

EFFECTS OF DIFFERENT STORAGE CONDITIONS ON
THE PHYSICAL PROPERTIES, MICROBIOLOGICAL
QUALITY AND SHELF-LIFE OF
"SAMBAL BELACAN"

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**EFFECTS OF DIFFERENT STORAGE CONDITIONS ON THE PHYSICAL
PROPERTIES, MICROBIOLOGICAL QUALITY AND SHELF-LIFE OF ‘SAMBAL
BELACAN’**

By

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the requirement for the degree of
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ENDORSEMENT

This project entitled **Effects of Different Storage Conditions on The Physical Properties, Microbiological Quality and Shelf Life Of ‘Sambal Belacan’** by **Wan Halimah bt Wan Omar**, Matric No. **UK 17785**, has been reviewed and corrections have been made according to the recommendation by examiners. This report is submitted to the Department of **Food Science** in partial fulfilment of the requirement of the **Bachelor of Food Science (Food Technology)**, Faculty of Agrotechnology and Food Science, University Malaysia Terengganu.



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DECLARATION

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

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ABSTRACT

'Sambal belacan' is a type of traditional condiment that popular among Malaysian and usually consumed with 'ulam-ulaman' in a meal of rice and other dishes. This study was conducted to investigate the effect of difference storage conditions on the physical properties, microbiological quality and shelf-life of 'Sambal belacan'. The availability of oxygen in the air and relative humidity were selected as major factors that influence the quality of 'Sambal belacan'. For the effects of anaerobic and aerobic condition in 'Sambal belacan' during storage, 'Sambal belacan' samples were stored at chilled and ambient temperature, respectively. Next, for the effects of low and high relative humidity in 'Sambal belacan' during storage, 'Sambal belacan' samples were stored at chilled and ambient temperature, respectively. All samples were analysed for physical properties (pH, CO₂ concentration, relative humidity (RH) and colour), microbiological quality (Aerobic plate count (APC), yeast and mould count, Lactic acid bacteria (LAB) count, *Psychrotrophic* bacteria count, *Enterobacteriaceae* count, *Escherichia coli* count, Coliform count and detection of *Salmonella sp.*), and Shelf-life (APC and yeast and mould count for six weeks storage duration). From all analyses, results showed that there were significant different ($P < 0.05$) for all samples due to increasing weeks of storage for both effects of availability of oxygen in air and relative humidity. However, significant different ($P < 0.05$) among samples detected in CO₂ concentration, L^* , a^* and H° (physical properties), yeast and mould count (microbiological quality and shelf-life) based on effects of oxygen in 'Sambal belacan'. Besides that, significant different ($P < 0.05$) was also detected in percentase of RH, a^* , and C° (physical properties), Lactic acid bacteria count (microbiological quality), APC and yeast and mould count (shelf-life). In conclusion, 'Sambal belacan' treated with low RH and kept at chilled temperature showed the most suitable and the safest storage condition until six weeks storage.

ABSTRAK

Sambal belacan merupakan hidangan tradisional yang popular di kalangan rakyat Malaysia dan biasanya di nikmati bersama ulam-ulaman bersama nasi atau lain-lain sajian. Kajian ini dijalankan untuk menyiasat kesan keadaan penyimpanan yang berbeza pada ciri-ciri fizikal, kualiti mikrobiologi, dan jangka hayat Sambal belacan. Kandungan oksigen dalam udara dan kelembapan telah dipilih sebagai faktor utama yang mempengaruhi kualiti Sambal belacan. Untuk kesan keadaan anaerobic dan aerobik dalam Sambal belacan semasa penyimpanan, sampel Sambal belacan masing-masing telah disimpan pada suhu sejuk dan suhu bilik. Kemudian, untuk kesan kelembapan rendah dan tinggi, sampel Sambal belacan masing-masing telah disimpan pada suhu sejuk dan suhu bilik. Semua sampel telah dianalisis untuk ciri-ciri fizikal (pH, kepekatan CO_2 , purata kelembapan (RH) dan warna (L^* , a^* , b^* , H° and C°), kualiti mikrobiologi (jumlah plat aerobic (APC), kiraan yis dan kulat, kiraan bakteria laktik asid (LAB), kiraan bakteria *psychotropik*, kiraan *Enterobactericea*, kiraan *Escherichia coli*, kiraan *koliform* dan pengesanan spesies *Salmonella*) dan jangka hayat (APC dan kiraan yis dan kulat selama enam minggu simpanan). Daripada semua analisis, keputusan menunjukkan adanya perbezaan yang signifikan ($P < 0.05$) untuk semua sampel berdasarkan peningkatan minggu penyimpanan untuk kedua-dua kesan kehadiran oksigen dalam udara dan kelembapan purata. Walaubagaimanapun, perbezaan yang signifikan ($P < 0.05$) diantara sampel di kesan dalam kepekatan CO_2 , L^* , a^* dan H° (ciri-ciri fizikal), kiraan yis dan kulat (kualiti mikrobiologi dan jangka hayat) berdasarkan kesan oksigen dalam Sambal belacan. Selain itu, perbezaan yang signifikan ($P < 0.05$) juga dikesan dalam peratusan RH, a^* dan C° (ciri-ciri fizikal), kiraan bakteria asid laktik (kualiti mikrobiologi), kiraan APC dan yis dan kulat (jangka hayat). Kesimpulannya, Sambal belacan dirawat dengan RH yang rendah dan disimpan pada suhu sejuk menunjukkan keadaan simpanan yang paling sesuai dan selamat untuk sehingga enam minggu simpanan.