

EFFECT OF ESTROGEN HORMONE,
17 β -ESTRADIOL ON FEMINIZATION,
SURVIVAL AND GROWTH OF BANANA
SHRIMP, *Penaeus merguensis*
(De Man, 1888) POSTLARVAE

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MASTER OF SCIENCE
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Effect of estrogen hormone, 17 B-Estradiol on feminization,
survival and growth of banana shrimp, Fenneropenaeus
merguiensis (De Man, 1888) Postlarvae / Muhammad Hafiz
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PERPUSTAKAAN SULTANAH NUR ZAHIRAH
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**EFFECT OF ESTROGEN HORMONE, 17 β -ESTRADIOL ON
FEMINIZATION, SURVIVAL AND GROWTH OF BANANA SHRIMP,
Fenneropenaeus merguensis (De Man, 1888) POSTLARVAE**

MUHAMMAD HAFIZ BIN BAHAR

**Thesis Submitted in Fulfillment of the Requirement for the Master Degree of
Science in the Institute of Tropical Aquaculture
Universiti Malaysia Terengganu**

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DEDICATION

I dedicate this thesis to my beloved mother and father for all their supports and encouragement throughout my studies and also to all my beloved friends for all of their helps and support.

Thank you.

Abstract of thesis presented to the Senate of Universiti Malaysia Terengganu in fulfillment of the requirement for the degree of Master of Science

EFFECT OF ESTROGEN HORMONE, 17 β -ESTRADIOL ON FEMINIZATION, SURVIVAL AND GROWTH OF BANANA SHRIMP, *Fenneropenaeus merguensis* (De Man, 1888) POSTLARVAE

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This study was conducted to differentiate the sexual characteristics and also to identify the ages when the sexes of banana shrimp, *Fenneropenaeus merguensis* postlarvae (PL) can be differentiated. This study was also conducted to determine the effects of different low concentrations (0, 200, 400, 600, 800 and 1000 mg/kg) of estrogen hormone, 17 β -estradiol (E2) on the survival, growth and feminization of *F. merguensis* PL. In addition, this study was done to determine the effect of different higher concentrations (0, 1000, 1200, 1400, 1600 and 1800 mg/kg) of E2 on the survival, growth and feminization of *F. merguensis* PL if the production of all-female was not achieved in the low concentration of E2. For the male PL, the appearance of petasma was seen; while for the female PL, thylecum was seen below the female body during PL50. The PL shrimps were fed with shrimp commercial diet mixed with different concentration of E2. One treatment feed

served as Control and five others were formulated to each treatment of 200, 400, 600, 800 and 1000 mg/kg. Based on the results of mean sex ratio values of male to female gained from Control till the highest E2 hormone concentration of 0, 200, 400, 600, 800 and 1000 mg/kg which were 1:1, 1:1, 1:1, 1:2, 1:3 and 1:4 respectively; it shows that higher concentration of E2 was needed to be studied. This study was furthered to identify the effect of different high dosage of E2 which consists of 1000, 1200, 1400, 1600 and 1800 mg/kg. The mean sex ratio values of male to female gained from Control till the highest E2 hormone concentration of 1000, 1200, 1400, 1600 and 1800 mg/kg were 1:1, 1:3, 0:1, 0:1, 0:1 and 0:1 respectively. Based on the results of specific growth rate (SGR) for body weight (BW), SGR for total length (TL), weight gain and also length gain, the concentration of 1600 mg/kg give higher results followed by 1800 and 1400 mg/kg. It was concluded that the optimum dosage of E2 to obtain all-female *F. merguiensis* PL was the 1600 mg/kg concentration.

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

KESAN HORMON ESTROGEN, 17 β -ESTRADIOL KE ATAS FEMINISASI, KEMANDIRIAN DAN TUMBESARAN POSTLARVA UDANG PUTIH, *Fenneropenaeus merguensis* (De Man, 1888)

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Satu kajian telah dilakukan untuk membezakan ciri-ciri jantina dan juga untuk mengenal pasti peringkat umur apabila jantina postlarva (PL) udang putih, *Fenneropenaeus merguensis* boleh dibezakan. Kajian ini juga dijalankan untuk menentukan kesan kepekatan hormon estrogen, 17 β -estradiol (E2) rendah yang berbeza (0, 200, 400, 600, 800 dan 1000 mg/kg) pada kelangsungan hidup, pertumbuhan dan kebetinaan PL *F. merguensis*. Di samping itu, kajian ini dilakukan untuk menentukan kesan kepekatan E2 tinggi yang berbeza (0, 1000, 1200, 1400, 1600 dan 1800 mg/kg) terhadap kehidupan, pertumbuhan dan kebetinaan PL *F. merguensis* jika pengeluaran semua-betina tidak dicapai dalam kepekatan E2 yang rendah. Bagi PL jantan, kemunculan petasma telah dilihat; manakala bagi PL betina, thylecum telah muncul di bawah tubuh betina semasa PL50. PL udang putih diberi makan dengan diet komersial udang bercampur E2 dengan kepekatan yang berbeza. Satu rawatan makanan telah digunakan sebagai Kawalan dan lima yang lain telah

dirangka bagi setiap rawatan 200, 400, 600, 800 dan 1000 mg/kg. Berdasarkan keputusan didapati nilai nisbah jantina jantan kepada betina yang diperolehi daripada Kawalan hingga kepekatan hormon E2 tertinggi 0, 200, 400, 600, 800 dan 1000 mg/kg adalah 1:1, 1:1, 1:1, 1:2, 1:3 dan 1:4 masing-masing; ia menunjukkan bahawa kepekatan E2 yang lebih tinggi diperlukan untuk kajian lanjutan. Maka kajian ini telah dilanjutkan bagi mengenal pasti kesan dos E2 tinggi berbeza yang terdiri daripada 1000, 1200, 1400, 1600 dan 1800 mg/kg. Nilai nisbah bermaksud jantina jantan kepada betina yang diperolehi daripada Kawalan hingga kepekatan hormon E2 1000, 1200, 1400, 1600 dan 1800 mg/kg ialah 1:6, 1:3, 0:1, 0:1, 0:1 dan 0:1 masing-masing. Berdasarkan keputusan kadar pertumbuhan spesifik (SGR) untuk berat badan (BW), SGR untuk jumlah panjang (TL), pertambahan berat dan juga pertambahan panjang, kepekatan 1600 mg/kg mempunyai keputusan yang lebih tinggi diikuti oleh 1800 dan 1400 mg/kg. Dapat disimpulkan bahawa dos E2 yang optimum untuk mendapatkan PL *F. merguensis* semua-betina adalah pada kepekatan 1600 mg/kg.