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| **Client:** | Joshua Martin | **File:** 24-001 |
| **Dept:** | Food Science | **Staff:**  **Student:** |
| **Date:** | 1/17/2024 | **Initial Meeting:**  **Follow-up:** |
| **Consultant and Attendees:** Joshua Martin, Dr. Bruce Craig, Youha Shin, Sumeeth Guda (observer) | | |
| **Statement of Problem:** To assess the impact of different doses of an antimicrobial agent on *Listeria monocytogenes* (LM) growth in food products. | | |
| **Goal of this Project:** Industry Partnership | | |
| **Background:** The project involves an industry partnership and is under an NDA. It aims to evaluate the effectiveness of various concentrations of an antimicrobial agent in controlling Listeria monocytogenes (LM) in a food matrix. The study entails measuring bacterial growth (CFU/g) across different antimicrobial levels, with samples collected every few days over a couple of weeks. The data analysis will be conducted using JMP software, and the client is interested in learning how to perform these analyses independently in future projects. | | |
| **Progress of project at this time:** Design Phase | | |
| Relevant information presented at meeting: Through questions about the design, we learned that the study involves 54 food samples inoculated with a standard amount of LM. Each food sample is also dosed with one of three doses of the antimicrobial agent and then observed at one of six time points, each combination with three biological replicates. Data points for analysis amount to 54, after averaging over the three technical replicates used to obtain the CFU/g response. The client will use JMP software for data analysis, focusing on factorial design with `time` and `level of inoculum` as two factors.  Data storage can be in wide or tall format. The client expects varying counts of colony-forming units, and log transformation will likely be necessary for data analysis, especially for higher CFU counts. Given that subject- matter often involves log-transformed units, back transformations may not be required. | | |
| Recommendations for Design and/or Analysis: It was noted that the client should avoid averaging over biological replicates as this eliminates replicate variability and relies on an additive model to compare differences over time or across concentration levels. A factorial design that can explore interactions between time and inoculum level was advised to the client. However, it was emphasized that the client should inform the consultants if any changes in the design are implemented.  For software usage and training, the focus is on being able to read the dataset in JMP, using menu items for Plots and Analysis, and applying linear models with time and level as factors.  Lastly, it was recommended to investigate the data on a log scale due to the variance increasing with the mean, with the possibility of using a Poisson rate model for low CFU counts; however, this was noted to be unlikely. | | |
| **Who will carry out these actions?**  The consultant will guide the client in setting up and understanding the JMP software, providing an example dataset for practice. The client will be responsible for collecting and preparing the data, ensuring it aligns with the discussed analysis plan.  The consultant will remain available for further guidance and to answer any queries regarding data analysis and JMP software usage. | | |
| **Status:** Continuing. | | |

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