

Assessment of Bacterial Contamination and Coliform Presence in 7-Months Stored Malaysian-Made Kimchi

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Structured Abstract

Background: Kimchi, a traditional Korean fermented food, is valued for its probiotics, nutritional benefits, and long shelf life, mainly due to lactic acid bacteria (LAB) that inhibit spoilage. Consumed widely across Asia, kimchi has been adapted in various countries, leading to regional versions that maintain core fermentation principles while incorporating local ingredients. Malaysian-made kimchi incorporates indigenous fruits and vegetables such as petai (*Parkia speciosa*), winged bean (*Psophocarpus tetragonolobus*), bilimbi (*Averrhoa bilimbi*) and guava (*Psidium guajava*). Despite showing no visible signs spoilage after long-term of storage, limited information exists on its microbiological safety in Malaysian-made kimchi kept refrigerated for seven months. This study aims to assess bacterial growth, total bacterial count (TBC), and the existence of coliform in Malaysian-made kimchi stored for seven months.

Methods: Five types of Malaysian-made kimchi: kimchi *petai*, winged bean, bilimbi with fish oil-based, bilimbi with soy sauce based and guava. Each sample was homogenized with phosphate-buffered saline (PBS). Serial dilutions up to 10^{-4} were prepared and aliquots from each dilution were then spread-plated onto Nutrient Agar, MacConkey Agar, and EMB Agar. All plates were incubated at 37°C, and bacterial growth was observed and enumerated after 24 and 48 hours.

Results: Bacterial growth was observed on both Nutrient and MacConkey Agar for all kimchi samples, indicating microbial activity after stored for 7-months. total bacterial count (TBC) revealed that Sample B2 (Bilimbi with soy sauce) exhibited the highest TBC on both Nutrient Agar and MacConkey Agar, recording 2.60 CFU/mL at 24 hours and 2.29 CFU/mL at 48 hours. Conversely, Sample B1 (Bilimbi with fish oil) displayed the lowest TBC at both time points (0.013 CFU/mL at 24 hours and 0.007 CFU/mL at 48 hours). No coliform bacteria were detected, as all samples produced only colourless colonies on MacConkey Agar, and EMB Agar yielded only minimal colourless colonies for Sample D (Guava).

Conclusion: Despite seven months of refrigeration, Malaysian-made kimchi showing bacterial growth. A slight decrease in bacterial counts was observed between 24 and 48 hours of incubation, suggesting a stabilization of the microbial population. The absence of coliform across all samples, as it indicates the kimchi is safe for consumption.

Keywords: Kimchi, Bacterial Growth, Coliform Detection, Long-term storage, Fermented Food Safety

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