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# THE EFFECT OF RABAL PROBIOTIC GIVING THROUGH FEED ON THE GROWTH AND SURVIVAL OF DUMBO CATFISH FRY (*Clarias gariepinus*)

## Pengaruh Pemberian Probiotik Rabal Pada Pakan Terhadap Pertumbuhan dan Kelangsungan Hidup Benih Ikan Lele Dumbo (*Clarias gariepinus*)

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**ABSTRACT**

Dumbo catfish (*C. gariepinus*) is a fish as a source of animal protein that has developed as a commodity for fisheries cultivation. Catfish cultivation technology continues to develop and has a significant effect on the efficiency of catfish cultivation and is supported by the availability of a wide market. Feed is one of the important elements in cultivation activities as one of the keys to supporting the growth and survival of cultivated fish. Providing rabal probiotics in artificial feed is one alternative to produce feed that is easily digested so that it can increase growth. This research was conducted in Mbawa Village, Donggo District, Bima Regency, West Nusa Tenggara Province, this research is an experimental study using a Completely Randomized Design (CRD) and consists of 4 treatments and 3 replications, the treatments are K (control / without giving Rabal probiotics), 8 ml / 100 grams, 10 ml / 100 grams, and 12 ml / 100 grams of feed. The parameters observed were absolute growth, specific growth, catfish survival, and water quality. The data obtained were analyzed for variety, regression using the SPSS application and analyzed descriptively. Based on the results of the analysis of variance from this study, it shows that the administration of rabal probiotics through feed produces survival, specific growth rate and absolute growth that have no significant effect ($p>0.05$), but based on the results of the linear regression analysis, it can be seen that the administration of rabal probiotics in feed has an effect on the survival of catfish. The highest survival value was found in the treatment of 12 mL/100 grams of feed, which was 64.10% and the lowest in the control, which was 53.84%.

Key words: Dumbo catfish (*C. gariepinus*), rabal probiotics, growth, survival

**ABSTRAK**

Ikan lele dumbo (*C. gariepinus*) adalah ikan sebagai sumber protein hewani yang telah berkembang sebagai komoditas budidaya perikanan. Teknologi budidaya ikan lele yang terus berkembang dan berpengaruh signifikan terhadap efisiensi budidaya ikan lele serta didukung

oleh ketersediaan pasar yang luas. Pakan merupakan salah satu unsur penting dalam kegiatan budidaya sebagai yang menjadi salah satu kunci penunjang pertumbuhan dan kelangsungan hidup ikan budidaya. Pemberian probiotik rabal dalam pakan buatan adalah salah satu alternatif untuk menghasilkan pakan yang yang mudah tercerna sehingga dapat meningkatkan pertumbuhan. Penelitian ini dilaksanakan di Desa Mbawa Kec. Donggo Kab. Bima, Provinsi Nusa Tenggara Barat, penelitian ini merupakan penelitian eksperimental yang menggunakan Rancangan Acak Lengkap (RAL) dan terdiri dari 4 perlakuan dan 3 ulangan, perlakuan tersebut yaitu K (kontrol/ tanpa pemberian probiotik Rabal), 8 ml/100gram, 10 ml/100gram, dan 12 ml/100gram pakan. Parameter yang diamati adalah pertumbuhan mutlak, pertumbuhan spesifik, sintasan ikan lele, serta kualitas air. Data yang diperoleh diaanlisis ragam, regresi dengan menggunakan aplikasi SPSS dan dianalisis deskriptif. Berdasarkan hasil analisis ragam dari penelitian ini menunjukan bahwa pemberian probiotik rabal melalui pakan menghasilkan sintasan, laju pertumbuhan spesifik dan pertumbuhan mutlak yang tidak berpengaruh nyata ($p>0,05$), tetapi berdasarkan hasil analisis regresi linear terlihat bahwa pemberian probiotik rabal dalam pakan berpengaruh terhadap sintasan ikan lele. Nilai sintasan tertinggi terdapat pada perlakuan 12 mL/100gram pakan yaitu 64,10% dan terendah pada kontrol yaitu 53,84%.

Kata kunci: ikan lele dumbo (*C. gariepinus*), probiotik rabal, pertumbuhan, kelangsungan hidup

## INTRODUCTION

Catfish (*Clarias gariepinus*) is one of the leading freshwater fishery commodities in Indonesia. Catfish production continues to increase every year to meet consumption needs, both domestic consumption and export. Catfish are known for their ability to adapt to various environmental conditions, fast life cycles, and high reproduction rates. However, the success of catfish cultivation still faces challenges, especially in terms of increasing the growth and survival of seeds, which are often influenced by the quality of feed and the cultivation environment (Eliyani *et al.*, 2015).

Feed is one of the most important factors in fisheries cultivation activities because it covers around 70% of the total production costs (Jiang *et al.*, 2023). Therefore, efforts to increase efficiency and improve feed quality are always the main focus in the field of nutrition. One strategy to improve feed quality is the use of probiotics as an additive in feed (Masriah & Laitte, 2021). Probiotics are living microorganisms that, when given in the right amount, can provide health benefits to the host (Ringø, 2020); (Monzón-Atienza *et al.*, 2023). In fish, probiotics can function to improve the quality of feed digestion, strengthen the immune system, and support microbial balance in the digestive tract (Aslamyah *et al*., 2022; Aisyah *et al.*, 2022).

Rabal probiotics are one of the probiotics developed for fish farming needs. This probiotic contains several bacteria such as *Lactobacillus* sp., *Bacillus* sp., and *Saccharomyces* sp. which are known to have various benefits, including increasing the efficiency of nutrient absorption, improving Feed Conversion Ratio (FCR), and reducing mortality rates in fish (Haqiqiansyah & Padang, 2023). However, the effectiveness of the use of Rabal probiotics, especially in dumbo catfish, still requires further research. Reported by (Ramadhana *et al.*, 2016) in his research which showed that giving feed containing *Lactobacillus* sp. in tilapia can increase the daily growth rate (SGR) by 9.12% compared to feed without probiotics. Furthermore (Sukenda *et al.*, 2016) reported that the administration of *Bacillus* sp. based probiotics to catfish fry can increase survival by 83.33% and daily growth rate by 5.40%, and (Rachmawati *et al.*, 2020) also found that the addition of *Saccharomyces cerevisiae* of 1.5%/kg of feed can increase feed utilization efficiency by 78.47% and reduce FCR by 1.39. Although these data show promising results, the use of Rabal probiotics in dumbo catfish feed has not been thoroughly evaluated. The specific combination of microorganisms in Rabal probiotics

has the potential to provide better benefits than conventional probiotics, especially in terms of supporting the growth and survival of dumbo catfish fry. This study aims to evaluate the effect of administering Rabal probiotics on the growth and survival of dumbo catfish fry. The results of the study are expected to provide innovative solutions in increasing the productivity of environmentally friendly, economical, and sustainable catfish farming. This data is also expected to provide recommendations to farmers regarding the use of Rabal probiotics as part of modern feed technology.

## RESEARCH METHODS

### Research Location

This research was conducted in Mbawa Village, Donggo District, Bima Regency, West Nusa Tenggara Province.

### Tool and Material

The tools used in this study were plastic buckets, aeration packages, digital scales, sprayers, rulers, sieves, sample plastics, measuring cups, thermometers, pH meters, water hoses, and cameras, while the materials used were catfish seeds, commercial feed, rabal probiotics, and fresh water.

### Research Procedure

### Preparation of Rabal Probiotics

9 liters of clean water are put into a bucket then added 130 mL of yakult, 500 mL of molasses, 2.8 grams of tape yeast (which has been finely ground) and 1 L of pure coconut water is poured into the bucket. The ingredients in the bucket are stirred for 1-2 minutes so that the ingredients dissolve and mix evenly. After that, the rabal probiotic is poured into a 5-liter jerry can, then the jerry can is tightly closed and stored for 7 (seven) days so that the fermentation process occurs perfectly which will be indicated by the liquid in the jerry can changing color to brown and smelling of tape/alcohol. Every day the lid of the jerry can is opened to release the fermentation gas, then the jerry can is tightly closed again. The jerry can is shaken for 1-2 minutes every day before releasing the gas so that the ingredients continue to be stirred well and process perfectly.

### Test Animals

Preparation of catfish seeds begins with an acclimatization process first for ±25 minutes before being put into the maintenance media, so that the temperature of the media water during the transportation of the seeds with the media water in the maintenance container is the same. The catfish seeds are then put into a plastic container with a density of about 26 fish per experimental unit. Maintenance of catfish seeds is carried out for 30 days. During maintenance, water changes are carried out once and siphoning is carried out. The feed given is in the form of artificial feed that has been mixed with rabal probiotics. In each experimental unit, fortified feed is spread according to the dose of each treatment, the process of seeding feed with rabal probiotics is carried out for 2 minutes. The frequency of feeding is carried out 3 times a day, namely at 8.00 am, 12.00 am and 5.00 pm by adlibitum.

### Research Design

This research was designed using a completely randomized design consisting of four (4) treatments and three (3) replications so that there were 12 experimental units. The treatments tested in this research were as follows:

K = control (without treatment)

A = 8 mL probiotic rabal/100 g feed

B = 10 mL probiotic rabal/100 g feed
C = 12 mL probiotic rabal/100 g feed
The layout of the experimental container is as follows:

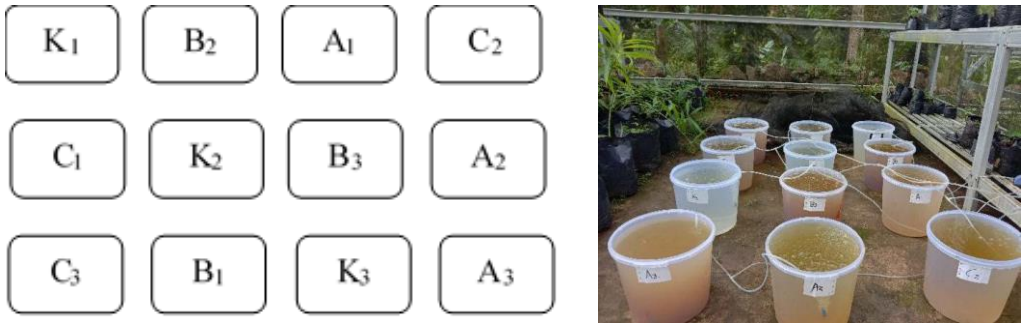



Figure 1. Layout of the experimental container during the research

**Observed Parameters**

**a. Absolute growth**

Absolute weight growth is calculated using the formula (Effendie, 1997) as follows:

$$W = Wt - Wo$$

Information:
W : Absolute growth (gram)
Wt : Final average weight (gram)
Wo : Initial average weight (gram)

**b. Specific Growth**

Pertumbuhan spesifik dihitung dengan menggunakan rumus Effendie, (1997):

$$SGR = \frac{\ln Wt - \ln Wo}{t} \; x \; 100$$

Information:
SGR : Specific growth rate (%)
Wt : Fish weight on day-t
Wo : Fish weight at the beginning of the research
t : Research time

**c. Survival**

The survival rate of catfish seeds is calculated using the formula proposed by (Effendie, 1997) as follows:

$$SR = \frac{Nt}{No} x100$$

Information:
SR = survival rate (%);
$N_t$ = Number of fish alive at time t (tail); and
$N_0$ = Number of fish alive at the start of maintenance (tail).

**d. Water Quality**

Measurement of water quality parameters was carried out at the beginning and end of the maintenance period. The water quality parameters measured included temperature, salinity, dissolved oxygen (DO), and pH.

**e. Data Analisys**

The data collected in this research includes absolute growth, specific growth, survival rate and water quality. Data on absolute growth, specific growth, and survival were analyzed using analysis of variance (ANOVA) and regression, and if significant differences were found, the analysis was continued with the W-Tukey test using SPSS software. While water quality data were analyzed descriptively.

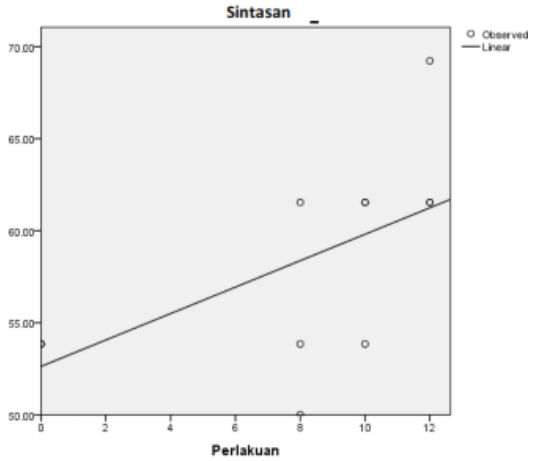
## RESULT

The average survival rate, specific growth rate and absolute growth of catfish (*Clarias gariepinus*) seeds fed with various concentrations of rabal probiotics are presented in Table 1.

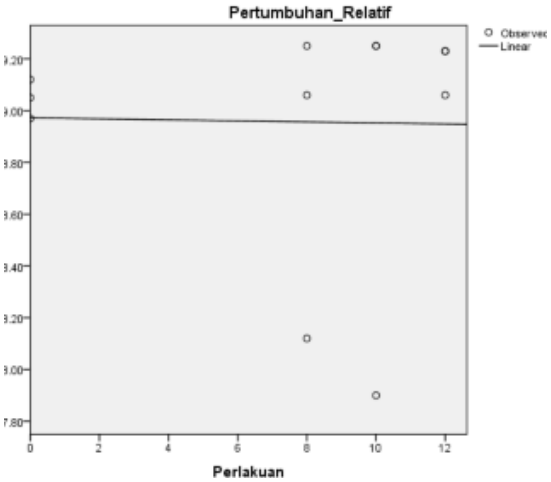
Table 1. Average survival rate, specific growth rate and absolute growth in catfish (*Clarias gariepinus*) seeds fed with various concentrations of rabal probiotics.

| Treatment | Parameter (±std) | | |
|---|---|---|---|
| | Survival rate (%) | Specific Growth Rate (SGR) (%) | Absolute weight growth (g) |
| Control | 53,85±0,00$^{a}$ | 9,046±0,07$^{b}$ | 29,723±0,75$^{c}$ |
| 8 mL/100 g feed | 55,13±5,87$^{a}$ | 8,810±0,60$^{b}$ | 30,323±1,391$^{c}$ |
| 10 mL/100 g feed | 58,97±4,43$^{a}$ | 8,800±0,77$^{b}$ | 30,620±2,182$^{c}$ |
| 12 mL/100 g feed | 64,10±4,43$^{a}$ | 9,173±0,09$^{b}$ | 31,210±1,143$^{c}$ |

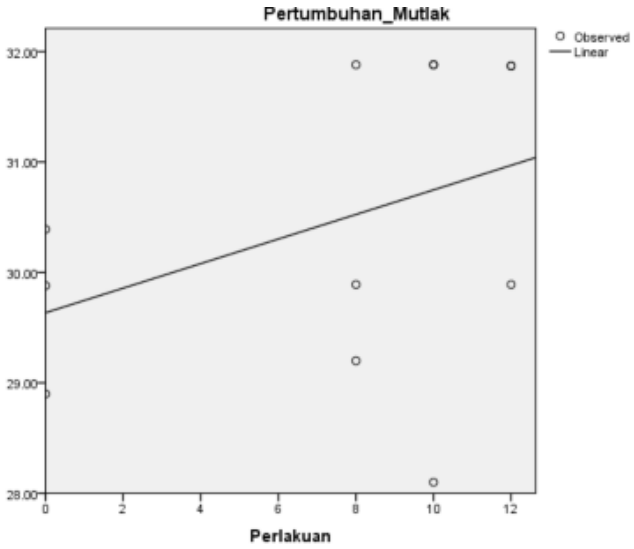
*Note: The same superscript letters in the same column indicate no significant difference between treatments (sig.>0.05) at the 95% confidence level based on the results of the analysis of variance.*




**A**




**B**




**C**

Figure 2. Linear regression model of the relationship between the concentration of probiotic rabal in feed on (A) survival of catfish fry (B) specific growth rate of catfish and (C) absolute growth of catfish fry.

Meanwhile, the range of water quality measurement results during the research can be seen in table 2.

Table 2. Results of water quality measurements during the research

| Parameter | Kisaran Nilai | Alat ukur | Referensi |
|---|---|---|---|
| Suhu ($^oC$) | 24,0-30,2 | Thermometer | 23-30 (Sugianti & Hafiludin, 2022). |
| pH | 7,1-8,0 | pH Meter | 7-8,5 (Eliyani et al., 2015). |
| Oksigen terlarut (mg/Liter) | 5,01-5,05 | DO Meter | 5-8 (Suparmin et al., 2024). |

## DISCUSSION

Based on the results of the analysis of variance (anova), it can be seen that the provision of various concentrations of rabal probiotics in feed did not have a significant effect ($p>0.05$) on survival, specific growth, or absolute growth in catfish seeds. Meanwhile, based on the results of the regression analysis, it can be seen that the provision of various concentrations of rabal probiotics in feed had a significant effect ($p<0.05$) on the survival of catfish seeds, but had no significant effect ($p>0.05$) on specific growth and absolute growth in catfish seeds. In more detail, the results of the regression analysis are presented in Figure 2. The absence of the effect of the provision of rabal probiotics in feed on survival, specific growth rate, and absolute growth in catfish seeds indicates that the use of rabal probiotics with concentrations of 0 (control), 8, 10, and 12 ml/100 grams in feed did not affect survival, specific growth rate, or absolute growth in catfish seeds. However, based on the research results as presented in table 1, it can be seen that in general the highest survival rate, specific growth rate, and absolute growth of catfish seeds were found in the feed treatment enriched with rabal probiotics with a concentration of 12 ml/100 grams of feed, this is reinforced by the results of the linear regression analysis as presented in Figure 2 which shows the relationship between the concentration of rabal probiotics in feed on survival, specific growth rate, and absolute growth of catfish.

Figure 2 shows that the higher the concentration of rabal probiotics in feed, the higher the survival rate, specific growth rate, and absolute growth of catfish seeds. The survival rate

is the percentage of the number of fish that live from the total fish raised (Masitoh *et al.*, 2015). In this study, the highest survival rate was found in feed with a concentration of 12 ml/100 grams of feed, namely 64.10%, while the lowest survival rate was found in feed without rabal probiotics (control), namely 53.85%. The highest mortality rate of catfish fry during this study occurred in the first week of the study, which was thought to be caused by stress due to transporting catfish fry from the Fish Seed Center (BBI) to the research site, which took 1 hour with damaged road conditions.

Based on the research results obtained, the highest specific growth rate value was found in the treatment of adding 12 mL/100 grams of rabal probiotics with an SGR value of 9.173%, while the lowest SGR value was found in the treatment of 10 mL/100 grams of feed. This shows that the higher the addition of rabal probiotics in the feed, the higher the growth rate of dumbo catfish fry. According to the statement (Masitoh *et al*., 2015) that the higher the concentration of Lactobacillus and in the digestive tract will increase the availability of nutrients that are easily absorbed in the digestive tract, through protein hydrolysis into simpler compounds, namely amino acids, so that metabolism becomes easier because protein absorption is assisted by the presence of protease enzymes, so that growth occurs.

The quality of the water in the cultivation media is a factor that has an important influence on the growth and survival of African catfish seeds, so that good water quality during the maintenance period must be controlled so that the fish can grow and develop well during the maintenance period. During the maintenance period of catfish seeds, water quality measurements were carried out from the beginning to the end of the study and the results are presented in table 2. Water quality plays a very important role in the maintenance of catfish seeds, considering that water is a living medium that directly affects the health and growth of catfish seeds. Poor water quality brings serious problems to the growth and survival of catfish seeds, the parameters observed in this study were temperature, pH, and dissolved oxygen.

The results of temperature observations during the study averaged 24.0-30.2˚C, this condition is still within the optimal limit for the life of catfish. Catfish live at a temperature range of 23-30ºC (Sugianti & Hafiludin, 2022) this shows that the water temperature during the study was still in accordance with the life of dumbo catfish, water temperature can affect the level of fish survival, morphological growth, reproduction and behavior. Temperatures that are too high will cause stress to fish and cause death to fish.

The acidity level (pH) obtained during the study ranged from (7.1-8.0), the pH value obtained was quite optimal for the life of catfish. This is reinforced by (Eliyani *et al*., 2015), stating that the growth and survival of catfish seeds are optimal at a pH between 7 and 8.5. If the pH value is too low or too high, the fish will easily become stressed, experience health and physiological problems, and even die. Therefore, it is very important to stabilize and manage water quality. For dissolved oxygen during the study, it was also at the optimum limit, namely 5.01-5.05 mg/L, which is in line with the opinion of (Suparmin *et al*., 2024) which states that the optimum dissolved oxygen for the survival and increased growth of catfish seeds is 5-8 mg/L.

## CONCLUSION

Based on the results of research on the effect of giving rabal probiotics in feed on the survival and growth of catfish seeds, it can be concluded that giving rabal probiotics in feed does not have a significant effect on survival, specific growth rate and absolute growth of catfish seeds. The best concentration of rabal probiotics in feed to produce survival, specific growth rate, and absolute growth of catfish seeds in this study was 12 ml/100 grams of feed.

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