UNIVERSITI PUTRA MALAYSIA

EFFECT OF SPIRULINA ENRICHED ARTEMIA ON THE BODY COMPOSITION OF RED TILAPIA (Oreochromis sp.)

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EFFECT OF *SPIRULINA* ENRICHED *ARTEMIA* ON THE BODY COMPOSITION OF RED TILAPIA (*Oreochromis* sp.)

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This project report is submitted in partial fulfillment of the requirement for the Degree of Bachelor of Agriculture (Aquaculture)

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This is to certify that I have examined the final project report and all corrections have been made as recommended by the panel of examiners. This report complies with the recommended format stipulated in the AKU 4999 project guidelines, Department of Aquaculture, Faculty of Agriculture, Universiti Putra Malaysia.

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ABSTRACT

The effect of *Spirulina* enriched *Artemia* on the proximate analysis of red tilapia (*Oreochromis niloticus.)* tissue was investigated. The experiment was conducted in 15 days that involved 3 locations which were the Institute of Bioscience, Nutrition Study Laboratory (Department of Aquaculture, Faculty of Agriculture, University Putra Malaysia) and Nutrition Study Sector, MARDI. The red tilapia, aged about 2 weeks were stocked into 12 tanks. Each tank contained 11L of freshwater and 110 tilapia individuals. There were 4 different treatments tested with 3 replicates for each treatment. Each 3 tanks were given treatment T1 (unenriched *Artemia*) , T2 (*Artemia* enriched with *Spirulina* for 3 hours), T3 (*Artemia* enriched with *Spirulina* for 6 hours) and T4 (*Artemia* enriched with *Spirulina* for 9 hours). All the diets tested were frozen before given to the fish 3 times per day. Initial proximate analysis was done before the culture period begins. After 15 days, the proximate analysis was once again done as final results. Water quality parameters were also measured throughout the culture period. Water quality parameters that have been measured were pH, dissolved oxygen (DO), water temperature and ammonia-nitrogen content. Result showed that unenriched and enriched *Artemia* gave effect on proximate analysis of the red tilapia. Treatment T4 (*Artemia* enriched with *Spirulina* for 9 hours) is the best compared to other treatments.

ABSTRAK

Kesan *Artemia* yang diperkayakan dengan *Spirulina* daripada Tasik Great Salt ke atas analisis proksimat tisu ikan tilapia merah (*Oreochromis niloticus*) telah dikaji. Kajian telah dijalankan selama 15 hari yang melibatkan 3 lokasi iatu di Institut Biosains, Makmal Pengajian Makanan (Jabatan Akuakultur, Fakulti Pertanian, Universiti Putra Malaysia) dan Bahagian Pengajian Makanan, MARDI. Tilapia merah berumur lebih kurang 2 minggu dimasukkan ke dalam 12 buah tangki. Setiap tangki mengandungi 11 Liter air tawar bersama 110 ekor ikan tilapia merah. Sebanyak 4 rawatan berbeza yang telah diuji, dengan setiap rawatan mempunyai 3 replikasi. Setiap 3 tangki replikasi diberi rawatan berbeza iatu T1 (*Artemia* yang tidak diperkayakan), T2 (*Artemia* yang diperkayakan dengan *Spirulina* selama 3 jam), T3 (*Artemia* yang diperkayakan dengan *Spirulina* selama 6 jam) dan T4 (*Artemia* yang diperkayakan dengan *Spirulina* selama 9 jam). Semua diet yang diuji telah dibekukan sebelum diberikan kepada tilapia sebanyk 3 kali sehari. Analis proksimat awal telah dilakukan sebelum bermulanya tempoh masa kajian. Selepas 15 hari tempoh masa kajian, analisis proksimat sekali lagi dilakukan sebagai keputusan akhir. Parameter kualiti air juga disukat sepanjang tempoh kajian dijalankan. Parameter kualiti air yang telah disukat adalah pH, oksigen terlarut (DO), suhu air dan kandungan ammonia-nitrogen. Keputusan menunjukkan *Artemia* yang diperkayakan dan yang tidak diperkayakan telah memberi kesan ke atas analisis proksimat ikan tilapia merah. Rawatan T4 (*Artemia* yang diperkayakan dengan *Spirulina* selama 9 jam) adalah yang paling baik berbanding rawtan-rawatan lain.

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LIST OF ABBREVIATION

T1, T2, T3, T4	Treatment
°C	Degree Celsius
ANOVA	Analysis of variance
SD	Standard deviation
mg	milligram
ppt	part per thousand
kg	kilogram
g	gram
µm	micrometer
mm	millimetre
mg/l	milligram per little
DO	dissolved oxygen
NH^3-N	ammonia nitrogen
ppt	part per thousand
sp.	spesies
%	Percentage
±	Plus minus (average)
pH	measure of acidity or basicity of a solution

CHAPTER 1

INTRODUCTION

Nowadays, fishes have been one of the most important protein source, widely consumed by human around the world. Due to the increasing world population, there is also proportional increase in fish demand. According to (Laude 2003), because capture fisheries are being exploited to their sustainable limit and beyond, aquaculture is expected to continue to have an important role. Also known as aquafarming, aquaculture is the farming of aquatic organisms including aquatic plants, crustaceans, molluscs and fish. It involves cultivating freshwater and salt water populations under controlled conditions, and can be contrasted with commercial fishing, which is the harvesting of wild fish.

Tilapia, the common name for nearly a hundred species of cichlid fish from the tilapiine cichlid tribe, is one of the fish that involved in aquaculture industry and is of increasing importance in aquaponics. Tilapia typically have laterally compressed, deep bodies. Like other cichlid, the lower pharyngeal bones are fused into a single tooth-bearing structure. Their mouth can be protruded, usually bordered with wide and often swollen lips (Popma et al. 1999). Typical tilapia can be recognized as they have a long dorsal fin, and also a lateral line which often breaks towards the end of the dorsal fin, and starts again two or three rows of scale below. Having characteristics of fast-growing, tolerant of stocking

density and adaptable, tilapiine species have been introduced and farmed extensively in many parts of Asia and are increasingly common aquaculture targets elsewhere (Lovshin, 1997).

In aquaculture industry, many types of live feed used to be consumed by cultured species. *Artemia* is one of them. It belongs to genus of aquatic crustaceans which is also known as brine shrimp.*Artemia*, the only genus in the family Artemiidae, has changed little externally since the Triassic period. For centuries, artemia had probably been used and known within its natural area of distribution. Sorgeloos (1980) described that its fame elsewhere only began to rise in the 1930's when some investigators adopted it as a convenient replacement for the natural diet for fish larvae, thus realising the first breakthrough in the culture of commercially important fish species.

Artemia are said to be found in about 500 artificial saltern and salt lakes seattered throughout the tropical, subtropical, along coastlines, inland as well as temperate climatic zones (Dhont and Stappen, 2003). The genus *artemia* is thus a complex of sibling species and subspecies, defined largely, but not completely, by the criterion of reproductive isolation. Very rarely, it has been shown that genetically extremely distinct and allopatric species can produce laboratory hybrids (Pilla and Beardmore, 1994). Playing important role as feed for fish, *artemia* is widely used in aquaculture industry. Its small size making it more palatable, suitable for fish larvae.During this stage, the fish species need some essential nutrition, help in increasing the growth rate. The high growth rate will

indirectly lower the cost of culturing. Despite concerning only on the growth rate, aquaculturists also do care about the nutritional value of their cultured fishes. High nutritional value fish reflects the high market value as well as showing that the fish is healthy.

In order to have good nutritional value, fishes should consume high nutritional value feed as their daily diet because it will affect their body biochemical composition. Nutritional feed presence in two common forms which are commercial and live feed. Undeniably, live feed production for cultured fish is much more expensive compared to formulated feed. However, enriched live feed comes with a lot of good benefits especially in providing the optimum value of biochemical composition in fish (Pilla and Beardmore,1994).

The general objective of this present work is to examine body composition of*Orechromis* sp. feed with *Spirulina* enriched *Artemia* and the specific objective is:

1. To study the effect of enriched live feed on the proximate analysis (protein, lipid, fiber, energy, ash and moisture) in *Oreochromis* sp.

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