



# EFFECTIVENESS OF LAMTORO LEAVES FLOUR (LEUCAENA LEUCACOCEPHALA) AND IMPRESSION IN ARTIFICIAL FEED ON THE GROWTH AND LIFETIME OF LIVING PATIN FISH (PANGASIUHYPOTHALAMUS)

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## ABSTRACT

Lamtoro is a shrub or tree up to 18 m tall, widely branched and vigorous, with clear gray bark and lenticels. Two-finned leaves with 4-9 pairs of fins, varying in length up to 35 cm, with large glands (up to 5 mm) at the base of the petiole, leaf blade 11-22 pairs/fin, 8-16 mm x 1-2 mm. The flowers are abundant with a head diameter of 2-5 cm, stamen (10 per flower), and pistils 10 mm long. Pods 14-26 cm x 1.5-2 cm, brown when old. The number of seeds 18-22 per pod, brown (Garcia et al., 1996). Bran is waste in the process of processing unhulled rice (paddy) into rice which contains the "outer" rice that is not carried away but is also mixed with the cover of the rice. This is what affects the high or low crude fiber content of the bran (Rasyaf, 1990). The increase in the absolute average length of the Siamese catfish seeds by feeding 1.44 cm lamtoro leaf meal was higher than 1.36 cm by feeding using bran. The increase in the absolute average weight of the Siamese catfish seeds by feeding 1.4 g of lamtoro leaf meal heavier than 0.52 g by feeding using bran. The FCR value of Siamese catfish seeds using lamtoro leaf meal was 1.053 better (small) than feed using 1.333 bran. Survival Rate (SR) in the container in the treatment of 94% lamtoro leaf flour and the treatment in the feed container using 93.33% bran. During the study, the temperature range, pH, and DO in the containers used for lamtoro leaf meal and bran feed were used for temperatures ranging from 26-30 °C, pH ranging from 6-7, and DO ranging from 4-7 ppm.

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## 1. INTRODUCTION

Siamese Patin (*Pangasius hypothalamus*) is one type of freshwater economical fish that is now being developed by fish farmers for cultivation. Siamese Patin has been an economical fish for a long time, especially in Sumatra and Kalimantan. This fish, whose meat is delicious and savory and of a large enough size, lives in the rivers and lakes of Kalimantan, Sumatra and Java (Kordi, 2005).

Siamese catfish was introduced from Thailand in 1972 and began to be widely cultivated in Indonesia in 1985. Biologically, Siamese catfish has several advantages compared to other freshwater fish, including easy to breed, many seeds, easy maintenance and fast growth. Siamese catfish growth is relatively fast because it is responsive to artificial feed. From an economic point of view, Siamese catfish can be a very potential fishery commodity because of its affordable price, high community demand and it can meet people's protein needs (Sunarma, 2007). According to Zonneveld et al., (1991) stated that, fish growth is largely determined by the availability of feed, quality, type and amount of feed that is sufficient for the body's needs of the fish. Internal factors that influence growth include heredity, sex, age, resistance to parasites and diseases, species and body size.

External factors that affect growth are food, space for movement and water quality (temperature, pH and dissolved oxygen) (Effendie, 1997).

The increase in aquaculture production can be achieved by accelerating growth, in which case high nutrition is required in the feed. In feeding, it must be considered that the amount of feed is sufficient, on time and the nutritional content is in accordance with the needs of the fish. Adelina (1999) states that fish growth is largely influenced by the balance of nutrient composition in feed. These nutrients include protein, fat, carbohydrates, vitamins and minerals.

Feed is the main need for growth for fish, availability will be the largest variable cost ( $\pm 60\%$ ) of production. An increase in feed prices will reduce profits and increase production costs. Therefore, feed formulations must be developed that have high feed efficiency with low feed production costs, but do not reduce the nutritional content of the feed (Arie, 2009). One way to reduce production costs is to find a source of feedstuffs that do not compete with human food staples, are sustainable, have high nutritional value and are relatively inexpensive (Murtidjo, 2001).

Efforts to reduce feed costs, some farmers use alternative feed ingredients as a substitute for feed ingredients. In general, alternative feed ingredients for fish come from various plant leaves whose nutritional content can be used as fish feed ingredients. In selecting feed ingredients, it should be considered in accordance with the provisions of feed ingredients, namely easy to obtain, cheap price, high nutritional content and does not compete with humans (Handajani and Widodo, 2010). One example of an alternative feed ingredient that is optimally utilized is lamtoro leaf.

Lamtoro leaves in the form of flour can be used as a mixture of fish feed in the form of pellets (Sarasasti, 2009). Lamtoro is a potential biological resource to be used as feed with sufficient nutritional value forage waste (Widiastuti, 2001). The chemical composition of lamtoro leaves, namely dry weight 97.8923%; crude protein 23.8326%, extract material without nitrogen (BETN) 31.0509%, crude fiber 23.5877%, fat 11.6858% and ash 7.7353% (FKH UA Training and Consulting Laboratory Inspection Service Unit, 2012).

Based on the above statement, the authors are interested in conducting research on the effectiveness of lamtoro leaf meal (*Leucaena leucacocephala*) and bran in artificial feeds on the growth and survival of Siamese catfish (*Pangasius hypophthalmus*).

## 2. METHOD

The research method used is the "t" test experimental method with artificial feeding treatment using bran raw materials and artificial feed using lamtoro leaf flour. The feed is self-processed with protein content of 28-30%. Feeding is given for 30 days. The test fish used in this study was Siamese catfish (*Pangasius hypophthalmus*) measuring 3-5 cm. The total number of tested fish was 300 fish (150 fish per container). The container used is a fiber tub measuring 2x1x0.8 m (PxLxT). The feeding dose is 5% of total biomass weight. Feeding frequency 3 times a day. The sampling method with simple random (simple random sampling) is a sample taken in such a way that each research unit or elementary unit of the population has the same opportunity to be selected as a sample, for example a population (N) of 100 individuals, will be selected 10 as a sample (n), (Singa Rimbun, 1989). Sampling was done once a week.

## 3. RESULTS AND DISCUSSION

### Fish Length Increase

From the observations that have been made on the addition of length of Siamese catfish seeds with the treatment of feeding lamtoro leaf meal and feed using bran, data obtained 4 times the measurement for 30 days of maintenance. Based on these data, the increase in the absolute average length (average length of fish at the end of maintenance - average length of fish at the beginning of maintenance) for feeding lamtoro leaf meal is 1.44 cm, and for feeding using bran is 1.36 cm. This is presumably due to the maintenance of Siamese catfish seeds in controlled conditions, both environmental factors, feeding, and water quality.

Table 1. The absolute average length of Siamese catfish on feeding of lamtoro leaf meal and feed using bran

Sunday	Long Siamese catfish by feeding with lamtoro leaf meal	Long Siamese catfish by feeding using bran
0	5.42	5.07
1	6.35	5.63
2	6.52	5.93
3	6.72	6.21
4	6.86	6.43

Based on observations on the average length growth of Siamese catfish, it shows that there is a difference in the average length between lamtoro leaf meal and bran feed. The highest absolute length of catfish was obtained in lamtoro leaf meal which was 1.44 cm and the lowest was in the feed using bran which was 1.36 cm.

From this study, the mortality rate can be as large as 3-4% respectively, this death was caused after sampling. Because the treatment is not good at the time of measurement and the fish are not in the water for too long and the temperature changes.

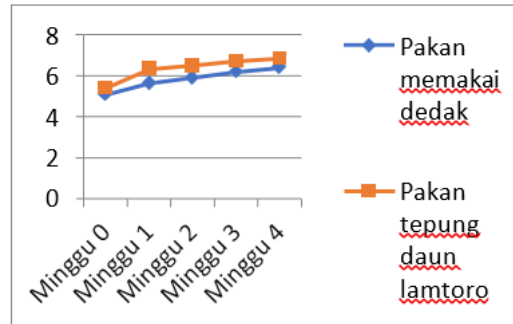


Figure 1. Diagram of the Absolute Average Length of Siamese Patin Fish Seeds during the Study

Data Analysis of Absolute Length Gain of Siamese Patin Fish Seeds. By using SPSS Version 22 software, it was found that the absolute weight data variety in the treatment of feeding lamtoro leaf meal was the same as the treatment of feeding using bran for 4 measurements for 30 days.

Table 2. t test of length data of Siamese catfish seeds with administration Lamtoro Leaf Flour Feed and Bran Feeding

Absolute Increase in Length Siamese Patin Fish Seeds	N	dF	T	Sig. (2-tailed)
Feeding flour Lamtoro Leaves - Feeding Put on bran	10	18	(2.771)*	0.013

Basically, external factors that affect the length increase of the Siamese catfish fry are water temperature, dissolved oxygen content, ammonia, and salinity. These factors interact with each other and together with other factors such as competition, quantity and quality of food, age and mortality rate which affect the length growth rate of catfish fry. In addition, the factor that can affect the rate of increase in length of catfish seeds is the feeding of lamtoro leaf flour. This is because the fish prefer or are eager to eat feed using lamtoro leaf flour.

### Fish Weight Gain

From the observations that have been made on the weight gain of Siamese catfish seeds with the treatment of feeding lamtoro leaf flour and feed using bran, data was obtained 4 times the measurement for 30 days of maintenance. Based on these data, the absolute average weight gain (average weight of fish at the end of maintenance - average weight of fish at the beginning of rearing) for feeding lamtoro leaf meal is 1.4 g, and for feeding using bran is 0.52 g. This is thought to be due to the maintenance of Siamese catfish seeds in controlled conditions, both environmental factors, feeding, and water quality due to using aerators.

Table 3. Average weight of Siamese catfish on feeding of Lamtoro Leaf Flour and Feed Using Bran

Sunday	Weight of Siamese catfish by feeding with lamtoro leaf meal	Weight of Siamese catfish by feeding using bran
0	1.37	1.11
1	1.99	1.50
2	2.15	1.55
3	2.36	1.67
4	2.77	1.63

Based on the results of observations on the average weight growth of Siamese catfish, there is a difference in the average weight between lamtoro leaf meal and bran feed. The highest absolute weight of Siamese catfish was obtained in lamtoro leaf meal, which was 1.4 g and the lowest was in bran feed, which was 0.52 g.

From this study, the mortality rate was obtained for 3-4% each, this death was caused after sampling. Because the treatment is not good at the time of measurement and the fish are not in the water for too long and the temperature changes.

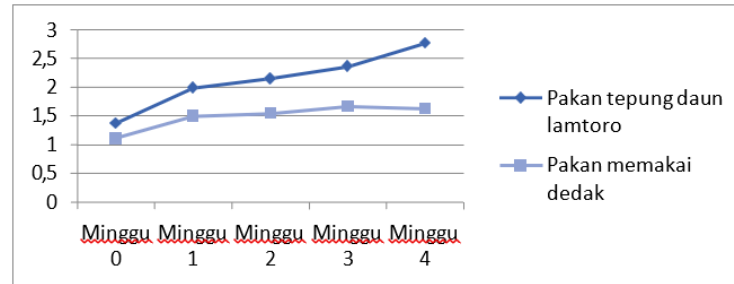


Figure 2. Diagram - Average Absolute Weight of Siamese Patin Fish Seeds during the Study.

### Data Analysis of Absolute Weight Gain of Siamese Patin Fish Seeds

By using SPSS Version 22 software, it was found that the absolute weight data variety in the treatment of feeding lamtoro leaf meal was the same as the treatment of feeding using bran for 4 measurements for 30 days.

Table 3. t test of weight data of Siamese catfish seeds with administration Lamtoro Leaf Flour Feed and Bran Feeding

Absolute Increase in Length Patin Fish Seeds	N	dF	T	Sig. (2-tailed)
Feeding flour Lamtoro Leaves - Feeding Put on bran	10	18	3.795)*	0.001

Basically, external factors that affect the weight gain of catfish are water temperature, dissolved oxygen content, ammonia, and salinity. These factors interact with each other and together with other factors such as competition, quantity and quality of food, age and mortality rate which affect the weight gain rate of Siamese catfish fry. In addition, the factor that can affect the rate of weight gain of Siamese catfish seeds is feeding lamtoro leaf flour. This is because the fish prefer or are eager to eat feed using lamtoro leaf flour.

### Survival Rate (SR)

The results of the calculation of the survival rate of the Siamese catfish seeds during the study showed that the results for feeding using lamtoro leaf meal were 94% and for feeding using bran was 93.33%. For more details, see the table 4:

Pakan	Number of initial stocking (tail)	Number of live fish (tail)	SR (%)
Leaf Flour Lamtoro	150	141	94
Bran	150	140	93,33

### Feed Conversion Ratio (FCR)

The results of the calculation of FCR Siamese catfish during the study showed that the results for feeding using lamtoro leaf meal were 1.053 and for feeding using bran was 1.333. For more details, see table 5.

Table 5. FCR Calculation Results

Pakan	Total Weight of the Overall Final Result (gram)	Total feed given during maintenance (grams)	FCR
Leaf Flour Lamtoro	390,5	411,58	1,053
Bran	228,3	390,5	1,333

### Water Quality Data

In this study, the water quality parameters measured were temperature, pH and DO which can be seen in table 6.

Table 6. Range of Water Quality Measured during the Study

Pengamatan	Suhu	pH	DO
Lamtoro leaf flour feed container	27-29°C	6,7-7	5-7 ppm
The feed container uses bran	26-30°C	6,5-6,9	4-5 ppm

These water quality parameters are in accordance with the needs of Siamese catfish. According to Arifin and Asyari (2001) in Nurhamidah (2007), Siamese catfish that are kept in ponds can grow well in a temperature range of 26.5-28 ° C tolerating temperatures of 22-30 ° C.

In this study, the pH value ranged from 6.0 to 7.0. According to Arifin and Tupang (1983) in Nurhamidah (2007), the suitable pH for Siamese catfish ranges from 6.5 to 8.0. The dissolved oxygen content in this study was around 5 ppm. The oxygen concentration is still suitable for the Siamese catfish. According to Legendre et al., (2000) in Kurdiarti (2003), dissolved oxygen concentrations above 3 ppm are still within the tolerance limit for catfish.

### 4. CONCLUSION

1. The increase in the absolute length of the Siamese catfish seeds by feeding 1.44 cm lamtoro leaf meal is higher than 1.36 cm by feeding using bran.
2. The increase in the absolute average weight of the Siamese catfish seeds by feeding 1.4 g of lamtoro leaf meal heavier than 0.52 g by feeding using bran.
3. The FCR value of Siamese catfish seeds using lamtoro leaf meal was 1.053 better (small) than feed using 1.333 bran.
4. Survival Rate (SR) in a container in the treatment of 94% lamtoro leaf flour and in the treatment in the feed container using 93.33% bran.
5. During the study, the temperature range, pH and DO were carried out in the containers used to feed the lamtoro leaf meal and the feed using bran, the temperature ranges from 26-30 °C, pH ranges from 6-7, and DO ranges from 4-7 ppm.

### ACKNOWLEDGMENTS (if applicable)

Further research is needed in the future so that the dosage of using different lamtoro leaf meal in artificial feed is tested to determine optimal fish growth and it is carried out on different types of fish.

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