

ANTHROBIOLOGICAL QUALITY AND SHELF LIFE OF READY
TO-EAT SANDWICHES STORED AT AMBIENT AND CHILLED
TEMPERATURES

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stored at ambient and chilled temperatures / Nik Nur Aziemah
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**MICROBIOLOGICAL QUALITY AND SHELF LIFE OF READY-TO-EAT
SANDWICHES STORED AT AMBIENT AND CHILLED TEMPERATURES**

By
Nik Nur Aziemah bt Nik Ahmad

**Research Report submitted in partial fulfillment of
the requirement for the degree of
Bachelor of Food Science (Food Service and Nutrition)**

**DEPARTMENT OF FOOD SCIENCE
FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCE
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ENDORSEMENT

The project report entitled **Microbiological quality and shelf life of ready-to-eat sandwiches stored at ambient and chilled temperatures** by **Nik Nur Aziemah Bt Nik Ahmad**, Matric No. **UK17248** has been reviewed and correction has been made according to the recommendations by examiners. This report is submitted to the Department of Food Science in partial fulfillment of the requirement of the Bachelor of Food Science (Food Service and Nutrition), Faculty of Agrotechnology and Food Science, Universiti Malaysia Terengganu.



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DECLARATION

I hereby declare that the work in this thesis is my own except for quotation and summaries which have been duly acknowledged.

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ABSTRACT

Sandwich is a kind of healthy snack that is gaining popularities in Malaysia. It is considered as ready-to-eat food (RTE) that can be prepared at home or buy at retail shop. It is important to maintain the shelf life of product because of the hot climate and tropical in Malaysia. This study was conducted to examine the microbiological quality and assess the level of unsatisfactory in sandwiches after storage at 48 hours at 28°C and 7 days at 4°C. Sample of sandwiches with different fillings were prepared under controlled conditions: tuna sandwich with salad, tuna sandwich without salad, egg mayonnaise sandwich with salad and egg mayonnaise sandwich without salad and kept at chilled temperatures ($4\pm 2^{\circ}\text{C}$) and room temperatures ($28\pm 2^{\circ}\text{C}$). Generally, sandwiches with salad showed higher microbial load compared to the sandwich without salad. It is suggested that salad contribute to a higher microbial load in the sandwiches. Raw ingredients of sandwiches were also analyzed and iceberg lettuce had highest water activity and microbial load among all the raw ingredients due to its convoluted surface area. *Escherichia coli* were detected at low level in the sandwiches with and without salad when stored at room temperatures. However, *Escherichia coli* were only detected in the sandwiches with salad during storage at chilled temperature. *Salmonella spp* and *Listeria monocytogenes* were not detected in all of the sandwiches.

ABSTRAK

Makanan sedia-dimakan semakin meraih populariti di Malaysia. Salah satu makanan sedia-dimakan yang popular di Malaysia ialah *sandwich*. *Sandwich* adalah sejenis snek yang sihat yang dikenali sebagai makan sedia-dimakan yang boleh disediakan di rumah atau dibeli di kedai. Adalah penting untuk mengekalkan jangka hayat sesuatu produk makanan sedia-dimakan. Ini kerana Malaysia mempunyai iklim panas dan tropika, kajian ini telah dijalankan untuk mengkaji kualiti mikrobiologi dan menilai tahap ketidakpuasan *sandwich* setelah disimpan pada 48 jam pada suhu 28°C dan 7 hari pada suhu 4°C. Sampel *sandwich* dengan inti yang berbeza telah disediakan di dalam keadaan yang terkawal; *sandwich* tuna dengan salad, *sandwich* tuna tanpa salad, *sandwich* telur mayonis dengan salad dengan *sandwich* telur mayonis tanpa salad dan disimpan pada suhu yang berbeza; suhu sejuk (4±2°C) dan suhu bilik (28±2°C). Secara umumnya, *sandwich* dengan salad menunjukkan kepadatan mikrob lebih tinggi berbanding *sandwich* tanpa salad. Setelah diteliti, salad merupakan sumber bagi kontaminasi mikrob di dalam *sandwich*. Bahan mentah di dalam *sandwich* juga dianalisa dan salad (*iceberg lettuce*) mempunyai aktiviti air dan kepadatan mikrob yang lebih tinggi berbanding bahan mentah yang lain kerana luas permukaan salad yang tidak sekata. *Escherichia coli* telah dikesan di dalam *sandwich* dengan atau tanpa salad yang disimpan pada suhu bilik. Walaubagaimanapun, *Escherichia coli* hanya dapat dikesan pada *sandwich* dengan salad yang disimpan dalam suhu sejuk. *Salmonella spp* dan *Listeria monocytogenes* tidak dapat dikesan dalam semua sampel *sandwich*.