

CHAPTER 1

INTRODUCTION

1.1 Background

Laphet (Myanmar traditional fermented tea leaf) is one of the most popular consuming tea leaves in Myanmar and it can be easily purchase in municipal market, grocery shop and supermarket in everywhere across country. It is cultivated especially on hilly region where it has appropriate climate, sufficient wetness and enough sunlight (Han & Aye, 2015).

One of the well-known regions is Shan state and it produce 80 % of the tea leaf in Myanmar. It has been centuries long that Laphet is eaten in Myanmar. Indeed, Laphet is forming by the fermentation of tea leaves (*Camellia sinensis*). For the fermentation of tea leaves, firstly the juvenile tea leaves are collected and steamed approximately five to ten minutes and after steaming the leaves, removal of water is paramount and the tea leaves are selected again (Bo *et al.*, 2020).

Secondly, the tea leaves are put into certain containers like clay pots and pressing with heavy weight. Natural bacteria ferment the tea leaves with limited air movement and the process take 3-4 months to complete (Bo *et al.*, 2020). Finally, pure fermented tea leaves are ready to eat and usually it can be eaten by mixing with tomato, garlic, sesame, peanuts, chilly, lemon, and olive oil. Moreover, the health advantages of consuming of tea leaves can avoid from cancer and cardiovascular disease, the antioxidative, anti-inflammatory, antibacterial, antiangiogenic, antiviral, neuroprotective, and cholesterol lowering effect (Chacko *et al.*, 2010).

Since the Laphet is fermented leaves, it is obvious that it has rich in bacterial activity. The amplicon-sequences occur *Lactobacillus* and *Acetobacter* are overflowing bacteria and *Candida*, *Pichia*, *Cyberlindera* and *Debaryomyces* are plentiful in yeast (Bo *et al.*, 2020) after microbial analysis of 14 Laphet sample from different parts of the country in Myanmar. According to study, Laphet is a good source of probiotic microorganism which contain superabundant of Lactic Acid bacteria (LAB) and Yeast. At the same time, green tea has abundance in -epigallocatechin-3gallate (EGCG) (Chacko *et al.*, 2010). The majority of probiotics are affiliates of the lactic acid bacteria

(LAB) group, which includes several genera such as *Lactobacillus*, *Leuconostoc*, *Streptococcus*, and *Enterococcus* (Touret *et al.*, 2018).

On the other hand, over consuming of green tea generate some unknown harmful effect because green tea catechins are not similar with each other (Chacko *et al.*, 2010). Green tea extract's EGCG is cytotoxin, and drinking green tea can cause acute cytotoxicity in liver cell, the body's main metabolic organ (Chacko *et al.*, 2010).

Additionally, Inflammatory bowel disease (IBD) mainly includes ulcerative colitis that causes inflammation and ulcer in the digestive tract. It can be identified by chronic, unpredictable, relapsing inflammation within certain regions of the gastrointestinal (GI) tract, IBD has been increasing worldwide (Ng *et al.*, 2018). IBD has a significant impact on quality of life and the presence of these comorbidities regrettable disease's burden ([Mikocka-Walus *et al.*, 2016b](#), [Szigethy *et al.*, 2021](#)). In the United States, a single UC patient spends an average of \$15,020 per year on medical expense and as a result, better and more economical therapies, as well as a cure, are critical (Daren 2013).

A lot of gene examination have been carried out by researchers for the cure of ulcerative colitis disease and Interlukin-6 (*IL-6*) and Interlukin10 (*IL-10*) gene have been played an important role for the IBD. *IL-6* is a pleiotropic cytokine having a wide range of biological functions, including both pro-and anti-inflammatory properties (Christoph 2015). *IL-6* is a prototypical pro-inflammatory cytokine that has a pivotal role in the development of all inflammatory disorders (Christoph 2015). Similarly, *IL-10* is pleiotropic cytokine with anti-inflammatory and immunosuppressive properties and produce by the antigen-presenting cell and by the autocrine feedback to increase scavenger and phagocytic abilities and influence the development of adaptive response, these cells can forbid the secretion of proinflammatory cytokines including *IL-1*, interferon (IFN)-gamma, and tumor necrosis factor (*TNF*)- α . The proinflammatory genes examination had been conducted for beneficial of ulcerative colitis by scholars and studies has shown IBD cure is still mystery.

Furthermore, a lot of health-related concern with green tea and pickle tea had been conducted in research area, there are still broaden knowledge gap have in the effect of Laphet (Myanmar traditional fermented tea leaf) in vivo study. Base on this issue, the research going to observe the effectivity of Laphet in lowering inflammatory in ulcerative colitis.

1.2 Problem Statement

As for the problem statement in this study:

1. Does the bacteria from Laphet has the probiotic potential characteristic?
2. How is the effect of Laphet's extract on the expression level of *IL-6*, *IL-1 β* , and *TNF- α* genes?

1.3 Research Purpose

The purpose of this research:

1. To determine the lactic acid bacteria (LAB) from Laphet has the probiotic characteristic.
2. To determine the effect of giving extract from Laphet on *IL-6*, *TNF- α* and *IL-1 β* genes expression.

1.4 Benefit of Research

This research is anticipated to provide information and contribution to advancement of science, particularly in the field of medicine in the future. Further, the beneficial consumption of Laphet in daily life.

1.5 Research hypothesis

1. What are the Latic Acid Bacteria genera could isolate from Laphet and how are their characteristic?
2. Does Laphet extract has the ability in gene expression level of *IL-6*, *TNF- α* and *IL-1 β* genes in Dextran Sulfate Sodium (DSS) induced animal model colitis.

