# Chapter 1

# Introduction

## 1.1 Background

This project is about the effects of different parameters that could affects the physical and chemical properties of the yogurt's final products. The project started from an interest in yogurt-making to mild curiosity. After searching through some research papers, it was found that most of the research consists of yogurts' benefits for health. Where some projects discuss about the positive effcets towards pathological condition, active aging, reduce body weight and prevent type 2 diabetes (Hadjimbei et.al, 2022, Le Roy et.al, 2022) While there are less in effects of parameters towards the yogurt final products. The papers that was found are mostly old papers that has been made more than ten years ago which give the thought that the topic of this project was not ventured enough. This gives the inspiration to venture to the topics of this project, where it will discuss the many parameters affecting the yogurt's physical and chemical properties and compare the results for each parameter.

Yogurt is one of the probiotic foods that are often consumed by many people. They are known for their abundance of high protein, rich micronutrients, vitamins and minerals. It has a high positivity in helping to improve gut microbiota due to the presence of live enzymes and active metabolites that happen during the fermentation process and food digestion in the human body. It also helps in preventing the risk of some health risk, such as controling blood glucose and reducing blood pressure. There are also studies that claim that yogurt helps with consumers who have lactose intolerance problems (Savaiano & Hutkins, 2020 & Baspinar & Güldaşb, 2020).

Since yogurt has been a very common probiotic products, there are demands for the said products. There are business that focus in manufacturing yogurt, there are the big industries and household production business. There are times where customers choose to make homemade yogurt, which leads to the ideas for the household business. There are many reasons for the housemade yogurt production, where it is cost savings, superior taste and freshness (Aktypis et.al,

2023). Another reasons would be that, the ingredients used could be control compare to the store bought products and it is a simple and short duration process of production. The products has high nutrition and health benefits that customers would be interetsted in (Hadjimbei et.al, 2022).

There are some studies that mention the importance of each parameter. For temperature, there is a study that stated that higher temperature will give the yogurt properties thicker, lower viscosity and different sensory properties. While the parameters for different percentages of inoculation will affect the whey separation causing thicker texture along with a decrease in the ph that will cause a more sour taste (Yang et.al, 2021 & Liu et.al, 2024). While different culture composition used could cause the changes in the yogurt quality and nutritional characteristics. Another factors that will affects the yogurt would be the final flavor and also its texture (Dabija et.al, 2018).

After doing several research on past literature, there are only 2 topics about yogurt, from medical or benefits of yogurt and manufacturing and ways to improve yogurt. However upon further research and digging, it was found that there are limited amount of reference that doesn't exceed up to 10 years ago. Such as the research of 'Effect of mixing during fermentation in yogurt manufacturing' by Aguirre-Ezkauriatza et.al., (2008) or the research of 'A method for manufacturing superior set yogurt under reduced oxygen conditions', by Horiuchi et.al., (2009). Another concern about the reference that was found is that, there are no reference that have the whole comparison between mixed strain culture used plus temperature and plus inoculation percentage. There are several reference that involves parameters, however it only consist of 2 different parameters. Such as the reference of 'A comprehensive review on yogurt syneresis: effect of processing conditions and added additives' by Arab et.al, (2022) or the 'Rheological Properties and Sensory Profile of Yoghurt Produced with Novel Combination of Probiotic Cultures Foods' by Ilić et.al, (2024). By venturing the topic of this project, it could help the product development of yogurt products especially to those startup or home business of yogurt by testing the product quality in the ph, viscosity, protein and sugar content of the yogurt,

With the temperature, inoculation percentage and different commercial mixed culture parameters, the results could determine the range of temperature, inoculation percentage and different mix culture effects towards the yogurt physical ane chemical properties. The result will show which range of parameters will be recommended and capable to selecting the desired traits of physical and chemical properties of yogurt.

**1.2 Objective**

The objective of this project is to determine the effects of different temperatures (4℃, 25℃, 45℃), inoculation percentages and different bacteria mixed culture used during the yogurt fermentation process on the yogurt's physical and chemical properties

**1.3 Hypothesis**

For Temperature Parameters Hypothesis:

H0: The temperature used for fermentation does not affect the pH, viscosity, protein, and sugar content of yogurt

H1: The temperature used for fermentation affects the pH, viscosity, protein, and sugar content of yogurt

For Percentage Inoculation Parameter:

H0: The Percentage Inoculation used for fermentation does not affect the pH, viscosity, protein, and sugar content of yogurt

H1: The Percentage Inoculation used for fermentation affects the pH, viscosity, protein, and sugar content of yogurt

For Different Commercial Mixed Culture Parameters:

H0: The Commercial mixed culture used for fermentation does not affects the pH, viscosity, protein, and sugar content of yogurt

H1: The Commercial mixed culture used for fermentation affects the pH, viscosity, protein, and sugar content of yogurt