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The Effect of Additioning Breaker Yeast (Saccharomyces Cerivicіae) In Feeding On the Vitality of Tila Fish Seeds (Oreochromis Niloticus) In The Rowing Phase

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Abstract:

This research aims to determine the effect of adding baker's yeast (*S. cereviciae*) to feed on the growth, survival and vitality of tilapia (*O. niloticus*).

This research was carried out at the Biota and Environmental Engineering Laboratory, Faculty of Fisheries, Indonesian Muslim University from March to May 2022.

This research was designed using a Completely Randomized Design, consisting of 4 treatments and three replications, namely treatment A Feed without the addition of bread yeast (control), treatment B Feed with the addition of 2% bread yeast, treatment C Feed with the addition of 4% bread yeast and treatment D Feed with the addition of 6% baker's yeast.

The results of the research showed that absolute weight growth, absolute length growth and the highest survival were obtained in treatment B (2%) namely 0.27 cm, 2.17 cm, 93%. The vitality level shows that tilapia fry are able to adapt to a salinity of 0-15ppt.

Keywords: Feed, baker's yeast, tilapia (*O. niloticus*), growth and survival.

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1. INTRODUCTION

Tilapia (*Oreochromis niloticus*) is a popular type of freshwater fish and is generally consumed by many people (Wibowo et al., 2021). It is also estimated that the prospect of tilapia cultivation has the same good opportunity to be developed as other types of consumption fish, because tilapia are productive when kept in various fields, not only in freshwater ponds, but also in ponds (Fahrizal & Nasir, 2018).

Disease problems can be a major obstacle because they can be detrimental to cultivation businesses such as reduced production, decreased water quality and even total death (Ashari et al., 2014).

One effective way to control disease is to use natural ingredients as immunostimulants. Currently, the use of immunostimulants is receiving increasing attention to be developed as a disease control method in fish and shrimp farming. Immunostimulants are substances that can increase or stimulate the fish's immune system by interacting directly with cells that activate the immune system (Manoppo & Kolopita, 2016).

Yeast is a single-celled living microorganism from the genus Saccharomyces. In bread yeast there are nucleotides which are essential nutrients that are useful for growth and cell reproduction (Dahoklory & Roti, 2018).
Utilization of yeast is one of the ingredients used in fish feed formulation as an element that can pulverize fibrous raw materials so that fish can easily digest pelleted feed (Telleng et al., 2016).
The aim of the research was to determine the effect of adding baker's yeast (*S. cereviciae*) to feed on vitality and increasing feed efficiency and growth of tilapia (*O. niloticus*).

2. RESEARCH METHODS

This research was carried out at the Biota and Environmental Engineering Laboratory, Faculty of Fisheries, Indonesian Muslim University Makassar from March to May 2022.

Research procedure

This research was carried out through several stages, namely:

1. Media Preparation

The Styrofoam box/Aquarium container is cleaned using detergent then dried, then filled with water from a drilled well which has been settled and aerated for 2 days to remove iron. Then 20 liters/container of water was filled and aeration was installed to supply oxygen.

2. Making and Mixing Feed

The feed used in this research was artificial feed originating from the Maros Brackish Water Aquaculture Research Institute (BBAP) which was added with baker's yeast.
The bread yeast is diluted first then stirred until it expands, then added to the feed. After mixing, the feed is molded using a feed molding machine and dried. Once dry, the feed is ready to be given to test animals. The feed used is self-formulated feed with ingredients as in Table 3 with a protein content of ± 30% (Table 1).

Table 1. Raw materials for tilapia fish feed (*Oreochromis niloticus*)

No.	Material Name	A	B	C	D
1.	Fish flour	33	33	33	33
2.	Soybean Flour	25	25	25	25
3.	Fine Bran	25	25	25	25
4.	Cornstarch	10	10	10	10
5.	Wheat	5	5	5	5
6	Vitamin	2	2	2	2
Total		100	100	100	100
Baker's Yeast (%)		0	2	4	6
Protein (%)		30,36	30,36	30,36	30,36
Fat (%)		9,30	9,30	9,30	9,30

3. Fish Distribution and Adaptation

The test animals used were tilapia fish seeds (*O. niloticus*) with an average length of 1-2 cm with a density of 10 fish/container. by adapting first for 3-4 days, on the first day the fish are given food without any difference in treatment with the predetermined dose.

4. Feeding

Feeding of tilapia (*O. niloticus*) is carried out 3 times a day, namely at 08.00, 11.00 and 16.00 with a dose of 10% of the biomass weight. To maintain optimal water quality, 1 hour after feeding, the remaining feed and feces are removed.

5. Sampling

Sampling is carried out every 7 days by weighing the weight and measuring the length of the fish.

6. Experimental design

The research method used in this research was a completely randomized design, consisting of 4 treatments and three replications, namely:

A. Feed without adding baker's yeast (control)
B. Feed with the addition of 2% baker's yeast
C. Feed with the addition of 4% baker's yeast
D. Feed with the addition of 6% baker's yeast

7. Research Parameters

A. Survival Rate (SR) uses the formula (Mudjiman, 2005):

SR=N_t/N_0 ×100%

Information:

SR: Survival Rate (%)
Nt: Number of fish alive at the end of rearing
N0: Number of fish alive at the start of rearing

B. Absolute Length Increase is calculated using the formula (Mudjiman, 2005):

Pm= Lt – Lo

Information:

Pm: increase in Absolute Length (cm)
Lt: Final average length (cm)
Lo: initial average length (cm)

C. Absolute weight growth is calculated using the formula (Mudjiman, 2005):

Wm = Wt - Wo

Information:

Wm: Absolute weight growth (g)
Wt: Biomass weight at the end of the study (g)
Wo: Biomass weight at the start of the study (g)

D. Observation of Tilapia Vitality

1. Increase the salt content by 5 ppt
2. Increase the salt content by 10 ppt
3. Increase the salt content by 15 ppt
4. Increase the salt content by 20 ppt.

8. Data Analysis

To determine the effect of treatment, analysis of variance (ANOVA) was carried out. Further tests were used to determine differences in the effect between treatments on variables using the Least Significant Difference test (Tukey HSD) with a 95% confidence interval using SPSS 21 software.

3. RESULTS AND DISCUSSION

1. Absolute Weight Growth

Treatment	Absolute Weight Growth
A. Baker's Yeast 0%	0,18±0,00
B. Baker's Yeast 2%	0,27±0,05
C. Baker's Yeast 4%	0,21±0,01
D. Baker's Yeast 6%	0,19±0,02

The results of analysis of variance (ANOVA) showed that feeding with the addition of different doses of yeast had a significant effect on the absolute weight growth of tilapia. with a significant value (P<0.05). Tukey's further test results showed that treatment A was significantly different from treatment B, but not significantly different from treatments C, and D. Treatment B was significantly different from treatments A, C, and D. Treatment C was significantly different from treatment B but not significantly different from treatments A and D. Treatment D was significantly different from treatment B but not significantly different from treatments A and C (Figure 1).

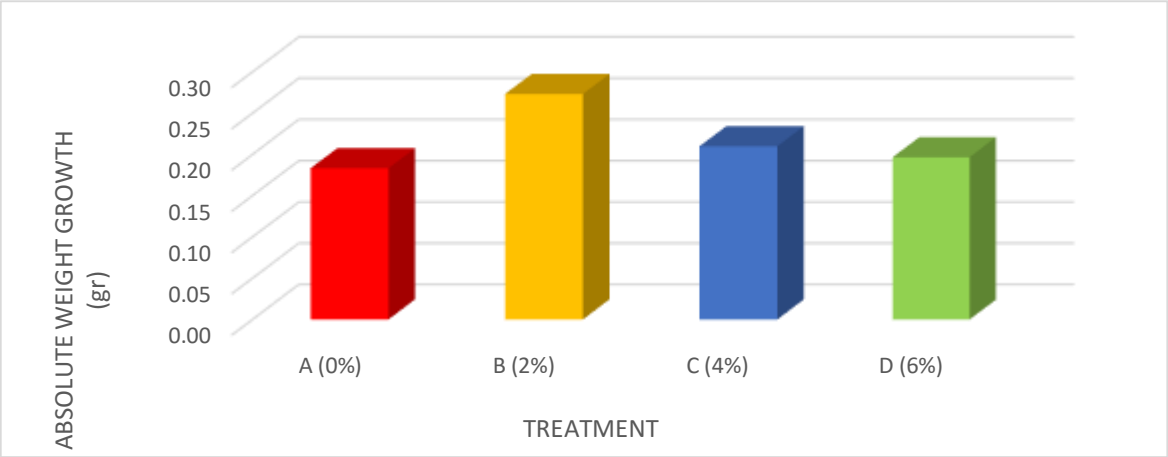

Figure 1 . Absolute Weight Growth in Tilapia (*Oreochromis niloticus*)

Figure 1 shows that the feed treatment without 0% A bread yeast experienced an absolute weight growth of 0.18 cm. Furthermore, the addition of baker's yeast to the feed experienced an increase in weight growth, namely for treatment B 2% by 0.27 cm, treatment C 4% by 0.21 cm and treatment D 6% by 0.19 cm. Increasing fish growth can be done by providing feed which functions as an energy supplier to stimulate growth and maintain survival. One factor that must be considered is the availability of feed for cultivated fish, both natural feed and artificial feed, which is available both in quality and quantity (Niode et al., 2017). Baker's yeast also contains other nutritional values including protein, fat, vitamins and minerals. Protein is a nutrient that is used in large quantities in fish feed formulations. Protein functions as a form of new body tissue, a replacement for damaged body tissue, a raw material for the formation of enzymes, hormones, antibodies and a source of energy (Manurung & Mose, 2018). This is revealed in research results (Kamaruddin et al., 2019) Supplementation of S. cereviceae as much as 2% in feed can increase growth and total digestibility of feed in growing fish.

2. Absolute Length Growth

Treatment	**Absolute Length Growth**
A. Baker’s Yeast 0%	1,43±0,11
B. Baker’s Yeast 2%	2,10±0,20
C. Baker’s Yeast 4%	1,80±0,26
D. Baker’s Yeast 6%	1,63±0,30

The results of the analysis of variance (ANOVA) test showed that feeding with the addition of different doses of yeast had a significant effect on the absolute length growth of tilapia (*Oreochromis niloticus*). Tukey's further test results showed that treatment A was significantly different from treatment B, but not significantly different from treatments C and D. Treatment B was significantly different from treatments A, C, and D. Treatment C was significantly different from treatment B but not significantly different from treatment A and D. Treatment D is significantly different from treatment B but not significantly different from treatments A and C.

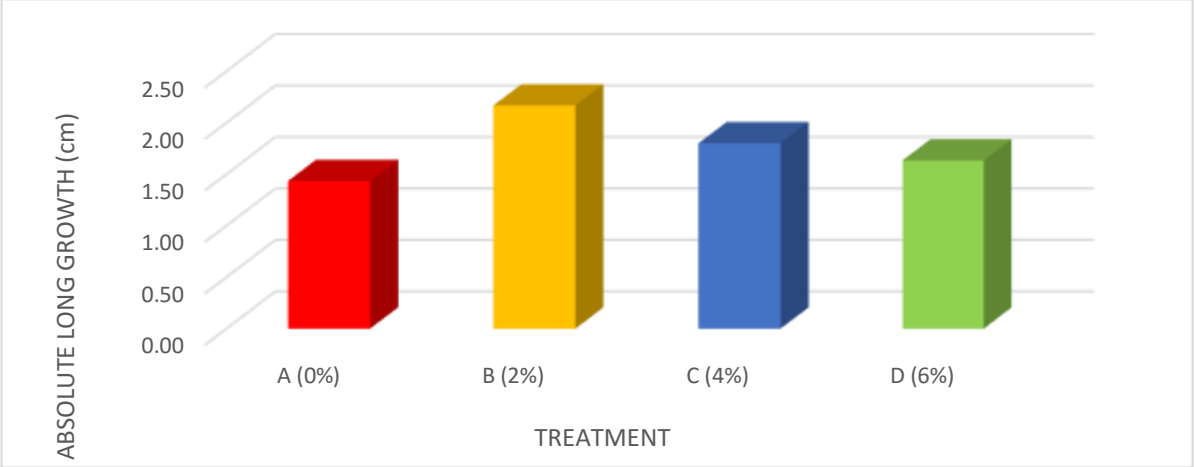

Figure 2. Absolute Length Growth in Tilapia (*Oreochromis niloticus*)

Figure 2 shows that the feed treatment without 0% A bread yeast experienced an absolute length growth of 1.43 cm. Furthermore, the addition of baker's yeast to the feed experienced an increase in weight growth, namely for treatment B 2% by 2.17 cm, treatment C 4% by 1.80 cm and treatment D 6% by 1.63 cm.

Based on the results of Li and Gatlin's research, pomfret fish showed growth in both length and weight with the addition of baker's yeast to the feed. This can be because baker's yeast contains nucleotides, in the wet form of purines and pyrimidines (Manurung & Mose, 2018).

When the diet was supplemented with a suitable amount of the yeast, the sea bass larvae grew faster, with an accelerated pancreatic and intestinal maturation, while survival and conformation were improved (Waché et al., 2006)

3. Survival Rate

Treatment	**Survival Rate**
A. Baker's Yeast 0%	0,86±0,57
B. Baker's Yeast 2%	0,93±0,57
C. Baker's Yeast 4%	0,90±0,00
D. Baker's Yeast 6%	0,90±0,00

The results of analysis of variance (ANOVA) showed that feeding with additional doses of yeast had no significant effect (P>0.05).

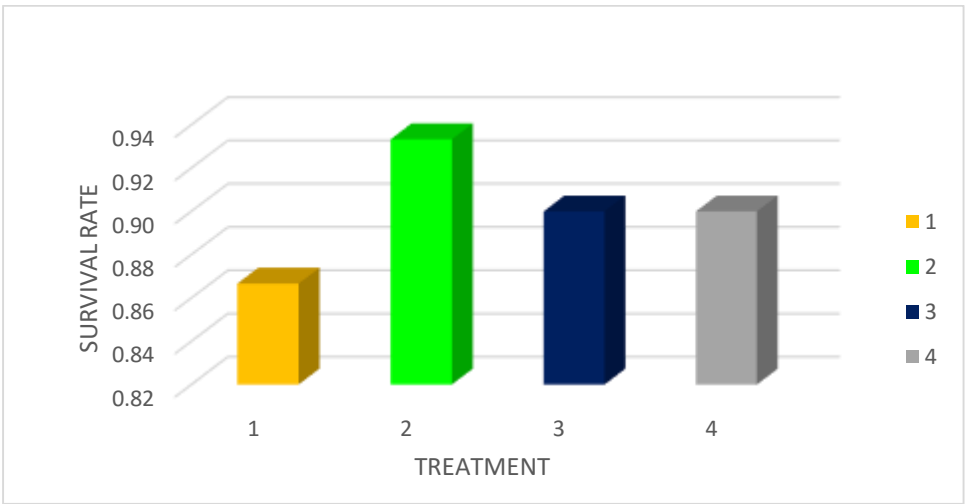

Figure 3. Survival rate

Figure 3 shows that the survival rate in all treatments is classified as good. The best survival rate was in treatment B at 93%, followed by treatments C and D at 90% and treatment A at 87%. Survival is influenced by the quantity and quality of feed that is able to meet the fish's needs and good rearing media. The high quality of life shows that the quality and quantity of feed provided is sufficient to meet the basic needs of the pomfret fish seeds (Manurung & Mose, 2018).

4. Water Quality

No	Treatment	Temperature	pH	Ammonia (mg/l)	DO (ppm)
1	A (0%)	26-28	7-7,3	0,043	5,0 - 6,0
2	B (2%)	27-29	7,1-7,2	0,043	5,0 - 6,0
3	C (4%)	28-29	7,1 - 7,2	0,043	5,0 - 6,0
4	D (6%)	27-28	7,1 - 7,2	0,043	5,0 - 6,0

The research results showed that the temperatures obtained during the research ranged from 26°C – 29°C. Tilapia can grow normally at a temperature range of 14 – 38 °C. The growth of tilapia fish will usually be disrupted if the habitat temperature is lower than 14 °C or at a high temperature of 38 °C (Rahim et al., 2015). The dissolved oxygen that was obtained during the research ranged from 5 – 6.0 mg/L, which is still within the appropriate limits for tilapia cultivation, in accordance with the opinion of Suyanto (2009) that in fish cultivation, the availability of dissolved oxygen in a body of water should not be less than 3 mg/ L. The pH obtained during the research ranged from 7-7.3 according to (Rahim et al., 2015) that tilapia fish have a high tolerance for environmental changes. A water pH between 5-11 can be tolerated by tilapia, but the optimal pH for tilapia breeding and growth is 7-8. Content.

5. Observation of Tilapia Vitality

The results of the vitality test showed that the tilapia seeds were able to adapt to a salinity of 0-15 ppt and at a salinity of 20 ppt the tilapia seeds began to swim on the surface of the water and there were several tilapia seeds that died. Fish deaths that occurred in each treatment were influenced by several factors, including salinity. The higher the salinity, the higher the death rate of tilapia fry because the level of osmoregulation is high while the ability of tilapia fish is low, which will result in the death of tilapia fish (Rahim et al., 2015).

4. CONCLUSION

The addition of 2% baker's yeast in artificial feed had a real effect on the rate of absolute length growth and absolute weight growth, but did not have a real effect on the survival of tilapia (*Oreochromis niloticus*).

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