 2000 or greater installed is necessary to open the database.

Unzipping and Opening the Database:

1. Double-click on the zipped file and select “Extract all files” from menu on the left
2. When the Extraction Wizard opens, click “Next”
3. Click on the “Browse” button, and select where you would like to save the database and click “Next”. Then “Finish”
4. Navigate to the extracted folder and double-click on the file labeled “Inventory of Agrifood Nanotechnology.mdb”
5. If a Security Warning message appears, click “Open”
6. The opening page of the database will have several options



Navigating Through the Database Records:

1. Selecting “Open Individual Records” will open a form containing all of the information collected and criteria used in our study as mentioned earlier. (see sample below)

The screenshot shows a Microsoft Access database record form. The title bar reads "Microsoft Access - [Nanotechnology]". The form is divided into several sections:

- Research Title:** Adhesin-specific Nanoparticles For Removal Of Campylobacter Jains From Poultry
- Primary Investigators:** Latour, R. A.; Shutzenberger, F. J.; Sun, Y. P.; Rodgers, J.; Tseng, T. R.
- Location of Research:** BIOSCIENCEERING, CLEMSON UNIVERSITY, CLEMSON, SOUTH CAROLINA, 29634
- Funding Sources:** USDA Nanotechnology
- Timeline of Research:** Sept. 2000 - Sept. 2004
- Grant Amount:** \$535,744.00
- Data Source:** USDA
- Time to Commercial:** 5-10 years
- Type of Research:** Applied
- Abstract:** Campylobacter jains are bacteria which cause abdominal cramps and profuse bloody diarrhea in humans. Large case-control studies have shown that 50-70% of campylobacter infections can be traced to poultry meat products which were contaminated with intestinal contents during processing. There are currently no practical and effective methods for addressing this food safety problem. The overall goal of this program is to develop and evaluate a novel, farm-based strategy for the removal of campylobacter from poultry intestinal tracts prior to processing. This strategy will employ bioactive nanoparticles specifically designed to bind to the biomolecular structures on the surfaces of campylobacter. A broad variety of potentially bioactive nanoparticles will first be synthesized. They will then be tested in vitro for bioactivity assessment and human handling and exposure safety evaluation in order to identify the most effective and safe nanoparticles designs. These will then be orally administered to both chickens and turkeys under actual farm conditions to dislodge colonized campylobacter from the intestinal lining and facilitate their local excretion. The birds' intestinal contents will be tested for reductions of campylobacter levels to assess the effectiveness of this treatment for removal of campylobacter and other foodborne microbial pathogens in poultry products. This overall program will be accomplished through the integration of research, education, and extension for the control of foodborne microbial pathogens in poultry meat products.
- Objective:** The overall objective of this program is to demonstrate the ability of synthesized adhesin-specific nanoparticles to bind to, aggregate with, and reduce the infective capability of human foodborne enteropathogens in poultry meat products. The specific objectives of the program are to synthesize a broad range of bioactive nanoparticles, evaluate their ability to bind to and aggregate targeted bacteria in vitro, further evaluate the most bioactive nanoparticles in farm-based studies in chickens and turkeys to assess their ability to agglutinate the targeted bacteria such that it is referentially expelled from the intestinal tract, and finally, perform contact sensitivity tests to evaluate human handling safety.
- Additional Information:**
- Techniques:** Transport Processes, Bio-Selective Surfaces, Bio-Separation, Micro-Fluids, Nano Bio-Processing, Nuclear Engineering, Drug Delivery, Modeling
- Topics:** Bio-Sensors, Environmental Process, Sustainable Agriculture, Pathogen Detection, Plant/Animal Producer, Veterinary Medicine, Bio-Processing for Food, Nano Bio Industrial Products
- Research Areas:** Pathogen and Contaminant Detection, Identify Preservation and Tracking, Smart Treatment Delivery Systems, Smart Systems Integration for Agriculture and Food Processing, Nanodevices for Molecular and Cellular Biology, Nanoscale Materials Science and Engineering, Environmental Issues and Agricultural Waste, Educating the Public and Future Workforce
- Exposure Endpoints:** Lab Workers, Industry Workers, Farmers, Consumers, Ecosystems, Other
- Questions Regarding Content:** Does this fit nanotech?, Does this fit agfood?
- Env/Ecol Risk:** Medium
- Health Risk:** Medium
- Health Benefit:** High
- Comment:** Look into specificity and toxicity of particles to do a better qualitative risk ranking.

2. The buttons on the bottom left part of screen are used to navigate through the records



Opening and Printing Reports

1. Selecting any of the reports listed, will open the respective report
2. Navigating through the report is identical to the process described above
3. To print the document, select the File Menu and click on Print

Any edits, suggestions, or additional information about the projects listed in this database can be sent to Prof. Jennifer Kuzma, jkuzma@hhh.umn.edu.