

**ISOLATION OF LACTIC ACID BACTERIA
FROM BROILER CHICKEN AND TILAPIA
Oreochromis niloticus AND ASSESSMENT OF
THEIR PROBIOTIC EFFECTS ON AFRICAN
CATFISH *Clarias gariepinus***

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MASTER OF SCIENCE

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**Thesis Submitted in Fulfillment of the Requirement
for the Degree of Master of Aquaculture in Faculty
of Fisheries and Aquaculture Sciences
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2017

DEDICATION

Thesis is dedicated to:

My wonderful parents. A special feeling of gratitude to my loving wife, Enas Albahloul whose words of encouragement and push for persistence ring in my ears. Then to my beloved country Libya, that support me to persue my graduate education in Malaysia.

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ISOLATION OF LACTIC ACID BACTERIA FROM BROILER CHICKEN AND TILAPIA *Oreochromis niloticus* AND ASSESSMENT OF THEIR PROBIOTIC EFFECTS ON AFRICAN CATFISH *Clarias gariepinus*

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SEPTEMBER 2017

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The chemotherapeutic use of antibiotics in aquaculture to control diseases had been practiced for several decades, which led to several complications such as the antibiotic resistance in animal's tissues together with the gastrointestinal imbalance of the microbial flora in aquatic species. Several probiotics to enhance the productivity of commonly cultured fish species in Malaysia have been conducted. However, reliable evidence in related to lactic acid bacteria derived from the gastrointestinal tract of broiler chicken *Gallus gallus* as an in-feed probiotic additive and its effects on African Catfish *Clarias gariepinus* are limited. This study aims to isolate lactic acid bacteria from broiler chicken and tilapia *Oreochromis niloticus* and evaluate their probiotic effects on African Catfish *Clarias gariepinus*. The experiment was implemented for 90 days, with a total number of 450 fingerlings of

African Catfish, *Clarias gariepinus* at an average weight of 2.3 ± 0.2 g. The fish were fed with commercial feed twice daily at a ratio of 5% of their body weight. Antagonistic analysis of isolates was carried out using double-layer agar method to select candidate probiotics. We also evaluated whether their tolerance gastrointestinal condition such as ph., bile salt and digestive enzyme, then identified candidate probiotic using De Man, Rogosa and Sharpe (MRS) agar. Analysis of Variance (ANOVA) was used to compare between control group and two diets groups supplemented with *Enterococcus durans* and *Lactobacillus plantarum*. The culture experimental result showed that both probiotics improved growth parameter and survival rate, even though there is no significant difference with control ($p > 0.05$). Whereas there is significantly probiotics increased with red blood cell (RBC), packed cell volume (PCV), and Mean Cell Volume (MCV) of both (*Enterococcus* sp. and *lactobacillus* sp). These results suggested these two probiotics have more influence on host immunity compared to growth factor. We identified two lactic acid bacteria (*Enterococcus* sp. and *lactobacillus* sp) from gut of chicken and tilapia. We need further experiment to reveal these mechanism and function to host immune as well as growth.

Abstrak tesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu sebagai memenuhi keperluan untuk ijazah Sarjana Sains

**PEMENCILAN BAKTERIA ASID LAKTIK DARIPADA AYAM PEDAGING
DAN TILAPIA DAN PENILAIAN TERHADAP KESAN PROBIOTIK
MEREKA PADA IKAN KELI AFRIKA**

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Kemoterapi menggunakan antibiotik bagi tujuan pengawalan penyakit yang digunakan selama beberapa dekad telah menyebabkan berlaku beberapa komplikasi seperti rintangan terhadap antibiotik dalam tisu haiwan dan ketidakseimbangan gastrousus pada mikroflora dalam spesies akuatik. Beberapa penyelidikan menggunakan probiotik untuk menambahbaik produktiviti ikan ternakan telah dijalankan di Malaysia. Namun, hanya sedikit bukti terhad yang boleh dipercayai berkaitan kesan probiotik asid laktik yang dikultur daripada saluran gastrousus ayam *Gallus gallus* dijadikan sebagai penambah dalam makanan terhadap ikan keli Afrika *Clarias gariepinus*. Penyelidikan ini bermatlamat untuk memencilkan bakteria asid laktik daripada ayam dan ikan tilapia *Oreochromis niloticus* dan menilai kesan

probiotik tersebut pada ikan keli Afrika *Clarias gariepinus*. Kajian eksperimen terhadap 450 anak ikan keli Afrika *Clarias gariepinus* (jantan dan betina) telah dijalankan selama 90 hari, dengan purata berat 2.3 ± 0.2 g. Ikan keli tersebut diberi makan sebanyak 2 kali sehari dengan nisbah 5% berat badan. Analisa terhadap kesan antagonistik telah dijalankan menggunakan pendekatan agar dua-lapisan manakala tahap rintangan terhadap antibiotik (AST) menggunakan teknik Kirby-Bauer dengan agar De Man Rogosa dan Sharpe (MRS). Analisa varians (ANOVA) digunakan bagi membezakan kumpulan kawalan dan dua kumpulan diet menggunakan *Enterococcus durans* dan *Lactobacillus plantarum*. Keputusan eksperimen menunjukkan keli Afrika yang diberi makanan mengandungi probiotik tidak menunjukkan keputusan yang signifikan penting berbanding kumpulan kawalan (tanpa probiotik) terhadap semua parameter pertumbuhan yang dikaji, iaitu spesifik kadar pertumbuhan, pertambahan berat, nisbah tukaran makanan (FCR), faktor keadaan, dan kadar kemandirian dengan tiada kesan penting pada prestasi pertumbuhan ikan keli Afrika ($p > 0.05$). Keputusan kajian menunjukkan probiotik yang digunakan tidak menunjukkan kesan peningkatan yang signifikan pada pertumbuhan ikan keli Afrika ($p > 0.05$). Kesan rembesan saluran penghadaman pada ikan keli dan kandungan protin makanan ikan sepanjang masa eksperimen dijalankan dianggap sebagai antara faktor-faktor yang menyumbang kepada ketidakberkesanan penggunaan kedua-dua probiotik tersebut terhadap kadar pertumbuhan ikan keli Afrika.