

# Jun tea prototype product development by lyophilization

Pimmada Moonwong\* and Narumol Thongwai

Microbiology Section, Department of Biology, Faculty of Science, Chiang Mai University, Chiang Mai, Thailand, 50200

Email : pimmada\_moon@cmu.ac.th



## Abstract

Jun tea is a kind of fermented beverage made by fermentation of tea and honey mixture with lactic acid bacteria and yeast. This project aimed to develop Jun tea powder (JTp) by lyophilization technique. To develop Jun tea product, *Lactiplantibacillus plantarum* FM03-1 and *Saccharomyces cerevisiae* var. *sake* VII16 were used as starter cultures for Jun tea fermentation at 30°C for 15 days. Subsequently, fermented products were further prepared in three forms including Jun tea (JT), concentrated Jun tea (cJT) and JTp. All preparations were evaluated their biological activities using the DPPH radical scavenging, Folin-Ciocalteu and agar well diffusion assays. It was found that all forms of Jun tea products possessed antioxidant properties. JTp could inhibit growth of test pathogenic bacteria including *Bacillus cereus*, Methicillin-resistant *Staphylococcus aureus* (MRSA) and *Staphylococcus aureus*. When JTp was kept at various temperatures including room temperature, 4, 25, 37 and 45°C for four weeks, it was found that the DPPH scavenging activity and the total phenolic content was decreased by 28.57 – 60.71% and 5.97 – 15.34%, respectively, while the antibacterial activity was reduced to only inhibited growth of *S. aureus* and MRSA. The JTp obtained had pleasant flavor. Hence, with its antioxidant and antibacterial properties, JTp has a high potential to be further developed to value-added products and achieve greater acceptance in the future.

## Introduction

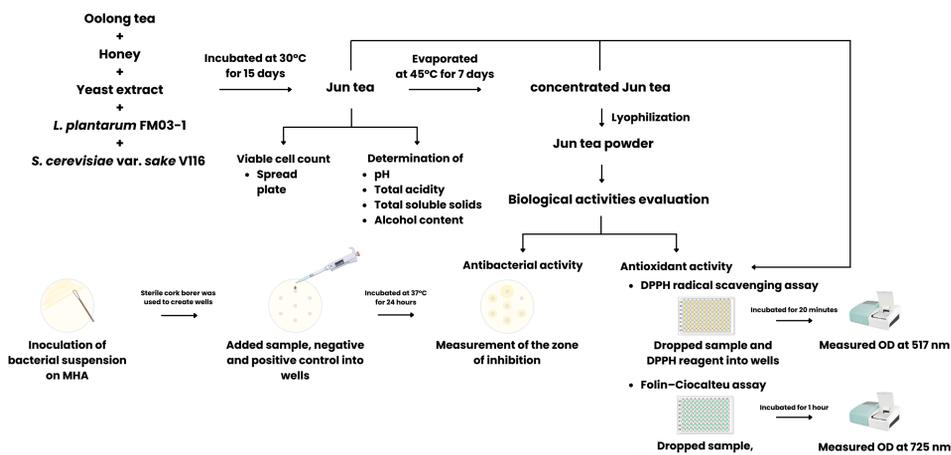
Currently, the consumption of health-oriented food and beverages is trendy across all age groups of consumers. Fermented foods and beverages are recognized as health beneficial products. Jun tea, a type of fermented beverage that remains relatively unknown, is made by fermenting different types of tea leaves with honey and a microbial culture consisting of lactic acid bacteria and yeast. Jun tea has a sour taste, an alcoholic aroma and slight effervescence that can provide a refreshing experience for the consumer. Moreover, Jun tea possesses a range of biological properties.

## Objectives

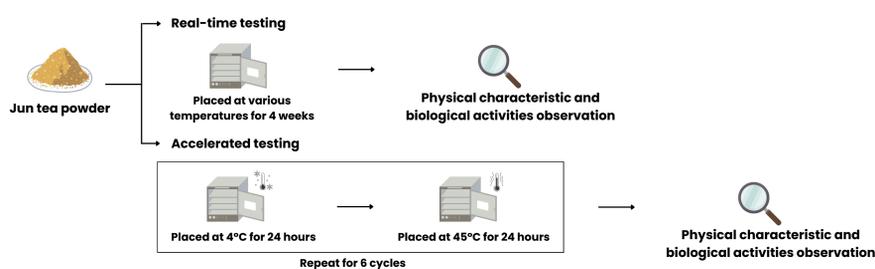
1. To investigate biological activity of Jun tea, concentrated Jun tea and Jun tea powder.
2. To evaluate shelf life of Jun tea powder.
3. To develop Jun tea product.

## Methodology

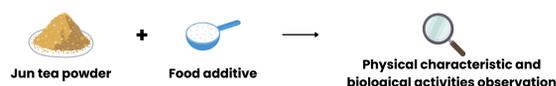
### 1 Jun tea, concentrated Jun tea and Jun tea powder production



### 2 Shelf life evaluation of Jun tea powder



### 3 Jun tea product development



## Results

### 1 Jun tea, concentrated Jun tea and Jun tea powder production

Biological activity was found in all forms of Jun tea, including antioxidants and total phenolic content. In addition, Jun tea powder show inhibitory effects against *B. cereus*, MRSA and *S. aureus*.

Table 1 Biological activities of Jun tea, concentrated Jun tea and Jun tea powder

Type of Jun tea	DPPH radical scavenging assay (µg GAE/ml)	Total phenolic content (mg GAE/ml)
Jun tea	4.50 ± 0.48	1.72 ± 0.05
Concentrated Jun tea	8.11 ± 5.21	6.63 ± 3.02
Jun tea powder	2.79 ± 0.62	44.86 ± 7.96

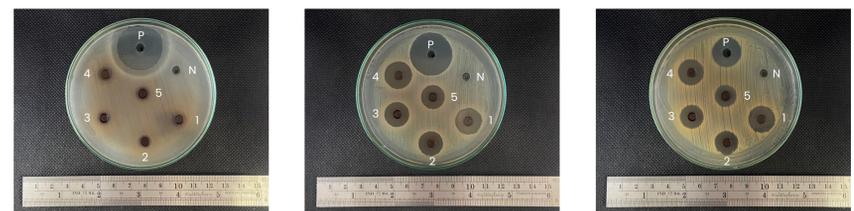


Figure 1 Inhibition zone of Jun tea powder: Positive control (P), Negative control (N), 100 mg/ml of Jun tea powder (1-5)

### 2 Shelf life evaluation of Jun tea powder

As the storage temperature and time increased, the moisture content of the Jun tea powder increased, while its biological activity decreased.

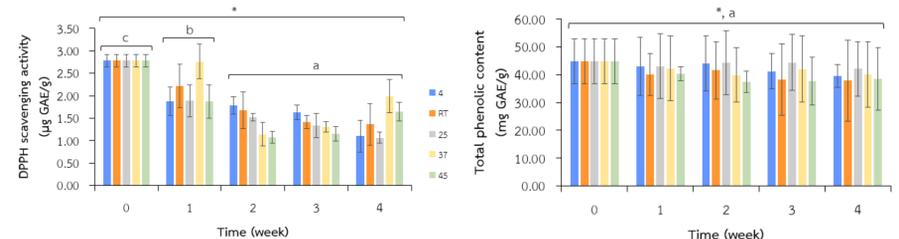


Figure 2 DPPH scavenging activity of Jun tea powder during storage at various temperature and time

Figure 3 Total phenolic content of Jun tea powder during storage at various temperature and time

### 3 Jun tea product development

Jun tea product contained Jun tea powder, honey powder, citric acid and sorbitol. When mixed with 150 ml of water, it had a honey aroma and a slightly sour taste. This product possessed antioxidant properties, a high total phenolic content, and showed inhibitory effects against MRSA and *S. aureus*.

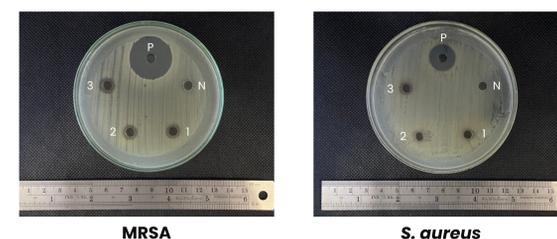


Figure 4 Zone of inhibition of Jun tea product: Positive control (P), Negative control (N), Jun tea drink (1-3)



Figure 5 Jun tea product

## Conclusion

Jun tea, concentrated Jun tea and Jun tea powder exhibit biological activities. A shelf-life study of Jun tea powder revealed that increasing storage temperature and time led to changes in its physical characteristic and decreased in biological activities as indicated by DPPH radical scavenging and Folin-Ciocalteu assays. However, when the Jun tea powder was further developed into a product, the final product demonstrated good taste and effectively retained its biological activities.

## Acknowledgements

This project has got an achievement because of support and advice from Asst. Prof. Dr. Narumol Thongwai, Dr. Patthanasak Rungsirivanich, SCB 2711 Research Laboratory members and all of my beloved friends. Furthermore, I would like to express my sincere gratitude to Chiang Mai University for its support during the experiment conducted at the university premises.

## Reference

- Grey, S. 2019. Jun Tea, Kombucha, Scoby And Culture! The Most Comprehensive Guide [Oline]. Available : <https://growyourpantry.com/blogs/kombucha/jun> [2024, Jun. 3]
- Pooosuntorn, N. 2024. Jun tea product development and biological activity evaluation. B.S. Thesis. Chaing Mai University.