# 1 THE EFFECT OF FEEDING FROM FERMENTED RICE BRAN AT DIFFERENT DOSES ON THE GROWTH OF KOI FISH SEEDS

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**Submission date:** 27-Apr-2023 01:58PM (UTC+0700)
**Submission ID:** 2076965247
**File name:** e_Bran_With_Different_Doses_On_The_Growth_Of_Koi_Fish_Fry_1.pdf (196.99K)
**Word count:** 4996
**Character count:** 25803

TRANSPUBLIKA INTERNATIONAL RESEARCH
IN EXACT SCIENCES
(TIRES)
VOLUME 1 ISSUE 2 (2022)

# THE EFFECT OF FEEDING FROM FERMENTED RICE BRAN AT DIFFERENT DOSES ON THE GROWTH OF KOI FISH SEEDS

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**Abstract**

*The production of alternative feeds as a substitute for commercial feeds is expected to reduce the cost of farmers, with fermentation techniques to improve feed nutrition so that it is better and more durable by utilizing rice bran. This study aims to find out the right dose of feed and find out the effect of feeding on the growth of koi fish seeds. The methods used are experimental and observation techniques. Data analysis techniques use SPSS. The results of the study on fish weight produced normally distributed data, homogeneous and there was also a real difference, namely in the treatment A, B, C and K can be seen the best treatment, namely in B (100% fermented rice bran feed). While the results of the study on the length of the fish produced normally distributed data, homogeneous and there was an influence, there was also a real difference, namely the best treatment, namely in B (100% fermented rice bran feed) with the best dose of 0.08gr. Based on the statement above, the fermentation of rice bran affects the growth of koi fish seed cultivation.*

*Keywords: Fermentation, Growth, Koi Fish Seed, Rice Bran*

## 1. INTRODUCTION

Metabolism is a complex process involving different chemical reaction pathways. Metabolism describes all the chemical changes in the body with the chemical reaction pathways involved. The process of chemical reactions that occur at the smallest organismal level or down to the cellular level is also metabolism (Syahrizal & Puspita, 2020). Fermentation is a metabolic process that converts organic compounds in food into simpler compound products by enzymes produced by microorganisms (Widyanto et al., 2021). The fermentation process occurs biochemical changes in food related to microbial activity and active enzyme metabolites produced by microorganisms. Fermentation products are mainly produced by the action of lactic acid bacteria, fungi and yeast. Fermentation results are obtained as a result of microbial metabolism in a material (Setiarto, 2020).

Fermentation aims to preserve seasonal and perishable foods. Over time, fermentation is an alternative development of food preservation because of its unique texture, aroma and taste. Fermented products are beneficial to consumer health, which may be the reason for the current development of fermented products. Breaking down complex ingredients into simpler components makes fermented products easier to digest than the original food product (Setiarto, 2020). Rice bran is a waste processing rice into rice. Rice bran is a by-product of rice milling during rice production. Bran production in Indonesia is quite high every year, reaching 4 million tonnes, each quintal of rice can produce 18 to 20 grams of bran (Superianto et al., 2018). In South Kalimantan there are also many who sell rice bran at

relatively cheap prices. According to the results of the study Suryani & Luthfi (2022), "the nutritional content of rice bran was obtained, namely dry matter of 88.97-89.97%, crude fat 12.22-14.39%, crude fiber 8.93-21.16%, crude protein 13.43-13.81%, and ash 8.86-15.71%".

Based on this, it was found the idea of making feed that has a fairly good nutritional value, namely by fermenting rice bran by utilizing microorganisms. According to Hidayat et al. (2018), "bacteria such as EM4 contain Lactobacillus casei and yeast Saccharomyces cerevisiae. To make microorganisms active in the fermentation process, molasses is given". According to Putra et al. (2020), "the use of local raw materials in the production of fish feed is an effort to reduce dependence on imported fish feed ingredients". Bran is a raw material that is widely used in society and little is known about its use in fish feed.

Feed is a source of energy for fish. Without food, fish will not grow and reproduce (Gusrina, 2018). The price of feed on the market is quite expensive, causing farmers to spend quite a lot of money to provide feed for fish. So, in this study a solution was found, namely innovation in making alternative feeds in the form of fermented rice bran feed, this is expected to save fish cultivators costs and alternative fermented rice bran feeds are expected to affect fish growth. One type of fish that has the potential to have a lot of interest among the public, namely koi fish, this fish is not a local fish from South Kalimantan. Koi fish come from Japan, but in Indonesia, especially South Kalimantan, there are indeed many who cultivate koi fish, both on a large and small scale. Koi fish has a special appeal because it is a type of ornamental fish that can survive in fresh water and has various and beautiful colors and patterns to look at. This koi fish is one of the fish that is suitable for cultivation. While the price of commercial koi fish feed on the market is quite expensive compared to rice bran, koi fish is suitable to be used as the object of this study.

Based on this background, this study aims to determine the appropriate dosage of fermented rice bran on the growth of koi fish seeds and to determine the effect of feeding fermented rice bran on the growth of koi fish seeds.

## 2. RESEARCH METHOD

This research was conducted for 4 effective months, from February to May 2022. This research was carried out at the Mentaos Freshwater Aquaculture Fishery Production Technical Implementation Unit (UPT PPBAT), Mentaos Village, North Banjarbaru District, Banjarbaru City, South Kalimantan Province.

The subjects in this study focused on providing fermented rice bran feed with different doses according to the calculation of the ideal feed for fish in a day. While the object of this study focused on koi fish seeds, totaling 5 individuals in one treatment, with a total number of koi fish seeds of 40 individuals.

The data collected in this study were, (a) Collection of experimental data before rice bran fermentation for 7 days, (b) Collection of observational data on the growth of koi fish seeds, namely Weight and length for four weeks, and (c) Collection of observational data on water quality in the form of water Ph, water DO, water temperature and water ammonia levels for 4 weeks.

This study was analyzed using the One Way Anova test to see the effect of feeding from fermented rice bran with different doses on the growth of koi fish seeds, and continued with Duncan's test to test the difference between all treatment pairs.

### 2.1. Research design

The design used in this study was a completely randomized design (CRD) consisting of three treatments and one control treatment. Each treatment was repeated twice. The following is the arrangement of the treatments tested:

**Table 1** Research Design

| Fermented rice bran feed | A1 | C2 | A2 | B1 |
|---|---|---|---|---|
| Treatment | B2 | K1 | K2 | C1 |

Information:
A1: 70% fermented rice bran feed
C2: 50% fermented rice bran feed
A2: 70% fermented rice bran feed
B1: 100% fermented rice bran feed
B2: 100% fermented rice bran feed
K1: Without treatment, namely 100% commercial feed
K2: Without treatment, namely 100% commercial feed
C1: 50% fermented rice bran feed

### 2.2. Research Tools and Materials

The tools used in this study were square jars, large round jars, large jars, fish scoops, digital scales, rulers, pH meters, thermometers, DO meters, aerators, stoves, pans, stir bars, spoons, clocks, small hoses, beaker. Whereas for even that used koi fish seeds, rice bran, EM4, molasses, water, feed Pf 500, prodac test NH3/NH4, and label paper.

### 2.3. Research Process

#### 2.3.1. Preparation phase

First, prepare tools and materials. Then, assemble the koi fish seed maintenance media and assemble the aerator. Then, mark all the koi fish seed rearing media jars according to treatment and repetition. Next, take the koi fish seeds from the pond at UPT PPBAT Mentaos Banjarbaru. Finally, sorting the koi fish seeds to be studied.

#### 2.3.2. Rice Bran Fermentation

The first process is to prepare the necessary tools and materials. Second, put rice bran in a pan and heat it on the stove. Third, move the rice bran that has been placed in the pan to a large jar. Fourth, measure 400 ml of water with a beaker. Fifth, measure molasses and EM4 each as much as 40 ml using a beaker. Sixth, mix water, molasses and EM4 into the container and stir until the mixture is homogeneous. Seventh, pouring the resulting mixture of water, molasses and EM4 into a large jar containing heated rice bran and stirring until

homogeneous. Eighth, leave it for 7 days with tightly closed jar conditions. Finally, record the experimental results on the instrument sheet.

### 2.3.3. Koi Fish Seed Farming

The first is to prepare the necessary tools and materials. Then, arrange the koi fish seed maintenance media according to the randomized treatment and repetition. Then, put 5 L of water into the maintenance media each. Attach an aerator into each maintenance medium. Weighing the Weight of fermented rice bran feed and commercial feed. Weighing koi fish seeds with the same Weight of ±1.0 g at the beginning of the study. Measuring koi fish seeds with the same length ± 4 cm at the beginning of the study. Measuring water quality, namely pH, DO, temperature, and ammonia levels was carried out every week for 4 weeks.

## 3. RESULT AND DISCUSSION

### 3.1. Rice Bran Fermentation Results

This stage is to make feed from rice bran by fermentation. Rice bran is processed by homogeneously mixing EM4 as good bacteria. The way to activate these bacteria must be given food and water intake, then given molasses or usually called molasses. This is confirmed by Setiarto (2020), that "fermentation requires energy which is generally obtained from glucose". Microbes use certain ingredients found in food as a substrate to produce energy, which is used to increase the population, in this process several changes occur in rice bran, namely changes in color, smell, taste and texture.

Before being fermented, rice bran has a light brown color, has a mild odor, tastes bland and has a rough texture to the touch. This fermentation activity is carried out for 7 days which aims to make the fermentation effective. This was also confirmed by Novia et al. (2014), "where the best time for fermentation is at least seven effective days of fermentation. During the fermentation process, the feed ingredient, namely rice bran, is left in a closed container". This aims to avoid microbes or external factors that interfere with fermentation or even fail.

(a) (b)

**Figure 1** (a) Rice bran feed before in Fermentation, (b) Rice Bran Feed After Fermentation

Based on Figure 1, during fermentation there were several changes, this was proven after opening the lid of the fermentation container, there were changes, namely the color changed to yellowish dark brown, when touched it has a soft and slightly moist texture,

smells like alcohol or like the smell of tape and when felt has a rather sweet sour taste and there is also water vapor in the fermentation container.

The smell of alcohol, the sour taste and the presence of water vapor on the lid of the fermentation container are emphasized by Widyanto et al. (2021) who states that "fermentation is the process of changing glucose into ethanol (ethyl alcohol) and carbon dioxide". The color change in both feeds was caused by a combination of feed with EM4 liquid and molasses which produces moisture. This was also stated by Purnamasari et al (2018) where high humidity can trigger the growth of microorganisms due to moisture absorbed in the feed ingredients, causing the color of the feed ingredients to darken. The sour taste is caused by a decrease in pH which occurs where lactic acid is formed from glucose. The smell of alcohol is caused by the influence of fermenting fungi on EM4. This was confirmed by Setiarto (2020), namely "Saccharomyces is a type of yeast or yeast that has the ability to convert glucose into ethanol". Water vapor is caused by an increase in temperature (Sari, 2022). Initially, this temperature increase was caused by bacterial isolates that were thought to grow in it which were capable of producing large amounts of CO2, this resulted in the appearance of water vapor on the surface of the fermentation container when it was opened.

EM4 also affects the nutritional content of feed. According to Haryani et al. (2021), "The effect on increasing or decreasing nutrient content is that the water content has increased". This is due to a decrease in the dry matter content during fermentation and also re-melting of organic matter that has been degraded by the microorganism Lactobacillus casei and an increase in this water content due to the addition of water from the results of microbial metabolism during fermentation. Santosa et al. (2017) also said that "the ash content had increased which was suspected of decreasing the organic matter content in rice bran". This is because the more organic matter is decomposed, the higher the ash content, the higher will be proportionally.

According to Nalle & Rubak (2022), "the increase in protein is caused by the ability of the bacterium Saccharomyces cerevisiae to secrete certain extracellular enzymes during fermentation, or the development of Saccharomyces cerevisiae into a single cell protein during fermentation". The increase in protein content is achieved by the action of protease enzymes produced by bacteria during fermentation. Santosa et al. (2017) also stated "an increase in fat, presumably because EM4 has lower lipase activity". Lipase is a water-soluble enzyme that acts by catalyzing ester bonds in water-insoluble lipid substrates such as long-chain triglycerides. Most of the bacterial lipases are produced extracellularly. In addition, microorganisms are in a stationary phase, thus experiencing increased substrate degradation. The microorganisms that play a role are the fermenting fungi Aspergillus niger and Pennicillium. According to Santosa et al. (2017), "the crude fiber content in rice bran has increased". It is suspected that the microorganisms of Saccharomyces cerevisiae and Rhodopseudomonas palustris do not decompose crude fiber. In addition, this is also due to the active microorganism Lactobacillus casei due to increased cellulose in rice bran.

### 3.2. Koi Fish Growth

#### 3.2.1. Absolute Weight Growth

The following is a table of absolute Weight data for koi fish seeds based on the research results obtained.

**Table 2** Absolute Weight Growth of Koi Fish Seeds

| Treatment | Repetition | Absolute Weight (grams) |
|---|---|---|
| A | 1 | 1.24 |
| | 2 | 1.30 |
| B | 1 | 1.98 |
| | 2 | 1.98 |
| C | 1 | 0.96 |
| | 2 | 1.00 |
| K | 1 | 0.90 |
| | 2 | 0.92 |

Based on the results of statistical tests using the One Way Anova test, it can be seen that the absolute individual Weight of koi fish seeds on fermented feed from rice bran at different doses has an effect. Then proceed to the Duncan test, it can be seen that the absolute individual Weight of koi fish seeds on fermented feed from rice bran with different doses, there is a significant difference between all treatments, namely in treatment A (70% fermented feed rice bran) B (100% fermented feed rice bran) C (50% feed fermented rice bran) and K (without 100% commercial feed treatment) can be seen in all Duncan tests and the curve shows that the data per week produces the most calculated treatment, namely in treatment B (100% fermented rice bran feed).

#### 3.2.2. Absolute Length Growth

The following is a table of absolute length growth data for koi fish seeds based on the research results obtained.

**Table 3** Absolute Length Growth of Koi Fish Seeds

| Treatment | Repetition | Absolute Length (grams) |
|---|---|---|
| A | 1 | 0.78 |
| | 2 | 0.80 |
| B | 1 | 1.30 |
| | 2 | 1.38 |
| C | 1 | 0.62 |
| | 2 | 0.64 |
| K | 1 | 0.68 |
| | 2 | 0.54 |

Based on the results of statistical tests using the One Way Anova test, it can be seen that the absolute individual length of koi fish seeds on fermented feed from rice bran at different doses has an effect. Continuing with the Duncan test, it can be seen that the absolute individual length of koi fish seeds on fermented feed from rice bran with different doses, there was a significant difference between all treatments, namely in treatment A (70%

fermented rice bran feed) B (100% fermented bran feed) rice) C (50% fermented rice bran feed) and K (without 100% commercial feed treatment) can be seen in all Duncan tests and the curve shows that the data per week produces the most calculated treatment, namely in treatment B (100% fermented rice bran feed).

### 3.3. Influence and the Right Dosage on Koi Fish Seed Cultivation

Based on the research results, it can be seen that the administration of fermented rice bran affects the development of koi fish seeds. This may be influenced by an increase in the number of bacteria that enter the digestive tract, because the addition of probiotics from EM4 fermented probiotics in feed can increase the growth rate of koi fish. Increased digestibility is influenced by nutrients that are absorbed more by the body, so that it can increase the growth of good bacteria in the digestive tract of fish which secrete digestive enzymes such as protease and amylase. The amount of enzymes secreted increases with the number of meals so that the fish consumes all the food (Jusadi et al., 2004). The addition of probiotic bacteria to fermented rice bran will affect the performance of digestive enzymes, so that the process of digestion and absorption of feed nutrients by koi fish is better. The use of probiotics in aquaculture can increase the immune response of fish, resistance to pathogens, growth, digestibility and appetite (Mudeng et al., 2020). According to Dewi et al. (2019), "fish will use food nutrients stored in the body and turn them into energy. This energy is used by fish for basic metabolism, locomotion, production of sex organs, maintenance of body parts and replacement of damaged and excess cells for growth".

Based on data analysis from this study, it is known that treatment B (100% fermented rice bran feed) gave the highest absolute length and growth rate compared to treatment A (70% fermented rice bran feed), C (50% fermented rice bran feed) and K (without 100% commercial feed treatment). This is probably because the amount of feed added to each treatment greatly affects the growth of the weight and length of the koi seeds. According to Chotimah et al. (2018), "the growth rate of fish depends on the amount of food given, oxygen, temperature, water acidity, and other factors". Therefore, it is suspected that feeding between treatments resulted in significant growth in weight and length of livestock. The K treatment (without treatment/100% commercial feed) can be seen to have a significant difference with treatment A (70% fermented rice bran feed), B (100% fermented rice bran feed), and C (50% fermented rice bran feed). This shows that fermented rice bran feed has an effect on the growth of koi fish seeds, namely fish are able to grow well from all treatments.

Based on statistical calculations, the best dose per week is treatment B (100% fermented rice bran feed). With a dose of B (0.08gr), which is in accordance with the calculation of the daily feed for fish, it can be calculated using the formula, namely:

**DFA =WNSR.FR**

Information:
DFA : The daily amount of feed given to the rearing medium
W : The average weight of the fish stocked in the rearing medium
N : Number of fish stocked
SR : fish survival
FR : The amount of feed given per day (%) corresponds to the maximum value (3-5%)

Based on the daily ideal feed formula, the dose in each treatment is determined according to the daily feeding. Calculations based on the formula produce the ideal daily feed, which is 0,25 gr per day, for one day it is given three meals, so for each feeding it is based on the formula, namely 0,08 gr. Then the dose can be calculated in the treatment with a count of %, then treatment A (0,056gr), B (0,08gr), C (0,04gr) and K (0,08gr).

### 3.4. Water Quality

Water quality is also a factor supporting fish growth. If fish live with good water quality, there is no excess or lack of pH, oxygen, or temperature, then fish can live and grow well. The quality of water in aquaculture that was maintained during the study was within normal limits to support fish farming. Water quality is the most important supporting factor, besides animal feed and fish species, in maintaining plant growth and sustainability. During the research the temperature ranged from 26 to 30°C, seeing the results of the temperature during the research it was always quite good for fish farming because fish farming usually requires temperatures between 25 to 30°C (Najib, 2018). If the temperature increases, the respiration of aquatic animals will speed up the metabolism of aquatic organisms, which causes more consumption of dissolved oxygen (Mangkapa et al., 2017).

The acidity or pH of water is the high concentration of hydrogen ion present in the water. In natural water, the pH value varies from 4 to 9, this is caused by acidic chemical compounds and CO2. If the water has a pH below 4 or above 11 there will be Weight death of aquatic organisms in the water. While the pH value during the study ranged from 7 to 8. Based on the pH value in the study it could be classified as good for aquaculture activities because it was still in the ideal category as in the initial waters, namely 7 to 8.5 (Nurchayati et al., 2021).

Dissolved oxygen (DO) is a very important water quality parameter when carrying out aquaculture operations, the dissolved oxygen concentration value will always change at any time. The presence of dissolved oxygen in water or culture media is the result of oxygen diffusion and photosynthesis by the chlorophyll population in the water. Dissolved oxygen during the study ranged from 5.4 to 5-9 ppm and was still relatively good according to the opinion of Monalisa & Minggawati (2010) that "the minimum value of dissolved oxygen for growth activity was 4 to 6 ppm".

There are 2 types of ammonia in water, namely (NH3 and NH4), in ammonium (NH4) it can be ionized while free ammonia (NH3) cannot be ionized. Free ammonia has toxic properties for aquatic organisms, if the concentration of free ammonia in water or cultivation media is too high it can cause death in organisms above 3 mg, because ammonia will

interfere with the process of transporting oxygen through the blood, resulting in airway obstruction (suffocation). Based on ammonia data, probiotic feeding is very helpful in reducing the ammonia content of leftover food, it is suspected that probiotics are food ingredients that cannot be digested by their hosts but have an extreme positive impact by stimulating the growth of beneficial bacteria in the digestive tract of animals (Ahmadi & Kurniawati, 2012). This is also in accordance with the purpose of giving probiotics to feed, namely to accelerate metabolism in biota so that there is no leftover feed that produces ammonia when feeding. However, if seen from the results of ammonia levels during the study in all treatments, it was still relatively normal for aquaculture activities, which was still below 0.25 mg/L.

## 4. CONCLUSION

Based on the results obtained on absolute Weight with statistical calculations per week, it can be concluded that feed from fermented rice bran affects the growth of koi fish seeds. It can be seen that there is a difference in the absolute individual Weight of koi fish seeds in the feeding of fermented rice bran with different doses. Judging from all the treatments the biggest calculation is in treatment B (100% fermented rice bran feed) while the results obtained at absolute length with statistical calculations can be seen from all the treatments with the biggest calculation namely in treatment B (100% fermented rice bran feed). So, it can be concluded that the right feed dose in this study is (100% fermented rice bran feed weighing 0.08 gr).

## REFERENCES

Ahmadi, H., & Kurniawati, N. (2012). Pemberian probiotik dalam pakan terhadap pertumbuhan lele sangkuriang (Clarias gariepinus) pada pendederan II. *Jurnal Perikanan Kelautan*, *3*(4).

Chotimah, S., Rusliadi, R., & Tang, U. M. T. (2018). Pertumbuhan Dan Kelangsunganhidup Ikan Baung (Mystus Nemurus Cv) Dengan Padat Tebar Berbeda Pada Sistem Resirkulasi. *Jurnal Online Mahasiswa (JOM) Bidang Perikanan Dan Ilmu Kelautan*, *5*(1), 1–13.

Dewi, A. T., Suminto, S., & Nugroho, R. A. (2019). Pengaruh pemberian pakan alami moina sp. dengan dosis yang berbeda dalam feeding regime terhadap pertumbuhan dan kelulushidupan larva ikan baung (Hemibagrus nemurus). *Sains Akuakultur Tropis: Indonesian Journal of Tropical Aquaculture*, *3*(1), 17–26.

Gusrina. (2018). *Genetika dan Reproduksi Ikan*. Deepublish.

Haryani, K., Lakzita, P. R., & Sari, P. P. (2021). Modifikasi tepung sorgum dengan metode fermentasi menggunakan bakteri asam laktat Lactobacillus bulgaricus. *Jurnal Inovasi Teknik Kimia*, *6*(1).

Hidayat, N., Meitiniarti, I., Setyahadi, S., Pato, U., Susanti, E., Padaga, M. C., Wardani, A. K., & Purwandari, U. (2018). *Mikrobiologi Industri Pertanian*. Universitas Brawijaya Press.

Jusadi, D., Gandara, E., & Mokoginta, I. (2004). Pengaruh penambahan probiotik Bacillus sp. pada pakan komersil terhadap konversi pakan dan pertumbuhan ikan patin

(Pangasius hypophthalmus). *Jurnal Akuakultur Indonesia*, *3*(1), 15–18.

Mangkapa, A., Lumenta, C., & Mokolensang, J. F. (2017). Efisiensi pakan bertepung kijing Taiwan (Anodonta woodiana) bagi pertumbuhan ikan mas (Cyprinus caprio L.). *E-Journal Budidaya Perairan*, *5*(3).

Monalisa, S. S., & Minggawati, I. (2010). Kualitas air yang mempengaruhi pertumbuhan ikan nila (Oreochromis sp.) di kolam beton dan terpal. *Journal of Tropical Fisheries*, *5*(2), 526–53.

Mudeng, C. C., Manoppo, H., Lantu, S., Kreckhoff, R. L., & Tumbol, R. A. (2020). Suplementasi bakteri probiotik meningkatkan performa pertumbuhan dan efisiensi pakan benih ikan mas (Cyprinus carpio). *E-Journal BUDIDAYA PERAIRAN*, *8*(1).

Najib, M. A. (2018). *Efektivitas Penambahan Suplemen Herbal pada Pakan Ikan terhadap Laju Pertumbuhan dan Kelulushidupan Benih Ikan Koi (Cyprinus carpio linnaeus)*. University of Muhammadiyah Malang.

Nalle, R. P. I., & Rubak, Y. T. (2022). *Buku Ajar Mikrobiologi Pangan*. Media Sains Indonesia.

Novia, N., Windarti, A., & Rosmawati, R. (2014). Pembuatan Bioetanol dari Jerami Padi Dengan Metode Ozonolisis–Simultaneous Saccharification And Fermentation (SSF). *Jurnal Teknik Kimia*, *20*(3).

Nurchayati, S., Haeruddin, H., Basuki, F., & Sarjito, S. (2021). Analisis Kesesuaian Lahan Budidaya Nila Salin (Oreochromis Niloticus) Di Pertambakan Kecamatan Tayu (Analysis On Land Suitability Cultivation Of Saline Tilapia (Oreochromis niloticus) at The Pond in Tayu District). *Saintek Perikanan: Indonesian Journal of Fisheries Science and Technology*, *17*(4), 224–233.

Putra, A. N., Yuaninda, A., Anarki, S. B., Syamsunarno, M. B., Mustahal, M., Hermawan, D., & Herjayanto, M. (2020). Efek Penambahan Prebiotik Pada Pakan Berbasis Bahan Baku Lokal Untuk Meningkatkan Pertumbuhan Dan Kecernaan Pakan Ikan Nila Oreochromis Niloticus. *Leuit (Journal of Local Food Security)*, *1*(1), 1–7.

Santosa, B., Fitasari, E., & Suliana, G. (2017). Produksi pakan fungsional mengandung tiga senyawa bioaktif dari ampas tahu dengan menggunakan Mikroba Effective Microorganism-4 dan Lactobacillus plantarum. *Buana Sains*, *17*(1), 25–32.

Sari, D. I. P. (2022). Isolasi Mikroorganisme Heterofermentatif Pada Biji Kakao (Theobroma Cacao L.) Selama Fermentasi Spontan. *Pasundan Food Technology Journal (PFTJ)*, *9*(1), 7–13.

SETIARTO, R. H. B. (2020). *Teknologi Fermentasi Pangan Tradisional dan Produk Olahannya*. Guepedia.

Superianto, S., Harahap, A. E., & Ali, A. (2018). Nilai nutrisi silase limbah sayur kol dengan penambahan dedak padi dan lama fermentasi yang berbeda. *Jurnal Sain Peternakan Indonesia*, *13*(2), 172–181.

Suryani, H. F., & Luthfi, N. (2022). Evaluasi kualitas nutrisi dedak padi dari pemasok bahan pakan di Kabupaten Semarang. *Journal of Animal Center (JAC)*, *4*(1), 26–32.

Syahrizal, D., & Puspita, N. A. (2020). *Metabolisme dan Bioenergetika*. Syiah Kuala University Press.

Widyanto, R. M., Muslihah, N., Raras, T. Y. M., Rahmawati, I. S., Dini, C. Y., & Maulidiana, A. R. (2021). *Gizi Molekuler*. Universitas Brawijaya Press.

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