

THE EFFECT OF FRESHWATER MUSSEL
(*Pilsbryconcha exilis*) AS PROTEIN
SOURCE TO THE GROWTH
PERFORMANCES OF RED TILAPIA
(*Oreochromis sp.*) FINGERLINGS

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RED TILAPIA (*Oreochromis sp.*) FINGERLINGS**

WAN NURHAFIZAH BINTI WAN IBRAHIM

**Thesis Submitted in Fulfilment of the Requirement for the
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Abstract of thesis is presented to the Senate of Universiti Malaysia Terengganu in fulfillment of the requirement for the degree of Master of Science.

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ABSTRACT

This study was designed to determine the effect of partially substitution of fishmeal by a new alternative animal based protein source, Freshwater mussel (*Pilsbryoconcha exilis*) on growth performance of Red Tilapia (*Oreochromis sp.*) fingerlings. Feeding in aquaculture can cost about 60% of the total cost production. Thus, the present study was aimed to identify a new alternative of animal by-product in partially replacement to fishmeal usage. Five treatment diets with varying replacement level of Freshwater mussel were formulated to 40% protein level. The diets were formulated to varying levels of replacement with 0%, 10%, 20%, 30% and 40% inclusion of Freshwater mussel meal. The control diet (0%) was prepared with fishmeal as the main protein source without inclusion of Freshwater mussel meal. Feeding trial was done for 42 days and diets were fed twice daily (8.00 am to 5.00 pm) to triplicate groups of Red Tilapia fingerlings. At the end of the study period, all the treatments were significantly different ($P < 0.05$) in which treatment 5 fish fed with 40% inclusion showed the highest growth performance compared to others. There was no significant differences observed on weight gained between Treatment 1 and Treatment 2 as well as between Treatment 3 and Treatment 5 ($P > 0.05$). Rapid growths were observed on sixth week of the feeding trial. Weight gained, specific growth rate (SGR) and protein efficiency ratio (PER) in Treatment 5 were observed to showed the highest value compared to the other treatments with 30.23g, 3.92, and 1.65 respectively. Better feed conversion ratio (FCR) was observed in treatment 5 where the FCR value was lowered (1.60) compared to others. The present study observed that the lowest growth performance showed by fish fed with control diet (0% inclusion) with high FCR value (2.26) and lowest SGR value. The results of this study indicate that fishmeal can be replaced with Freshwater mussel meal up to 10% inclusion to the diets. The best growth performance observed to associate with 40% inclusion of Freshwater mussel meal to the diets. The present study highly suggest that partially replacement of Freshwater mussel meal to the fish diet will contribute to the new finding of alternative protein source, hence will increase profitability by allowing the production of less expensive feeds, while supporting the sustainable growth of Red Tilapia in aquaculture industry.

Abstrak tesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu sebagai memenuhi keperluan untuk Ijazah Master Sains.

KESAN PENGGANTIAN KIJING (*Pilsbryconcha exilis*) SEBAGAI SUMBER PROTEIN UTAMA TERHADAP KADAR TUMBESARAN ANAK IKAN TILAPIA MERAH (*Oreochromis sp.*)

ABSTRAK

Kajian ini bertujuan untuk menentukan kesan penggunaan sumber alternative protein baru berasaskan sumber haiwan, Kijing atau dikenali dengan nama saintifik sebagai *Pilsbryconcha exilis* terhadap pertumbuhan anak ikan (fingerling) Tilapia Merah, (*Oreochromis sp.*). Kos terlalu tinggi sehingga mencapai 60% bagi penyediaan makanan ikan menyebabkan penyelidik berusaha mencari alternative sumber protein baru. Kajian ini bertujuan untuk menggantikan kijing dan mengurangkan penggunaan fishmeal dalam diet ikan berasaskan sumber haiwan. Lima diet yang mengandungi 40% protein telah diformulasi mengikut kepelbagaian kadar penggantian Kijing (0%, 10%, 20%, 30% dan 40%) terhadap makanan ikan tersebut. Diet yang tidak mengandungi kemasukan Kijing (100% fishmeal) adalah sebagai diet kawalan yang akan dibandingkan kadar pertumbuhan anak ikan Tilapia merah dengan empat diet yang lain pada akhir eksperimen. Terdapat 5 rawatan berlainan peratus kemasukan Kijing dengan setiap satu rawatan mempunyai 3 replikasi. Anak ikan Tilapia Merah tersebut diberikan makanan yang telah diformulasi dalam tahap percubaan selama 42 hari, dengan kadar pemberian makanan sebanyak 2 kali sehari (8.00 pagi dan 5.00 petang). Akhir kajian menunjukkan kelima-lima rawatan diet tersebut mengandungi perbezaan antara satu sama lain ($P < 0.05$). Tiada perbezaan pertumbuhan berat antara Diet 1 dan Diet 2 serta Diet Diet 3 dan Diet 5 ($P > 0.05$). Diet 5 (40%) menunjukkan kadar pertumbuhan yang sangat memberangsangkan berbanding rawatan diet yang lain. Diet 5 menunjukkan nilai pertambahan berat, kadar pertumbuhan spesifik (SGR), dan nisbah kecekapan protein (PER) yang paling tinggi yang mana menunjukkan nilai 30.23g, 3.92, dan 1.65 bagi setiap satu komponen. Manakala, nisbah penukaran makanan (FCR) dalam diet 5 rendah berbanding dengan diet lain iaitu 1.60. Diet kawalan menunjukkan tahap pertumbuhan ikan yang paling rendah dengan nilai FCR paling tinggi (2.26), SGR terendah (2.55). Secara keseluruhan, kajian ini membuktikan bahawa penggantian Kijing terhadap penggunaan fishmeal boleh menyumbang kepada penemuan satu sumber alternatif protin baru dalam makanan ikan akuakultur. Kajian ini terbukti melalui keputusan yang dicapai iaitu penggantian Kijing sebanyak 40% ke dalam diet ikan menyebabkan nilai FCR rendah dengan nilai SGR tinggi. Konsep tersebut sangat penting untuk diambilkira bagi menentukan kualiti makanan ikan yang telah diformulasi. Kajian ini juga mampu mengurangkan penggunaan fishmeal dalam diet ikan seterusnya sedikit sebanyak mengurangkan kos pengeluaran makanan ikan tilapia dalam industri akuakultur.