

## ABSTRACT

Whey is a byproduct of the cheese-making process. It is a rich source of protein and lactose therefore; it is commonly used as a dietary supplement particularly by athletes and bodybuilders. The huge quantities of whey produced by the dairy industry during cheese making are difficult to process, which forces the factories to dispose of this waste directly in the lands or water bodies, creating a serious environmental issue.

The main objective of this research was to utilize whey waste in industrial applications rather than dumping it into the environment. Because it contains lactose sugar, it can be fermented to lactic acid. Lactic acid bacteria (LAB) are required for this technique to convert lactose to lactic acid. This technique is divided into five steps, the first of which is to isolate the bacteria and the second of which is to identify it. The growth rate curve of isolated bacteria was examined. Following that, a batch fermentation is performed utilizing mixed culture media to discover which substrate is preferable to whey. Finally, pure LAB strains were used in batch fermentation using whey solution to produce lactic acid.

For the first step, LAB has been isolated from yogurt and cultured on MRS agar. Then, biochemical tests have been performed therefore proved that the isolated bacteria are *lactobacilli* bacteria. After that, the fermentation process by using mixed culture have been shown that whey and MRS substrates are the best two substrates and media for *lactobacilli* bacteria to produce the optimum amount of lactic acid. However, the growth rate curve was not finished due to time constraints. Finally, due to the extended lag period, manufacture with pure lactobacilli strains proved ineffective, resulting in extremely low bacteria concentrations and no production.