

**BIOMASS PRODUCTION BRINE SHRIMP ARTEMIA FED
WITH JACKFRUIT SEED BASED EXTRACT ENRICHED
WITH LECITHIN (JSB-L+)**

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**SCHOOL OF MARINE SCIENCE AND ENVIRONMENT
UNIVERSITI MALAYSIA TERENGGANU**

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BIOMASS PRODUCTION OF BRINE SHRIMP *ARTEMIA* FED WITH
JACKFRUIT SEED BASED EXTRACT ENRICHED WITH LECITHIN (JSB-L+)

By

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Research Report submitted in partial fulfilment of
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2014



**SCHOOL OF MARINE SCIENCE AND ENVIRONMENT
UNIVERSITI MALAYSIA TERENGGANU**

**DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT**

It is hereby declared and verified that this research report entitled **BIOMASS PRODUCTION OF BRINE SHRIMP *ARTEMIA* FED WITH JACKFRUIT SEED BASED EXTRACT ENRICHED WITH LECITHIN** by **KHATIJA BINTI SAIFUL BAHARI**, Matric No. **UK 25159** have been examined and all errors identified have been corrected. This report is submitted to the School of Marine Science and Environment, Universiti Malaysia Terengganu as partial fulfillment towards obtaining the Degree of Science (Marine Biology).

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LIST OF ABBREVIATIONS

ANOVA	-	Analysis of Variance
cm	-	Centimeter
g	-	Gram
hr	-	hour
hrs	-	hours
HUFA	-	Highly Unsaturated Fatty Acids
JSB-L+	-	Jackfruit seed based with Lecithin
m	-	Meter
mg	-	Miligram
ml	-	Mililiter
mm	-	Milimeter
ln	-	Log _e
L	-	Liter
ppt	-	Parts per thousands
PUFA	-	Polyunsaturated Fatty Acids
SGR	-	Specific Growth Rate
µm	-	Micrometer
%	-	Percentage
°C	-	Degree Celcius

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ABSTRACT

Brine shrimps *Artemia* nauplii and decapsulated cysts have remained the first choice for the first feeding of fish larvae, under intensive culture. However, compared with freshly hatched nauplii, the nutritional value of on-grown and adult *Artemia* is much exceptional. The increasing cost of *Artemia* is a constraint to fish farming among resource poor farmers particularly in the developing world, which has necessitated the need for alternative feeds. It has been shown that most of the feed used in the process of on-grown *Artemia* is costly and difficult to prepare. The use of jackfruit seed, a common agriculture waste product is a potential alternative to substitute the use of microalgae *Spirulina* in the biomass production of *Artemia*. The seeds are very nutritive, with approximately 30% crude protein, 38% carbohydrate, and 1.5% crude fiber. In this study, a jackfruit seed based extract enriched with a small amount of Lecithin (JSB-L+) was tested as an inert feed for biomass production of *Artemia*, with microalgae *Chlorella* served as the control feed. Specifically, 4 grams of live *Artemia* nauplii were fed with different concentrations of JSB-L+ (10cm, 13cm and 15cm water turbidity) and the biomass was determined after 14 days in a batch culture system. Feeding with 10 cm turbidity JSB-L+ produced biomass with each adult measures approximately 7.85 ± 0.73 mm in length. Survival reached approximately 60% in the first 7 days of culture. Feeding with 13cm turbidity JSB-L+ yielded approximately 35.53 g biomass and this is comparable to those fed with similar concentration of *Chlorella*, indicating that JSB-L+ is a potential substitute for microalgae. Nevertheless, a higher SGR 16.96 ± 1.74 mm was obtained with *Chlorella* and this is perhaps due to its high nutrient composition. Meanwhile, when feed concentration were standardized to 15 cm, the *Artemia* biomass produced with JSB-L+ is slightly higher than *Chlorella*, with the former yielding approximately 32.60

g but the SGR is lower than *Chlorella*, 15.50 ± 2.45 mm. It is anticipated that JSB-L+ is a good inert feed for *Artemia* and it represents a simple and cheap alternative to substitute the use of microalgae for the biomass production of this important live food species.

PENGELUARAN BIOJISIM BRINE SHRIMP *ARTEMIA* DIBERI MAKAN JSB
DIPERKAYA DENGAN LECITHIN (JSB-L +)

ABSTRAK

Brine shrimp nauplii *Artemia* dan sista merupakan makanan pilihan pertama untuk anak ikan, di bawah kultur intensif. Walau bagaimanapun, berbanding dengan nauplii baru menetas, nilai *Artemia* yang dibesarkan dan *Artemia* dewasa adalah lebih luar biasa. Kos *Artemia* yang semakin meningkat adalah kekangan untuk pertanian ikan di kalangan sumber petani miskin terutamanya di negara membangun yang memerlukan keperluan untuk makanan alternatif. Ia telah menunjukkan bahawa kebanyakan makanan yang digunakan dalam proses membesarkan *Artemia* adalah mahal dan sukar untuk disediakan. Benih, satu bahan buangan pertanian biasa adalah salah satu alternatif yang berpotensi untuk menggantikan penggunaan mikroalga *Spirulina* dalam biojisim *Artemia*. Biji benih adalah sangat berkhasiat, dengan kira-kira 30 % protein mentah, 38% karbohidrat, dan 1.5 % serat mentah. Dalam kajian ini, ekstrak berasaskan biji nangka diperkaya dengan jumlah yang kecil Lecithin (JSB -L +) telah diuji sebagai makanan lengai untuk pengeluaran biojisim *Artemia*, dengan mikroalga *Chlorella* berkhidmat sebagai makanan kawalan. Khususnya, 4 gram nauplii *Artemia* secara langsung diberi makan dengan kepekatan yang berbeza JSB-L+ (10cm, 13cm dan 15cm kekeruhan air) dan biojisim ditentukan selepas 14 hari dalam satu sistem budaya kelompok. Pada 10 cm kekeruhan JSB-L+ biomas dihasilkan dengan setiap peringkat dewasa kira-kira 7.85 ± 0.73 mm panjang. Kadar kelangsungan hidup mencapai kira-kira 60% dalam 7 hari pertama budaya. Pada 13cm kekeruhan JSB -L + membuahkan kira-kira 35.53 g biomas dan ini adalah setanding dengan yang diberi makan dengan kepekatan sama *Chlorella*, ini menunjukkan bahawa JSB -L + adalah pengganti berpotensi untuk mikroalga. Walau bagaimanapun, SGR% 16.96 ± 1.74

mm yang lebih tinggi telah diperoleh oleh *Chlorella* dan ini adalah mungkin kerana komposisi nutrien yang tinggi. Sementara itu, apabila kepekatan makanan telah diseragamkan hingga 15 cm, biomass *Artemia* yang dihasilkan dengan JSB -L + lebih tinggi sedikit daripada *Chlorella*, kira-kira 32.60 g tetapi SGR% adalah lebih rendah daripada *Chlorella*, 15.50 ± 2.45 mm. Adalah dijangka bahawa JSB-L+ adalah makanan baik untuk *Artemia* dan ia merupakan alternatif yang mudah dan murah untuk menggantikan penggunaan spesies mikroalga untuk penghasilan biojisim yang penting untuk spesies makanan hidup ini.