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# Understanding bubble dynamics in sonicated edible lipids to improve their physiochemical properties

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## Expected Data Type

*Digital* and *non-digital* data will be collected in this research. Digital data will be collected in the laboratory using specific instruments such as differential scanning calorimeter (DSC) and rheometer. *Raw* digital data will be collected and specific parameters will be extracted from it and summarized in a spread sheet. For example, onset and peak temperatures will be extracted from the DSC raw data and summarized for further processing with statistical analysis in excel or Prism software. We will refer to this data as “*processed data*”. Non-digital data such as melting points, density, and experimental temperature will be also collected. Non-digital data will be manually entered in notebooks and copied into spreadsheet daily, which will be backed up to an external hard drive on a daily basis.

This project will include: (a) Still images and videos (raw and processed data – digital), (b) Rheological and thermal analysis data (raw and processed data – digital), (c) Crystallization kinetics data (raw data – digital and non-digital), (d) Characterization of intrinsic properties of the material (raw data – digital and non-digital), and (e) Sensory and flavor data (raw data – digital). Raw sensory data will be collected using human subjects using a survey software (SIMS 2000).

Raw data will be stored and preserved in their original format but also exported and saved as a comma separated file (.csv spreadsheet). Collected data (raw, processed, digital and non-digital) will be transferred to spreadsheets and saved as a comma separated file (.csv spreadsheet).

## Data Format

Some of the data collected will have a specific format from the software in the piece of equipment. Still images from microscopy measurements will be recorded as .jpeg or .tiff. High speed videos will be saved as .avi. Raw data from the DSC and rheometer will be collected with the TA Instruments software and will be saved as 001 files (software specific file format). This raw data will be exported and saved as .csv files in the equipment computer. Processed data from the DSC and rheology measurements will be summarized in spreadsheet (.xls and .pzfx) and saved as .csv. Crystallization kinetics data will be exported from the equipment (time domain nuclear magnetic resonance) in the form of a .csv format. Manual data will be also recorded from these experiments and collected in a notebook. Data collected in notebooks will be exported to spreadsheets and saved as .csv with associated readme files to document them.

Data collected will be analyzed in Excel (.xls) or Prism (pzfx) spreadsheets and will be saved exported as .csv files. Data presented in conferences will have the form of .pdf and/or .ppt.

Readme files will accompany the data to explain data collection, experimental set-ups, and observations or notes recorded during the experiments.

## **Data Storage and Preservation**

Data will be stored in computers in the PD's laboratory and will be backed up on a daily basis to external hard drives. In addition, data will be stored in box.com and shared with the research group. This type of storage will also ensure that data is not lost and that it is preserved. Storage in Box.com will allow for long-term storage of the data. Data stored in Box.com is backed up and password protected.

The laboratory and office spaces will remain locked at all times after hours ensuring data security. Laboratory notebooks and external hard drives containing the data will be kept in the laboratory over the duration of the project and moved to the PD's office after the project is terminated.

## **Data Sharing and Public Access**

Research data will be kept confidential and will be shared with the public through publication in peer-reviewed journals and through presentations and professional meetings. After publication, raw and processed data will be available to the public through placing it in DigitalCommons@USU, Utah State University's institutional repository.

Raw data collected from sensory evaluation tests using human subjects will remain confidential at all times to protect panelists privacy and to comply with IRB guidelines. This sensitive data will be stored in box.com and only the PD and IRB authorized personnel involved in the project will have access to it. Only non-identifying statistical data will be made available to the public, per the IRB protocol which will be submitted for this project.

Raw and processed data and presentation will be archived in Utah State University's institutional repository, Digital Commons. DigitalCommons@USU supports all the file types and formats. Files are provided with persistent URLs, and if needed, a DOI. All files are backed up at multiple sites, including cloud storage.

## **Roles and Responsibilities**

DMP will be implemented by the PD and co-PDs of this project and their graduate students. Graduate students will be responsible for collecting data in their notebooks and transfer all the data (digital and non-digital) to box.com in the right format. The PD will oversee that the overall DMP is correctly and timely implemented. To facilitate this, the PD will hold monthly meetings with the personnel of this project to ensure that data is protected and saved securely. Once the students graduate and after the project is finalized the PD will be responsible for long-term storage and preservation.

## **Monitoring and Reporting**

Project funded by NIFA will be subjected to this DMP and compliance will be monitored throughout the duration of the project and after the project is terminated. The implementation of the DMP will be reported to NIFA through REEport and will include data sharing activities such as publications, presentations to conferences, and progress on storage activities.