

# Process Optimization for Drinkable Yogurt Based on By-product Water from Wash-free Rice Processing

無洗米製造の副生水を原料とする飲むヨーグルトの加工プロセス最適化

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## 1. Background and objectives

Wash-free Rice is a new type of rice product which does not require washing before cooking, due to the advance separation of “skin bran” during processing. By-product Water (BPW), which is produced simultaneously during the processing of Wash-free Rice, has high nutritional value however still in a low rate of utilization nowadays.

In order to improve the utilization rate and added value of this potential raw material, this study focuses on using lactic acid bacteria starter culture to study the applicability of BPW for a development of drinkable yogurt.

## 2. Preliminary identification of fermentation characteristic in BPW

As a newest application of unknown raw material, the fermentation characteristics and growth curve of three selected starter cultures in BPW were identified. Also, to resolved the unpleasant flavour and long fermentation time of final product, domestication of starter culture in BPW substrate was carried out, which showed significant promotion on bacteria activity.

## 3. Process optimization of drinkable yogurt based on BPW

Relationship between three single factors (type of starter culture, fermentation temperature, and initial glucose content) with two responses (viable count of LAB, titratable acidity) was investigated using Response Surface Methodology (RSM) by Center Composite Faced Design. Optimal process condition was obtained at 38.2 °C fermentation temperature, 4.2 g/100 mL initial glucose content and

fermented by starter culture 1 (YO-MIX 505). The final product derived from this optimum process reached to 7.7 log CFU/mL of LAB viable count and 1.2% titratable acidity with high sensory properties. Model regression analysis and verification experiment showed the high reliability of predicted models and condition. Finally, as conclusion, process condition of BPW-based drinkable yogurt is successfully optimized by RSM.

## 4. Conclusion and prospect

This research was the first time to utilize BPW for beverage production. The growth pattern of *L. bulgaricus* and *S. thermophilus* in BPW was investigated, which may provide theoretical support to further study. Domestication of three starter cultures also showed significant promotion on bacteria activity. An optimal process condition of BPW-based drinkable was optimized by RSM. The final product derived from this optimum process could reach to a high quality. All results showed utilization value of BPW has been promoted in this research. And BPW is potential to be used as a material for fermented products.

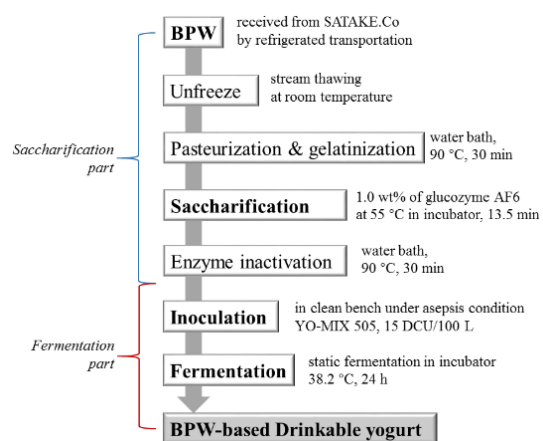


Fig 1. Process flow chart of BPW-based drinkable yogurt under optimal process condition