





EFFECTS OF PARTIAL SUBSTITUTION OF SALT WITH SELECTED  
MINCED SPICES ON MICROFLORA AND PHYSICOCHEMICAL  
CHARACTERISTICS OF FERMENTED CATFISH

BY

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## ENDORSEMENT

The project report entitled '**Effects of Partial Substitution of Salt with Selected Minced Spices on Microflora and Physicochemical Characteristics of Fermented Catfish**' by **Fatin Hanani Binti Hamdzah**, Matric No **UK18340** has been reviewed and corrections have 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 (Foodservice 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 quotations and summaries which have been duly acknowledged.

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## ABSTRACT

Fermented fish is one of most popular preservation techniques to preserve fish and produce unique organoleptic attributes and taste. It is produced in cottage industry and each country has its own preference fermentation technique influenced by culture and availability of raw materials. This study was conducted on the effect of partial substitution of salt with selected minced spices on the micro-flora, physical and chemical conditions of Malaysian fermented catfish. The objective of this study was to investigate the effects of selected minced spices, namely ginger, black pepper and turmeric on the fermented catfish after its salt concentration had been reduced to half from normal usage of salt concentration (30%) in fermented catfish. The use of these spices as antimicrobial agents was mainly to reduce the microbial load in the fermented catfish. The physicochemical analyses such as visual observation, pH, acidity, colour, texture measurement were observed in the prepared fermented fish for 8-days fermentation. At the same time, microbiological quality and lactic acid bacteria (LAB) count were also determined. During 8-days fermentation, LAB count was increased gradually and had decreased the pH value while increased the acidity level of fermented catfish. This combination effects (pH and acidity level) had decreased the hardness of fermented catfish's texture. Then, the concentration of spices that produce pH between 4.5 to 5.0 of fermented catfish are considered as safe product which were 4% ginger, 4% black Pepper, 4% turmeric, and 6% black pepper. Besides that, the 6% black pepper of fermented catfish was the most suitable antimicrobial agent in maintaining the good quality of physicochemical properties and reducing the microbial loads in the sample.

## ABSTRAK

Pekasam adalah salah satu teknik penjerukan ikan yang boleh menghasilkan ciri-ciri organoleptis dan rasa yang unik. Ia selalunya dihasilkan secara kecil-kecilan dan setiap negara yang ada menghasilkan ikan jeruk mempunyai cara penjerukan ikannya yang tersendiri berdasarkan kepada budaya dan ketersediaan bahan mentahnya. Kajian ini adalah tentang kesan rempah cincang yang digunakan untuk menggantikan sebahagian garam ke atas keadaan microflora, fizikal dan kimia pekasam keli. Objektif kajian ini adalah untuk menyiasat kesan rempah seperti halia, lada hitam dan kunyit pada pekasam keli setelah kandungan garamnya diturunkan menjadi separuh daripada kepekatan garam yang biasanya digunakan di dalam industri pembuatan pekasam (30%). Penggunaan 3 jenis rempah sebagai agen anti-mikrob ini adalah bertujuan untuk menurunkan kandungan mikrob yang terdapat dalam ikan pekasam keli. Analisis psikokimia seperti pemerhatian visual, pH, jumlah keasidan makanan, warna dan tekstur telah dijalankan ke atas pekasam keli yang difermentasi selama 8 hari. Selain itu, kiraan bakteria laktik asid (LAB) dan mikrobiologikal yang lain juga telah ditentukan. Semasa dalam 8 hari tempoh fermentasi pekasam keli, bilangan bakteria LAB telah beransur-ansur meningkat dan ini membuatkan pH pekasam keli menurun dan pada masa yang sama, jumlah keasidan pekasam keli juga meningkat. Gabungan daripada ketiga-tiga kesan ini (LAB, pH dan nilai keasidan) telah membuatkan tekstur ikan pekasam keli semakin menurun. Kemudian, kepekatan dan jenis rempah yang menghasilkan pH diantara 4.5 hingga 5.0 yang dianggap sebagai produk yang selamat ialah sampel pekasam keli yang ditambah dengan 4% halia, 4% lada hitam, 4 % kunyit dan 6% lada hitam. Disamping itu, ikan pekasam keli yang ditambah dengan 6 % lada hitam didapati paling sesuai di dalam mengekalkan kualiti dan ciri-ciri psikokimia serta membantu mengurangkan pertumbuhan mikrob di dalam sampel.