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Preface

Excellences, Distinguished Participants, Ladies, and Gentlemen,

I am honored and delighted to welcome you to the 1st International and National Symposium on Aquatic Environment and Fisheries (INSAEF) 2020 of Syiah Kuala University on behalf of the conference committee. I wish to take this opportunity to welcome all the participants, the keynotes, and our invited speakers for coming to our campus virtually.

This year is a different year. The pandemic has shifted our workspaces to home. However, we believe that communication amongst the scientist should remain connected and updated. The INSAEF allows the researchers, scientists, and students of the aquatic environment and fisheries to share their work, thoughts, ideas, learn from and lean on each other in this challenging time. The International and National Symposium on Aquatic Environment and Fisheries (INSAEF) is held virtually. This is due to the pandemic states of COVID-19 in Indonesia and the increase of cases number in Aceh especially. Therefore, the Rector of Syiah Kuala University has released a protocol that all academic activities should arrange virtually or by an online platform. The policy of 14-days quarantine also urges this symposium conducted virtually.

The safety during the pandemic of COVID-19 states is still unpredictable while the work of scientists is needed to be published and updated soon. Besides, the communication amongst the scientist and sharing information into the community should remain connected and updated. The effortless online conference platform (Zoom Conference Meeting) supports this symposium conducted without postponed.

This symposium consisted of three sessions: plenary, parallel session, and fast presentation. The plenary session has two keynote speakers that will deliver their talk in 45 minutes for each. The parallel sessions will be divided into five parallel sessions and every session will have 1 invited speaker that will deliver their talk in 20 minutes for each and approximately 15 oral presenters that will deliver their talk in 10 minutes. Finally, fast presentation session will have ten presenters who will talk for 5 minutes in each class. Each keynote speaker will talk in 45 minutes in a plenary session, 10 minutes in a parallel session, and 5 minutes in a fast presentation session included the Q&A session. Each session will have a moderator who will manage the whole session included Q&A session.

The participants are from Indonesia (Aceh, Bogor, Bali, Padang, Kepulauan Riau etc), Malaysia, Germany, The United Kingdom, USA representing the students, lecturers, and researchers. The targeted number of all participants is 430 participants divided into 130 presenters (80 oral presenters and 30 fast presenters) and 300 non- presenters. After running a strong review, the committee received 115 articles to be published in IOP Conference Series:



Earth and Environmental Science.

Our technical program is rich and varied, with two keynote speeches, five invited talks, and seven parallel sessions. On this occasion, I also wish to thank our keynote speaker Prof. Dr. Agung Dhamar Syakti, S.Pi, DEA (Rector of Universitas Maritim Raja Ali Haji), Prof. Dr. Muchlisin, ZA., M.Sc (Dean of Faculty of Marine and Fisheries, Syiah Kuala University) and our invited speakers Prof Dr. Siti Azizah Mohd Noor (Universiti Malaysia Terengganu), Associate Prof. Dr. Hawis H. Maduppa (IPB University), Dr. Sebastian Ferse (ZMT, Bremen), Dr. Sally Keith (Lancaster University) and Achmad Adhitya, Ph.D. (co-founder Jaringan Alumni Luar Negeri).

Finally, as the chairman of INSAEF 2020, I know that the conference's success depends ultimately on the many people who have worked with us to plan and organize both the technical program and supporting arrangements. I thank the Organizing Committee members who have all worked extremely hard to detail essential aspects of the conference programs, including the Rector of Syiah Kuala University Prof. Dr. Samsul Rizal, M. Eng. and the Dean of Faculty of Marine and Fisheries Prof. Dr. Muchlisin, ZA., M.Sc.

Sincerely yours,

Nur Fadli, Ph.D



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- Number of submissions received: 159 papers
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- Number of submissions accepted: 115 papers
- Acceptance Rate (Number of Submissions Accepted / Number of Submissions Received X 100): 72.33%
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- Any additional info on review process: Preliminary review. The papers passed the first review will be reviewed again from the following aspects: originality, innovation, technical soundness, and applicability
- Contact Name: Dedi Fazriansyah Putra, Affiliation: Faculty of Marine and Fisheries, Syiah Kuala University, Email address: dfputra@unsyiah.ac.id and Nurfadli, Affiliation: Faculty of Marine and Fisheries, Syiah Kuala University, Email address: nurfadli@unsyiah.ac.id



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Artemia sp. enrichment with vitamin C and taurine to support growth and survival rate of vaname (*Litopenaeus vannamei*) larvae: early study

Thia Monica¹, Supono¹ and Endang Linirin Widiastuti¹

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Abstract

The aim of the study was to determine the effect of *Artemia* sp enrichment with vitamin C and taurine on the growth and survival rate of Vaname (*Litopenaeus vannamei*) post larvae. The data were collected using randomized design with four treatment groups, which are control (group A), *Artemia* sp enriched with 50 mg vit CL⁻¹ media (group B), *Artemia* sp enriched with 50 mg taurine L⁻¹ media (group C), and *Artemia* sp enriched with 25 mg vit C and 25 mg taurine L⁻¹ media (group D). Data were analyzed statistically using ANOVA followed by LSD/Tukey at 5% level, using the growth and survival rate of the vaname post larvae and water quality as the data variable.

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***Artemia* sp. enrichment with vitamin C and taurine to support growth and survival rate of vaname (*Litopenaeus vannamei*) larvae: early study**

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Abstract. The aim of the study was to determine the effect of *Artemia* sp enrichment with vitamin C and taurine on the growth and survival rate of Vaname (*Litopenaeus vannamei*) post larvae. The data was collected using randomized design with four treatment groups, which are control (group A), *Artemia* sp enriched with 50 mg vit CL⁻¹ media (group B), *Artemia* sp enriched with 50 mg taurine L⁻¹ media (group C), and *Artemia* sp enriched with 25 mg vit C and 25 mg taurine L⁻¹ media (group D). Data were analyzed statistically using ANOVA followed by LSD/Tukey at 5% level, using the growth and survival rate of the vaname post larvae and water quality as the data variable.

1. Introduction

Vaname shrimps (*Litopenaeus vannamei*), known as Pacific white shrimps, has been formally declared as the most valuable commodity for aquaculture by the Ministry of Marine Affairs and Fishery of Indonesia in 2001. Since then, aquaculture of vaname shrimps has developed rapidly in many coastal areas in Indonesia. Strategies of providing availability and good quality of shrimp farming assets were proposed to increase the national competitiveness of shrimp production and shrimp business player [1]. It is essential to conduct a study related to shrimp seeds or shrimp larva to provide good quality of shrimp seeds.

Shrimp seeds production from the shrimp hatcheries is expected to produce the best quality of shrimp larvae. However, most of these hatcheries encountered high mortality and low growth rate and development of larvae/juvenile shrimps. Balanced and good nutrition is needed as energy sources for the larvae/juvenile shrimps growth and development [2]. *Artemia* is known as the best natural diet source of nutrition for these juveniles.

In many aquaculture productions, water quality and nutrition are monitored for the high performance of the juveniles. Nutrition is usually stored in the fish meal, which is the main protein source in the diets for aquaculture species [3], [4]. As the aquaculture production increases, the demand on fish meals will also be high and expand the fish meal industry, leading to a higher fish meal price. Research shows that adding vitamin C and taurine into juveniles diets can improve their performance or quality. Adding vitamin C in diets proven to be successfully improve the survival rate and body protection of juvenile tiger shrimp, *Penaeus monodon* [5].

Taurine, as one of free amino acids containing sulfur, is widely distributed in many different animal tissues [6]. Taurine with other amino acids also involve in osmoregulation of shrimp. Increases in seawater salinity will boost the concentration of these three amino acids including taurine [7].



Therefore, this study aimed to determine the effects of dietary addition of vitamin C and taurine in natural diet, *Artemia*, on the growth performance and survival rate of white or vaname shrimps (*L. vannamei*).

2. Material and Methods

2.1. Time and Location

This research was conducted in September 2020 at the CV Hatchery, Manunggal 23, Anyer, Banten.

2.2. Diet Preparation

Frozen *Artemia* was weighed and towed and put in media enriched with vitamin C and taurine as treatments for 60 minutes. After 60 minutes, they were filtered and rinsed with seawater prior given to juvenile white shrimp. Small aquariums with a volume of 1.5 L were used for this enrichment of *Artemia* and seawater was added to the aquarium as much as 600 ml. Enrichment to *Artemia* was given twice a day and the study was conducted for 8-days of observation.

2.3. Juvenile White Shrimp Preparation

Juvenile white shrimp were collected from CV Manunggal 23 – Karang Suraga of Anyer District – Banten Province. Juvenile white shrimp used in this study was in post-larvae stadia (PL-1). Twenty small aquariums with 5 L capacity were used and filled with 2 L of filtered seawater. Each aquarium consisted of 100 larvae L⁻¹. They were fed with enrichment *Artemia* with/without vitamin C and/or taurine. After eight days of observations, the growth and survival ratio were determined.

2.4. Experimental Design

This study was conducted in a complete randomized design with four treatments and five replications. Group A used as control and was given *Artemia* without enrichment; Group B was given *Artemia* enriched with vitamin C for 50 mgL⁻¹; Group C was given *Artemia* enriched with taurine for 50 mgL⁻¹; Group D was given *Artemia* enriched with vitamin C for 25 mgL⁻¹ and taurine for 25 mgL⁻¹.

2.5. Water Management

During the study, seawater was not changed but added during the feeding period. Parameter of water quality was determined at PL-1, PL-4 and PL-8 (which can be seen in Table 3).

2.6. Data Collection and Analysis

The growth of the white shrimp larvae (PL) was determined in early study prior to the given treatment and after 8-days of observation by measuring the body's length from rostrum to the tail (in mm). While the survival rate was calculated by the number of larvae prior to and after treatments. Survival ratio (%) = 100 x final number/initial number. Results were expressed as mean ±SEM. Analysis data was conducted using ANOVA followed with LSD (P<0.05). All statistical analyses were performed using the Minitab18 (USA).

3. Results and Discussion

The survival rate and growth of the vaname shrimp larvae (PL-1 to PL-8) after 8 days of observation can be seen in following tables.

The highest survival percentage of vaname shrimp larvae is in the aquarium enriched with vitamin C and taurine. This condition seemed to be driven by the effect of vitamin C and taurine within *Artemia*. Diets supplemented with vitamin C could improve the growth by gaining weight and decreased the feed conversion of prawns, but the survival rate and molting frequency roughly constant [8]. However, in the aquarium with *Artemia* enriched taurine alone (C) had significantly more survival ratio compared to the control group (A). The study shows that the increased survival ratio is

presumably affected by taurine. Nevertheless, deficiency in vitamin C could lower food conversion and growth, incomplete molting, lower stress resistance [9], and immune response in juvenile marine fish [10]. Enrichment of *Artemia* with vitamin C in the diet also increases the survival ratio and growth of catfish *Pangasionodon* sp. larvae [11].

In our study, the use of vitamin C of 50 mg/L was very low compared to other study by [12], which used 0.9 gL⁻¹. This concentration is the optimum level of vitamin C in *Artemia*. Therefore, the treatment with only vitamin C (group B) did not show any difference in survival ratio compared to the control group (A).

Meanwhile, the treatment of taurine only to *Artemia* (group C) increased the survival ratio significantly compared to those in the control group (A). We could say that taurine might enhance the ability of the larvae of vaname to survive. Carnivorous biota (such as fish and shrimp) could accumulate more taurine than plant-eating fish [13]. Some studies also indicate that taurine supplementation significantly improved growth and feed efficiency than taurine-free control diet [14]. The use of taurine in the vaname larvae body could be responsible for the anti-oxidative and protective effect, as seen in other fish, such as zebrafish [15]. Taurine was also known to be the essential amino acid in diets for most fish [16].

In contrast, even though the enrichment of taurine in *Artemia* significantly differed compared to the control group by looking only at body length, taurine enrichment in *Artemia* did not exceed the growth of the vaname larvae compared to the treatment of only vitamin C to enriched *Artemia* (Table 2).

Based on the results of the analysis of the stomach of *Danio albolineatus* eating insects (100%). Nevertheless, all the treatment groups significantly increased the growth of the vaname larvae compared to the control group by looking at the body length. These results indicate that vitamin C or taurine alone enhances body length growth. Simultaneously, the combination of both gave the highest positive impact on both body length growth and survival ratio.

Vaname larvae/juveniles used in this study were in Post Larvae (PL-1) stadium and underwent PL-8. At the PL-1, the juveniles were actively moving for feeding [17]. This activity needs the nervous system to work properly. The taurine obtaining from *Artemia* enrichment presumably worked in their nerve system, helping them move to find their diets. Another study using taurine enrichment in rotifer also indicated significant improvement in survival and development of larval vaname [18]). However, determining of the amount of taurine concentration in juvenile shrimp body should be undergone.

Table 1. The Survival ratio (%) of Vaname shrimp larvae in different treatments

Treatment Group	X ± SEM (%)
A	62.80 ± 2.65 ^c
B	69.00 ± 2.17 ^{b,c}
C	74.80 ± 1.16 ^b
D	84.00 ± 1.05 ^a

^{a,b,c}Statistical significant with *LSD* at 5%

Table 2. The body length growth of Vaname shrimp larvae in different treatments

Treatment Group	X ± SEM (mm)
A	2.96 ± 0.05 ^d
B	3.40 ± 0.05 ^b
C	3.22 ± 0.04 ^c
D	3.66 ± 0.03 ^a

^{a,b,c}Statistical significant with *LSD* at 5%

Water quality is another essential thing needed in shrimp culture. We picked only four water quality parameters because there was no water changing of the media in this study. However, all the four of water quality parameters were given in ranges values indicated by the Indonesian National Standard (SNI) for vaname production (Table 3).

Table 3. Water quality of the treatment media during 8-days observation

Parameter	Media	SNI ¹
Temperature (°C)	30 – 31	28.5 – 31.2
DO (mg L ⁻¹)	5.6 – 5.7	5.0 – 6.7
pH	7.80	7.9 – 8.2
Salinity %	32	25 – 35

4. Conclusion

In this early study, enrichment of *Artemia* as a natural diet with vitamin C and taurine with a 25 mgL⁻¹ concentration in each media increased the survival ratio and the growth in body length of the juvenile vaname shrimp in post larvae stadia.

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