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# ADDITION OF REBON SHRIMP FLOUR AS AN ATTRACTANT IN FEED FOR THE GROWTH OF PATIN FISH (*Pangasius pangasius*)

## Penambahan Tepung Udang Rebon Sebagai Atraktan dalam Pakan Terhadap Pertumbuhan Ikan Patin (*Pangasius pangasius*)

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**ABSTRACT**

Increasing the growth rate of catfish can be done by adding attractant sources in fish feed. The study aims to analyze the effect of adding rebon shrimp flour as an attractant source on the growth and feed conversion of catfish. This study was conducted from December to February 2025 at the IPAL Building 4, Faculty of Fisheries and Marine Sciences, Padjajaran University. This research method is experimental with 5 treatments of rebon shrimp flour attractant addition levels of 0%, 2%, 5%, 7% and 10%. The parameters observed wereabsolute length growth, absolute weight growth, specific growth rate (SGR) and feed conversion ratio (FCR).The results of this study concluded that the addition of 10% rebon shrimp flour attractant wasthe best dose for the growth of catfish, which is able to increase length growth by 12.23 cm, absolute weight growth by 0.66 g, specific growth rate (SGR) by 2.43%/day, and feed conversion ratio (FCR) by 2.09.

**Keywords**: Rebon shrimp flour, Attractant, Patin fish

**ABSTRAK**

Atraktan merupakan bahan tambahan yang dapat meningkatkan kesukaan ikan terhadap pakan yang diberikan salah satunya berasal dari crustacea tepung udang rebon karena mengandung glisin dan betain. Penelitian ini bertujuan untuk menganalisis pengaruh penambahan tepung udang rebon sebagai sumber atraktan terhadap pertumbuhan dan konversi pakan ikan patin. Metode penelitian ini adalah eksperimental dengan 5 perlakuan tingkat penambahan atraktan tepung udang rebon sebesar 0%, 2%, 5%, 7% dan 10%. Parameter yang diamati adalah pertumbuhan panjang mutlak, pertumbuhan bobot mutlak, laju pertumbuhan spesifik (SGR) dan rasio konversi pakan (FCR). Hasil dalam penelitian ini menyimpulkan bahwa penambahan atraktan tepung udang rebon sebesar 10% adalah dosis terbaik pada pertumbuhan ikan patin, yang mampu meningkatkan pertumbuhan panjang sebesar 12,23 cm, pertumbuhan bobot mutlak sebesar 0,66 g, laju pertumbuhan spesifik (SGR) sebesar 2,43%/hari, dan rasio konversi pakan (FCR) sebesar 2,09.

**Kata kunci**: Tepung udang rebon, Atraktan, Ikan patin

## INTRODUCTION

Patin fish (*Pangasius pangasius*) are found in many Indonesian public waters. Catfish is a large freshwater fish and has high economic value as a food fish. This fish is one of the popular fish and is in great demand by consumers in Indonesia. The production value of catfish in Indonesia will reach up to 431,380.77 tons in 2023 (Ministry of Maritime Affairs and Fisheries 2024).

Feed is one of the important components for aquaculture business activities, feed components that support fish growth must be available and able to meet the fish's needs. Increasing feed efficiency in meeting nutritional needs is very necessary in order to reduce production costs. In this era, increasingly expensive fish feed ingredients affect feed prices in general. Many feed ingredients must be imported. Feed costs are the highest expenditure factor. Apart from feed costs, the nutritional needs of the fish must be considered. Good fish feed must contain sufficient nutritional value such as protein, carbohydrates, vitamins, fats, minerals and energy in sufficient quantities so that it can support fish growth properly. Feed that produces good quality feed is found in quality feed raw materials, so the availability of raw materials must be maintained in terms of quality and quantity (Amri 2007). Fish feed generally has a composition of fish meal, corn flour, rice bran, vitamins and minerals. Fish food consists of two types, namely natural food and artificial food. Natural food is usually formed in living creatures (plankton) which is quite difficult to develop. Increasing feed efficiency through meeting nutritional needs is very much needed in order to reduce production costs. Artificial feed using attractants has become the focus of research in increasing the efficiency and effectiveness of feeding fish. Attractants are stimulants that increase the appetite and attractiveness of fish. An attractant is an ingredient that is mixed into feed with a small composition to increase food intake, growth and fish consumption of feed (de-Olivera and Cyrino 2004). The use of materials that are attractants is very important in the fry stage of catfish so that the fish try to respond to the presence of food and fish activity in searching for food more efficiently. One of the natural attractants that is quite easy to find in Indonesian waters is rebon shrimp (*Mysis relicata*). Rebon shrimp flour also contains attractants in the form of glycine and betaine which are very important for stimulating fish appetite (Khasani 2013). According to research from Harahap (2018) the glycine content in rebon shrimp is 1.18%.

The aim of this research was to analyze the effect of adding rebon shrimp flour as a source of attractant on the growth and feed conversion of catfish.

## RESEARCH METHODS

### Place and Time

This research will be carried out at IPAL Building 4, Faculty of Fisheries and Marine Sciences, Padjadjaran University. This research was carried out from 26 December to 3 February 2025.

### Tools and Materials

The tools that will be used during the research are a pH meter, tray, aquarium (25 x 25 x 40 cm), stationery, fiber tub, basin, bucket, DO meter, heater, blower, aeration hose, aeration stone, cell phone, label paper, blender, millimeter block, oven, 100 mesh filter, water hose, scoop, meat grinder, rice ladle, digital scale, and waring net.

The materials that will be used during the research are catfish, rebon shrimp flour, fish meal, soybean flour, fine bran flour, corn flour, binder (adhesive), premix (vitamins), and ziplock.

**Research Design**

The method used in this research was RAL (Completely Randomized Design) using 5 treatments and 3 replications. The treatment used was the percentage of rebon shrimp flour given to the test fish feed per day with the formulation. These treatments are:

- Treatment A: Addition of 0% rebon shrimp flour to feed (control)
- Treatment B: Addition of 2% rebon shrimp flour to the feed
- Treatment C: Addition of 5% rebon shrimp flour to the feed
- Treatment D: Addition of 7% rebon shrimp flour to the feed
- Treatment E: Addition of 10% rebon shrimp flour to the feed

**Procedure**

**Making Rebon Shrimp Flour**

Making rebon shrimp flour refers to Nurnalis (2003) in Pertiwi (2012) which has been modified. The process of drying rebon shrimp uses an oven at 70°C for 1 hour. Dried rebon shrimp are mashed using a blender. The results of the blending are then sieved using a 100 mesh sieve to obtain finer rebon shrimp flour and can be used as a raw material for making attractant sources in feed.

**Making Test Feed**

The preparation of test feed in the research refers to research by Islama *et al.,* (2023) which has been modified. The feed raw materials that will be used are rebon shrimp flour, fish meal, soybean meal, fine bran flour and corn flour, weighed according to a predetermined formulation. The feed ingredients are mixed one by one in a bowl with warm water added and stirred until the mixture is evenly mixed. Then add water to which probiotics have been added. The dough is molded using a molded feed potato press and then dried in the oven at 60°C for 5 hours. Once dry, the feed is cut and stored in a closed container away from direct sunlight. The test feed was formulated using the Pearson square method with a protein content of 40% (iso-protein). Data on making catfish feed can be seen in Table 1.

Table 1. Composition of feed ingredients and Proximate Analysis of Test Feed (% Dry Weight)

| Materials | Treatment (%) | | | | |
|---|---|---|---|---|---|
| | A (0) | B (2) | C (5) | D (7) | E (10) |
| Fish Meal (g) | 44,94 | 40,53 | 39,65 | 38,77 | 37,45 |
| Soybean Flour(g) | 44,94 | 40,53 | 39,65 | 38,77 | 37,45 |
| Fine bran(g) | 3,41 | 7,37 | 7,13 | 6,98 | 6,74 |
| Corn Flour(g) | 1,71 | 3,68 | 3,57 | 3,49 | 3,37 |
| Rebon Shrimp(g) | 0 | 2 | 5 | 7 | 10 |
| Binder (Progol)(g) | 4 | 4 | 4 | 4 | 4 |
| Vitamins(Premix)(g) | 1 | 1 | 1 | 1 | 1 |
| Total(g) | 100 | 100 | 100 | 100 | 100 |

Information:

1) Materials were obtained from the Missouri Poultry Shop in Bandung

**Test Container Preparation**

Preparation of the test container began with the aquarium, fiber tub, hose, and aerator stone. These were sterilized using Unides Aqua to kill any pathogens. Then, the aquarium was rinsed with running water. The aquarium was allowed to dry for 24 hours. Once dry, the aquarium was arranged and filled with 10 liters of settling water. The thermometer and aeration were then installed.

**Acclimatization of Test Fish**

The acclimatization process for catfish in a fiber tank for 10 days. The purpose of acclimatization is to prevent stress for newly arrived catfish and ensure their health. The fish are then placed in an aquarium at a density of 10 fish per tank (1 fish per liter).

**Test Fish Maintenance**

The fish will be tested for 40 days. Feeding will be conducted twice daily (8:00 AM and 4:00 PM WIB) at a rate of 5% of the fish biomass. Water quality will be managed by siphoning out waste from the bottom of the aquarium every three days. Water changes will be made at a rate of 10% of the total water volume.

**Data retrieval**

Data collection on the length and weight of fish is carried out every 10 days, on the 0th, 10th, 20th, 30th and 40th days.

**Observation Parameters**

**Absolute Weight Gain**

The absolute weight growth of fish is calculated using the formula of Effendie (1979), in Muchlisin *et al.,* (2016) which is as follows:

$$W = Wt - Wo$$

Information:
W = Absolute average growth (g)
Wt = Average weight at the end of the study (g)
Wo = Average initial weight of the study (g)

**Absolute Length Growth**

According to Zonnevald *et al.,* (1991) absolute weight growth can be calculated using the following formula:

$$L = L_t - L_0$$

Information:
L = Length growth (cm)
Lt = Average length of fish at the end of the study (cm)
$L_0$ = Average length of fish at the start of the study (cm)

***Specific Growth Rate*** **(SGR)**

The specific growth rate is calculated based on the following formula:

$$SGR = \frac{(lnWt - lnWo)}{T}\ x\ 100\%$$

Information:
SGR = Specific growth rate (%/day)
Wo = Average seed weight at the start of the study (g)
Wt = Average weight of seeds on day t (g)
T = Maintenance period (days)

***Feed Conversion Ratio***

The feed conversion ratio (*Feed Conversion Ratio*) is calculated based on the following formula:

$$FCR = \frac{F}{(W_t + D) - W_0}$$

Information:
FCR = Feed conversion ratio
F = Weight of feed given
Wt = Weight of test fish at the end of maintenance (g)
D = Dead fish weight (g)
Wo = Weight of test fish at the start of maintenance (g)

**Water Quality**

Measurement of water physicochemical factors to obtain results on water quality as a maintenance medium during the study. Water physicochemical parameters were observed weekly, including temperature, pH, and DO measurements. Dissolved oxygen (DO) concentration was measured using a DO meter. The pH level was measured using a pH meter. Temperature was measured using a thermometer. Water samples for analysis were taken from the fish maintenance container.

**Data Analysis**

Data obtained from observations of absolute length growth and specific water growth rate were analyzed using analysis of variance (ANOVA) with a 95% confidence level. If the results were significant and significantly different (P<0.5%), then the Duncan multiple range test was used to determine the differences between treatments and determine the best treatment. Data from water quality measurements were analyzed descriptively.

## RESULT

**Absolute Length Growth**

Results of observations of the growth of catfish with treatment using rebon shrimp as an attractant

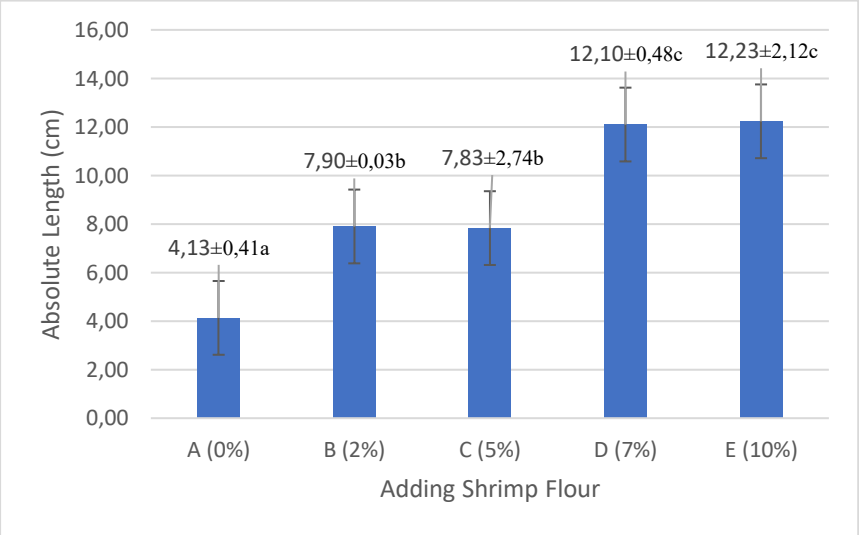


Figure 1. Average Absolute Length Growth Value Based on the Addition of Shrimp Flour Attractant during 40 Days of Maintenance.

**Absolute Weight Gain**

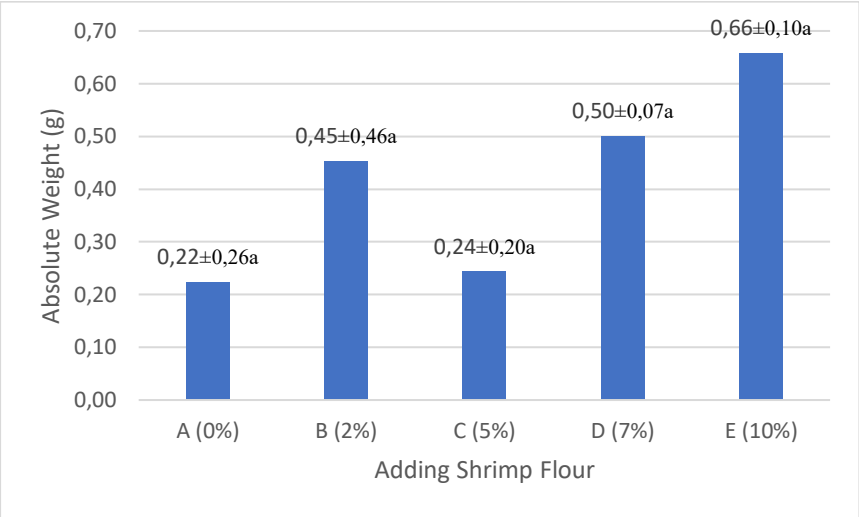


Figure 2. Average Absolute Weight Growth Value Based on the Addition of Shrimp Flour Attractant in 40 Days of Maintenance.

***Specific Growth Rate* (SGR)**

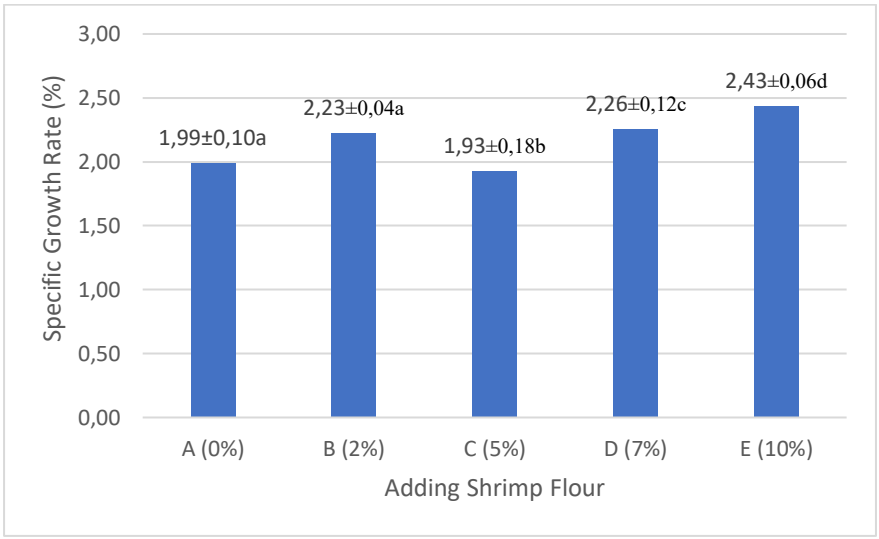


Figure 3. Average Absolute Growth Rate Based on the Addition of Shrimp Flour Attractant for 40 Days of Maintenance.

***Feed Conversion Ratio***

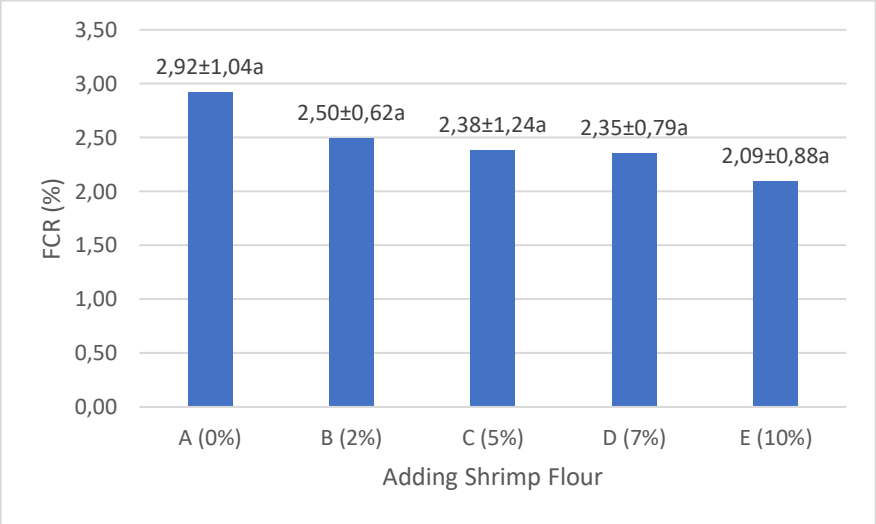


Figure 4. Average Feed Conversion Value Based on the Addition of Shrimp Flour Attractant for 40 Days of Maintenance.

**Water Quality**

The water quality measurements included temperature (ºC), dissolved oxygen (DO), and acidity (pH). Data from the water quality measurements for the catfish rearing during the study can be seen in Table 2.

Table 2. Results of water quality measurements for catfish rearing over 40 days.

| Parameter | Treatment | | | | | SNI |
|---|---|---|---|---|---|---|
| | A (0%) | B (2%) | C (5%) | D (7%) | E (10%) | |
| Temperature (°C) | 24,3-25,7 | 24,1-25,5 | 24,4-25,7 | 24,1-25,9 | 24,3-25,6 | 23-30 |
| DO (mg/L) | 5,2-7,8 | 5,7-7,5 | 5,5-7,8 | 5,7-7,7 | 5,2-7,8 | >4 |
| pH | 8,1-8,4 | 8,1-8,4 | 8,1-8,3 | 8,1-8,4 | 8,1-8,4 | 6,5-8,5 |

Information : (SNI 01-6483.5-2002)

## DISCUSSION

**Absolute Length Growth**

Absolute length growth is the change in fish size over a specific period of time. Size can be expressed in units of length, as the fish grows throughout its life, thus suggesting that fish have unlimited growth (Rahardjo *et al.,* 2011). Observations of the average absolute length in a study of catfish treated with rebon shrimp as an attractant were conducted for 40 days.

Analysis of variance (ANOVA) results with a 95% confidence level showed a significant difference between treatments ($P<0.05$) in the absolute length growth of catfish. The highest average absolute length growth was achieved in the 10% TUR (E) treatment, which was 12.23 cm, while the lowest was achieved in the 0% TUR (control) treatment, which was only 4.13 cm. The results of the study, which included rebon shrimp as an attractant in catfish reared for 40 days, resulted in the highest absolute length growth, achieved in the 10% TUR treatment, which was higher than the absolute length growth achieved by Imanudin et al. (2024) with the addition of earthworm flour as an attractant source in catfish feed with the addition of

10% earthworm flour amounting to 6.85 cm. The high absolute length growth in catfish with the addition of 10% TUR (E) is due to the presence of essential amino acids in rebon shrimp flour, one of which is arginine. According to Guilaume *et al.,* (2001) essential amino acids play a role in growth, especially the arginine component. Arginine can stimulate insulin secretion to increase growth hormones (Sholichin 2012). Essential amino acids also have a protein sparring effect that plays a role in protein synthesis, thus catfish can produce optimal growth. The level of ability of catfish to digest feed well so that feed is efficient in the fish's body for growth so that nutrients and minerals from the feed can be absorbed well and feed utilization is more effective to increase fish growth (Mufidah *et al.,* 2017). The arginine content in rebon shrimp flour is 3.42% (Sukarman *et al.,* 2011). According to Sukarman and Sholichah (2012), the minerals that influence the growth of fish length are calcium, phosphorus and magnesium.

**Absolute Weight Gain**

Absolute weight gain, as defined by Mahardika et al. (2017), is the difference between the total body weight of the fish at the end of the study and the total body weight of the fish at the beginning. The results show the average weight gain values of feed at different dosage levels over 40 days.

Analysis of variance (ANOVA) results with a 95% confidence level showed a significant difference between treatments ($P<0.05$) in the absolute weight gain of catfish. The average absolute weight gain of catfish with the addition of rebon shrimp flour attractant was highest with the addition of 10% TUR (E) at 0.66 g, and the lowest with 0% TUR (A) at 0.22 g. The results of the study of adding rebon shrimp as an attractant to catfish seeds maintained for 40 days resulted in the highest absolute weight growth, namely the 10% TUR treatment of 0.66 g which gave lower absolute weight growth results when compared to the study of Amalia *et al.,* (2017) using earthworm flour as an attractant source in catfish feed with an addition of 10% carried out for 42 days amounting to 9.76 g. The high absolute weight growth of catfish in the addition of 10% TUR (E) is not only caused by the balance of nutrients contained in the formulation, rebon shrimp also contains high-quality protein, essential amino acids, and minerals and vitamins needed by fish for growth. According to Sutarya (2002) the amount of feed consumed by fish can affect fish growth. Growth occurs because the feed has excess energy and affects the rapid growth of fish. According to Amalia *et al.,* (2017) good catfish growth is due to the protein content in the feed that is in accordance with the protein needs of the catfish body. According to Subandiyono and Hastuti (2016), the senses of sight, smell, taste, shape, and odor of feed are important for fish in locating and identifying feed. The use of appropriate attractants in feed can increase food absorption quickly, reduce the time it takes to mix feed nutrients with water, and provide additional nutrients for protein and energy metabolism (Polat and Beklevik, 1999 in Yudiarto *et al.,* 2012).

**Specific Growth Rate (SGR)**

Specific growth rate is the percentage difference between the initial weight of the fish divided by the length of the rearing period (Mulqan *et al.,* 2017). Observations of the specific growth rate of catfish with different treatments involving the addition of rebon shrimp meal as an attractant to the fish feed at varying dosage levels were conducted over a 40-day period.

Analysis of variance (ANOVA) results with a 95% confidence level showed a significant difference between treatments ($P<0.05$) in absolute weight growth of catfish. The average specific growth rate of catfish was highest with the addition of 10% TUR (E) at 2.43%/day, and lowest with the 5% TUR treatment at 1.93%/day. The results of the study, which showed that adding rebon shrimp as an attractant to catfish reared for 40 days resulted in the highest specific growth rate, namely with the 10% TUR treatment, which yielded better specific growth rates compared to the study by Amalia *et al.,* (2019) used earthworm flour as an attractant source in catfish feed with an addition of 10% carried out for 42 days resulting in

the highest specific growth of 1.97% / day. This is suspected that the addition of 10% TUR produces optimal growth. The quality of this rebon shrimp has a quality feed as an attractant and is good in meeting the nutritional needs needed by catfish because rebon shrimp flour contains high protein and rebon shrimp flour also contains essential amino acids that contain attractive substances that allow fish to consume feed faster which affects fish growth. According to Khasani *et al*., (2013) rebon shrimp has an attractant content in the form of glycine and betaine which is very important to stimulate fish appetite for feed so that fish become more voracious in eating feed. Research from Amalia *et al.,* (2019) Providing good feed for fish growth can also affect the specific growth rate of catfish and feed that has quality has better nutritional content in catfish growth. According to Sunarto and Sabariah (2009), the growth rate of fish depends on the amount of feed consumed, endurance, water quality, and the ability of the fish to utilize the feed. The specific growth rate is closely related to the growth of body weight derived from the feed consumed by the fish (Amalia *et al.,* 2019). According to Amalia *et al.,* (2019), providing efficient feeding can increase growth in fish with good quality values, and feed nutrition influences feed efficiency. If feed efficiency produces good quality, it can increase the growth rate of the fish. According to Mokolensang (2018), the greater the growth rate, the better the role of the feed used for fish growth.

**Feed Conversion Ratio**

The feed conversion ratio (FCR) is the ratio of the amount of feed required to produce 1 kg of fish meat (Hariani & Purnomo 2017). Observations on the feed conversion ratio of catfish with the addition of rebon shrimp meal as an attractant source in the feed at different dosage levels during 40 days of maintenance.

Analysis of variance (ANOVA) results with a 95% confidence level showed a significant difference between treatments ($P<0.05$) in absolute weight growth of catfish. The lowest average feed conversion ratio for catfish was found with the addition of 10% TUR (E), at 2.09, and the lowest feed conversion ratio for catfish without the addition of 0% TUR (control), at 2.92. The results of the study with the addition of rebon shrimp meal as an attractant source in the catfish feed resulted in the lowest feed conversion ratio of 2.09 at the 10% TUR addition, resulting in a lower feed conversion ratio, which is better than the study conducted by Sumanteri *et al.*, (2021) substitution of rebon shrimp flour and golden snails in catfish feed resulted in a feed conversion ratio of 2.35. The use of rebon shrimp as a feed ingredient still faces the problem of chitin content. Providing a small amount of feed can produce maximum fish body weight. This is in accordance with the statement of Rukisah *et al.,* (2021) that the lower the feed conversion ratio, the better the quality of the feed provided. The results of the feed conversion value in this study are suspected to indicate that fish can utilize feed well and optimally so that the feed is absorbed quickly and converted into meat. The more effective and efficient feed utilization will reduce the feed conversion value (FCR), which means that the feed has good quality and quantity (Handayani *et al.,* 2014). According to Djariah (2005), feed quality can be influenced by the digestibility or absorption capacity of the fish of the feed that has been consumed. Therefore, a lower feed conversion value means better feed quality, but a higher feed conversion value means the fish have poor quality.

## CONCLUSION

Based on the results of the research that has been conducted, it can be concluded that the level of addition of rebon shrimp flour as an attractant source in catfish feed results in an increase in absolute length growth, absolute weight growth, specific growth rate (SGR) and feed conversion ratio (FCR). In the treatment of adding rebon shrimp flour attractant of 10% is the best dose for catfish growth, which is able to increase length growth by 12.23 cm,

absolute weight growth by 0.66 g, specific growth rate (SGR) by 2.43%/day, and feed conversion ratio (FCR) by 2.09.

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