

## Abstract

Polyphenols, the main compounds in tea, possessed both chemical and prebiotic properties that could support the growth of beneficial gut microbiota. This study aimed to evaluate the effectiveness of matcha and hojicha green tea extracts for promoting probiotics growth and antioxidant activity. Tea samples were finely ground and extracted using two methods including hot extraction (80°C for 20 minutes) and cold extraction (4°C for 16 hours). All extracts were dried using evaporation and lyophilization. After extraction, the matcha green tea exhibited the highest yield at 20.23%. Moreover, the matcha cold extract showed the highest phenolic compound content of 101.89 ± 11.53 mg gallic acid/g extract. In addition, the matcha cold extract also displayed the highest antioxidant activity of 252.87 ± 76.61 mg gallic acid/g extract that observed by DPPH assay. However, the extraction methods did not affect the amount of phenolics and antioxidant capacity. This study was determined the concentration of tea extracts that did not inhibit the growth of probiotics such as *Lactobacillus paracasei* MP137, *Lactobacillus casei* TISTR 1340, *Lactobacillus plantarum* TISTR 2070, *Bacillus coagulans* BC-G44, and *Bifidobacterium animalis* subsp. *lactis* CP-9. Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) tests on probiotics revealed that matcha extracts had the lowest MIC and MBC values 15.63 mg/ml. Additionally, matcha extracts at the concentration of 15.63 – 31.25 mg/ml could significantly promote the growth of *L. paracasei* and *B. animalis* after 48 hours. These findings suggest that matcha green tea extract has strong potential as a prebiotics and antioxidant activity.

## Introduction

Prebiotics had ability to support gut health by promoting beneficial microbiota, with polyphenol-rich green teas like matcha and hojicha offering additional health benefits. Matcha enhances gut and brain function, while hojicha provides a low-caffeine alternative that reduces fatigue. As cold-brew tea gains popularity, further research is needed to compare extraction methods and explore the benefits of Thai-grown matcha and hojicha, supporting both health and local tea production.

## Objectives

To study effects of hot and cold tea extraction on the phenolic content, antioxidant activity, and probiotic growth promotion of matcha and hojicha.

## Methodology

### 1 Tea extracts preparation

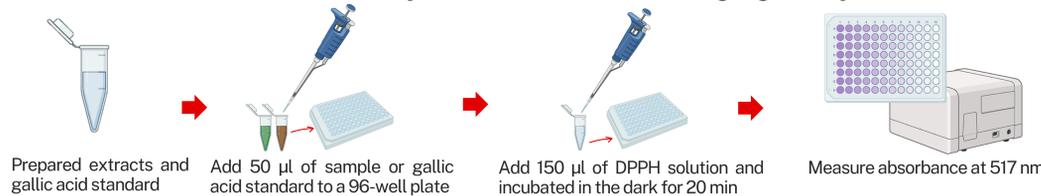


### 2 Chemical measurement

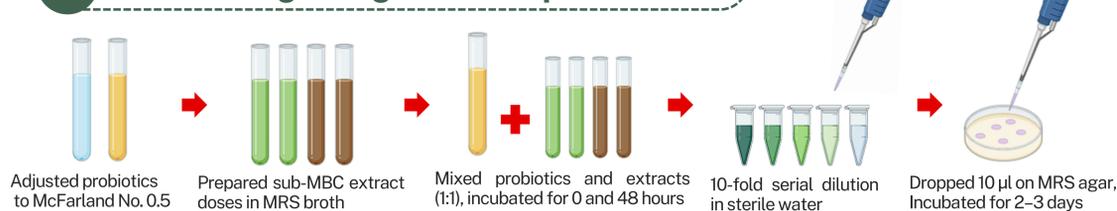
#### • Total phenolic content: Folin-Ciocalteu assay



#### • Antioxidant activity: DPPH radical scavenging assay



### 3 Promoting the growth of probiotics



## References

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## Results

Table 1 : Yield of tea extracts

Tea extraction	Extraction yield (%)	Characteristics
Hojicha hot	14.59	Dark brown to black
Hojicha cold	7.64	Dark brown to black
Matcha hot	16.81	Dark green, viscous
Matcha cold	20.23	Dark green, viscous

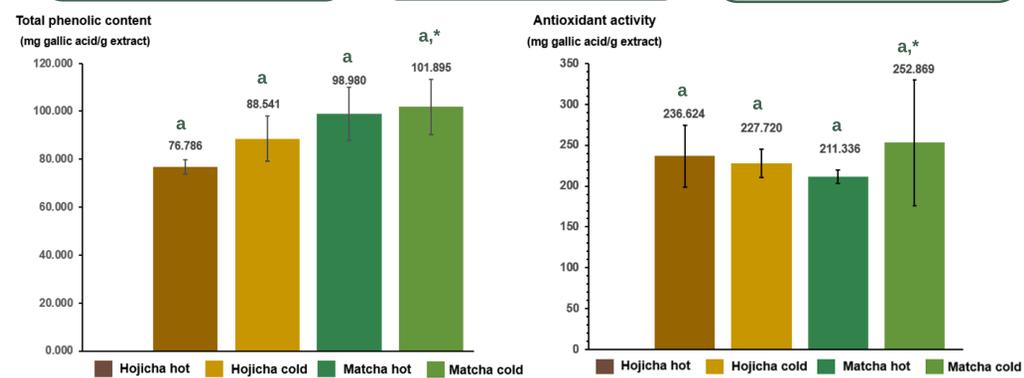


Fig.1 : Total phenolic content

<sup>a</sup>The statistical values were compared between the extraction methods for each extract ( $P < 0.05$ ). <sup>\*</sup>The results showed the highest content ( $P < 0.05$ ).

Fig.2 : Antioxidant activity

<sup>a</sup>The statistical values were compared between the extraction methods for each extract ( $P < 0.05$ ). <sup>\*</sup>The results showed the highest content ( $P < 0.05$ ).

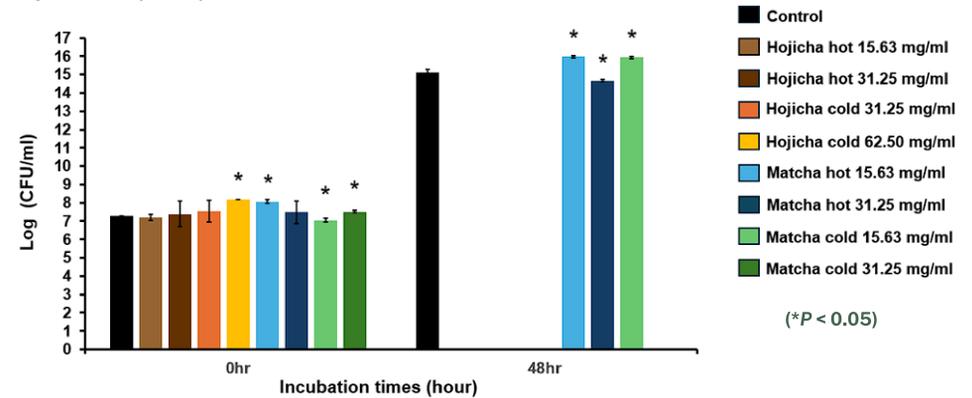


Fig.3 : Promoting the growth of *L. paracasei* M137 cultured with tea extracts

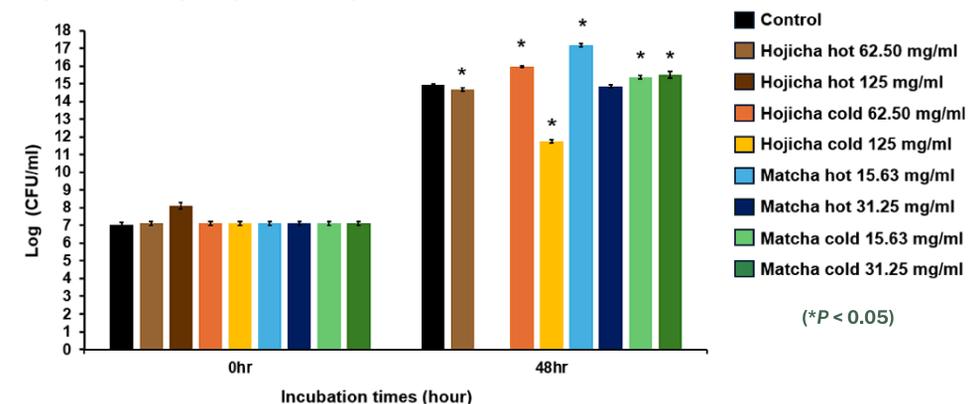


Fig.4 : Promoting the growth of *B. animalis* subsp. *lactis* CP-9 cultured with tea extracts

## Conclusion

Cold matcha extract revealed the highest yield, total phenolic content and antioxidant activity. Both hot and cold matcha extracts could promote *L. paracasei* M137 and *B. animalis* subsp. *lactis* CP-9 growth, while cold hojicha extract could support *B. animalis* subsp. *lactis* CP-9 growth. These results highlighted beneficial values of matcha and hojicha teas as functional beverages for promoting gut health.