**Statistics (STAT 802) Project Group 4**

**Somdatta Achar**

**Kassim Sulleyman**

**Title:** Evaluating the survival of pathogenic bacteria in beef jerky

A study was conducted to evaluate the effect of two different inoculation methods (dry and wet) on the Salmonella population in beef jerky of varying thicknesses. The beef jerky samples were divided into two main groups based on inoculation methods: Dry Inoculation and Wet Inoculation. Each of these main groups was further divided into sub-groups based on thickness: 1/4 and 1/8 inch.

The objective of the study was to determine the survival rates of Salmonella population when processed in a commercial dehydrator, as well as to assess the impact of inoculation method and thickness on the Salmonella population.

**Problem:**

In recent times, the consumption of beef jerky has been linked to multiple illness and hospitalizations involving Escherichia coli or Salmonella and nationwide beef jerky recalls attributed to these pathogenic bacteria.

**Questions:**

Using the collected data, perform a statistical analysis to address the following questions:

1. Is there a significant difference in the Salmonella population before and after inoculation for each inoculation method and thickness combination?
2. Does the inoculation method (dry vs. wet) significantly affect the Salmonella population after inoculation?
3. Is there an interaction effect between the inoculation method and thickness on the Salmonella population after inoculation?

**Data to be taken:**

* Absolute microbial counts
* Hourly water activity
* Proximate analysis for fat
* Proximate analysis for protein
* Moisture protein ratio

**Resources:**

All methods and procedures will be conducted in a Biosafety 2 Laboratory. A food microbiologist with expertise in conducting microbiological challenge studies will be required. Pathogenic and surrogates of Salmonella will be needed for the study. A commercial dehydrator and water activity meter will also be required and a chemical laboratory to conduct the proximate analysis on the beef jerky samples.

**Constraints:**

Procuring the bacteria isolates and storage of the bacteria are the constraints of this study.