e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:05/Issue:01/January-2023 Impact Factor- 6.752 www.irjmets.com

THE USED OF ECENG GONDOK ON FEED AND ITS IMPLICATED ON LELE FISH

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DOI : https://www.doi.org/10.56726/IRJMETS32766

ABSTRACT

The aim of this experiment was to examine "the used level *Eichhornia crassipes* meal on growth and feed efficiency of lele fish. The research used Completely Randomized Design (4x4), with used of levels *Eichhornia crassipes* mix. Meal (0, 10%,20%, and 30%). Each treatment was used 10 Lele seeds size ±5 g. Implicated on lele fish was that level of *Eichhornia crassipes*mix. meal was not significant on growth and feed efficiency. The Absolute Growth with used level 0%, 10%, 20%, and 30%,respectively 2,96%, 3,32%, 2,11%, dan 2,06%. Finally, the used level of *Eichhornia crassipes* mix.meal can used10% on feed.

Keywords: Eceng Gondok Mix.Meal, Lele Seed, Growth.

I. INTRODUCTION

Food can be a factor that determines population and growth. The type of food of a fish species depends on age and time (Effendie, 1979). According to Mudjiman (1984), the order of the digestive tract of fish consists of the mouth, esophagus, esophagus, stomach, intestines to the anus. Furthermore, Ichwan (1997) states that the quality and quantity of fish food also depends on the size of the food that is suitable for the fish's mouth.

Fish feed is one of the most important factors in a fish farming business. The availability of feed will affect the growth and survival of farmed fish. In the process of fish farming, especially in enlargement activities, the most important factor is the availability of sufficient amounts of feed. Feed makes the biggest contribution, reaching 60-70% of the total production cost and the feed must contain all the necessary nutrients such as carbohydrates, fats, proteins, minerals, vitamins and essential amino acids in sufficient and balanced quantities. This condition is very much needed for businesses in the field of aquaculture, including catfish farming (Kordi, 2009).

Catfish are omnivorous and greedy fish, very responsive to artificial pellets, even to forage. The main protein sources that are often used in the manufacture of pellets are fish meal and soy, which compete with food and animal feed. Forage is an appropriate alternative as a raw material for mixing in pellet production because it is easy to provide, cheap and has many types, especially those from aquatic weeds from Lake Lubuk Siam, Kampar District, Kampar Regency, where 70% of the water surface is covered with water hyacinth.

Isnansetyo (1992) stated that mortality in larvae is often caused by the feed used containing low EPA and DHA. Fish can grow optimally if the protein content in the preparation of the feed is not too different according to their needs. There is a supply of protein containing amino acids obtained from food and also the process of forming energy from food substances.

Water hyacinth is an aquatic plant that is very difficult to eradicate. This is due to the very fast growth of water hyacinth and its high survival rate. From a hydrological standpoint, water hyacinth can cause surface water loss up to 4 times when compared to open surfaces and can cause siltation of lakes, rivers or other watery areas. As a result of the uncontrolled growth of water hyacinth, it will cause siltation of water areas, and closure of river channels and lakes (Sukman and Jacob, 1991).

Water hyacinth is one of the aquatic weeds that causes a lot of losses in waters. However, water hyacinth can be used as organic fertilizer and is also used to maintain and improve soil fertility in ponds. Water hyacinth can be used as animal feed, such as fish feed, industrial raw material, gas producer, protein producer, and green manure (Setyowati et al. in Sutanto and Rachman, 2002). According to Efawani (2016) that based on direct observation and practice in In the field, it turns out that organic material in the form of water hyacinth can be used as an alternative feed for catfish, so it does not require too much capital to buy pelleted feed, because this material is relatively cheaper compared to the price of pellets, because water hyacinth can be easily found.

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This very fast growth of water hyacinth requires serious handling. Mechanical, chemical and biological eradication in several countries has never produced optimal results (Gopal and Sharma, 1988). Based on this, so that water hyacinth can be utilized and has economic value, the research team needs to conduct research on the use of water hyacinth in feed and its implications for catfish.

II. RESEARCH PURPOSES AND OBJECTIVES

The aim and objective of this study was to determine the effect of the level of use of water hyacinth in the feed mixture on the growth and feed efficiency of catfish. Method and analysis which is performed in your research work should be written in this section. A simple strategy to follow is to use keywords from your title in first few sentences.

III. METHODOLOGY

Location and Time of Research

The research was carried out at the UR Faculty of Fisheries and Maritime Waste Management Laboratory from February to November 2017. Proximate analysis of the test feed was carried out at the Fisheries Products Chemistry Laboratory, UR Faculty of Fisheries and Marine Science.

Materials

The tools to be used are 16 aquariums, blowers, hoses, and aeration stones for oxygen supply, scales for calculating feed and fish, as well as grinding machines, and pellet makers. The materials to be used are catfish seeds from the first nursery weighing ± 5 g /fish biomass. Water hyacinth obtained from fish farmers in Lubuk Siam Village, Kampar District, Kampar Regency.

This study used an experimental method with a completely randomized design (4 x 4), namely:

A. Commercial feed without water hyacinth.

B. Commercial feed containing 10% water hyacinth.

C. Commercial feed containing 20% water hyacinth.

D. Commercial feed containing 30% water hyacinth.

Procedure

1. Preparation stage: preparing the aquarium, procuring water hyacinth, preparing experimental containers.

2. Observing the response of fish to water hyacinth.

3. Making pellets consisting of a mixture of dried water hyacinth, rice bran, soy flour, fish meal and fish oil. Water hyacinth is first withered, dried in the sun, ground into flour and fermented with beef rumen, then mixed with soy flour, rice bran, fish meal, and fish oil (commercial pellets). Pellets are composed of 35-40% isoprotein.

The proximate results of fermented water hyacinth flour and water hyacinth flour can be seen in Table 1.

Table 1. Proximate analysis of water hyacinth flour and fermented water hyacinth flour

Ingredient	Nutrient content (%)				
	Proteins	Lipid	coarse fiber	Ash	Water
Water hyacinth Flour	13,74	0,68	1,38	7,56	11,69
Fermented Water hyacinth Flour	14,20	1,52	1,31	7,41	10,55

Source: Labs. Chemistry of Fishery Products UR

While the results of the feed proximate analysis can be seen in Table 2.

Table 2. Results of proximate analysis of the test feed

treatment	Nutrient content (%)				
	Proteins	Lipid	Coarse fiber	Ash	water
P0 (0%)	22,91	1,53	1,75	8,52	10,70
P1 (10%)	20,99	1,09	1,49	8,09	9,55
P2 (20%)	24,87	1,76	1,69	8,45	10,21
P3 (30%)	23,92	1,48	1,63	8,02	11,01

Source: Labs. Chemistry of Fishery Products UR

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4. Fish rearing: The fish used are catfish seeds from the first nursery with a size of ±5 g/fish biomass.

The research took place at the Waste Management Laboratory and data analysis at the Fisheries Products Chemistry Laboratory, UR Faculty of Fisheries and Maritime Science.

Feed consumption (g)

The data obtained were analyzed by means of variance, then continued with Duncan's Multiple Range Test (Steel and Torrie, 1995).

Mathematical model: Yij = m + ai + eij

Information:

Yij = Results of observations on the i-th treatment and j-th repetition.

m = General average.

ai = Effect of the i-th treatment.

eij = Error component effect.

Assumption:

1. The eij values are normally distributed and independent of each other.

2. The expected value of eij = 0.

3. The variance of eij = d2.

So eij ~ NID(0, d2).

4. The effect of treatment is fixed.

The hypothesis tested:

1. H0 : Ro = R1 = R2 = R3.

2. H1: Ro _ R1 _ R2 _ R3., or at least a pair of unequal Ri.

Decision rule:

- If Fcount < Ftable, then accept H0.

- If Fcount > Ftable, then reject H0.

IV. RESULTS AND DISCUSSION

Based on the research results that have been carried out for 21 days raising catfish (Clarias batracus) seeds in aquariums on a laboratory scale can be obtained from observing several aspects in the form of tables.

Growth Rate of Catfish Seed (Clarias batracus)

The weight of catfish seeds during maintenance 21 days after being weighed every 7 days from the start of rearing can be seen in Appendix 1. While the average weight of individual catfish (grams) in each treatment can be seen in Table 3.

Table 3. The average weight of individual catfish (grams) in each treatment

Observation of the day	Treatment (fermented water hyacinth flour) (grams)			
	control (0%)	P1(10%)	P2 (20%)	P3 (30%)
0	8,54	9,40	8,5	8,78
7	12,94	12,53	12,20	13,43
14	19,64	20,60	20,04	22,62
21	4,22	12,95	15,26	9,51
Total	45,34	55,48	56,00	54,33
Average	11,33	13,87	14,00	13,58

The average weight of catfish individuals (grams) in each treatment was the highest during the study, namely P2 (10%) of 14.00 g, followed by P1 (10%) of 13.87 g, P3 (30%) of 13 .58 g compared to feed without water hyacinth meal. While the lowest from the fermented water hyacinth treatment was P3 (30%). This shows that

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the water hyacinth feed given for 21 days of rearing catfish in the aquarium can be eaten and is still preferred by catfish fry up to P3 (30%). Overall the water hyacinth feed still increased the growth of catfish fry at P3 (30%) until the 14th day, namely 22.62 g and on the 21st day it dropped dramatically, namely 9.51 g. This is presumably due to the increasingly turbid water quality, the remains of water hyacinth feed which settles a lot at the bottom of the aquarium and the occurrence of cannibalism (eating others), many of which die (found their limbs are incompletely cut), because this catfish is a type of catfish. carnivorous fish (greedy). The use of 10%, 20%, and 30% water hyacinth flour tends to be better than feed without water hyacinth. This shows that the food substances contained in water hyacinth can be utilized by fish. According to the results of the analysis, the protein content of fermented water hyacinth flour was 14.20%. The protein requirement for catfish feed according to Sachwan (1996) was 30-35%. the trend of increasing weight to the level of use of P3 (30%) was 13.58 g, where the optimal increase in weight at P2 (20%) was 14.00 g, when compared to the weight on feed without water hyacinth flour.

The results of the analysis of diversity showed that there were no significant differences between treatments. This indicated that water hyacinth flour could be used in making feed up to a level of 30%.

The results of the analysis based on the growth rate of the specific growth rate of catfish in each treatment during the study can be seen in Table 4.

Table 4. Specific growth rate (%) of catfish in each treatment

Test	Treatment (fermentation of water hyacinth flour)			
	P0 (0%)	P1 (10%)	P2 (20%)	P3 (30%)
1	0,42	8,82	3,42	1,71
2	0,77	0,67	2,01	2,47
3	2,06	1,91	0,07	2,02
4	8,60	1,86	2,94	2,03
Total	11,85	13,27	8,44	8,22
Average	2,96	3,32	2,11	2,06

The average specific growth rate of catfish seeds in each treatment during the study was the highest in P1 (10%) of 3.32% and the lowest in treatment P3 (30%) of 2.06%. It is suspected that the feed containing fermented water hyacinth flour (10%) had a major influence on the growth of catfish seeds compared to treatments P0 (0%), P2 (20%), and P3 (30%). The growth rate of the seeds catfish at P2 and P3 tends to decrease. In this case the use of water hyacinth flour in feed for catfish seeds can increase optimal growth to P1 (10%), it is suspected that feed containing high water hyacinth flour is less desirable and is not digested properly, because this catfish is a carnivore that has a small intestine. short to difficult to digest crude fiber from water hyacinth feed.

feed efficiency

The results of calculating the efficiency of catfish feed in each treatment during the study can be seen in Table 5.

Table 5. Feed efficiency (%) of catfish in each treatment during the study

Test	Feed efficiency (water hyacinth fermentation)			
	Control (0%)	P1 (10%)	P2 (20%)	P3 (30%)
1	0,69	14,59	19,26	6,28
2	9,32	5,21	13,86	8,86
3	4,62	16,34	-5,24	13,10
4	7,46	12,27	20,07	11,72
Total	22,08	48,42	47,95	39,96
Average	5,52	12,10	11,99	9,99

The average efficiency of feeding ranged from 5.52% (P0 0%) to 12.10% (P1 10%). The effect of treatment on the efficiency of feeding was clarified by statistical analysis in which the list of variance is listed in Appendix 3.

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Based on the results of the analysis of variance, it appears that the treatment had no significant effect (P>0.05) on the efficiency of feeding the catfish fry.

Although it is known that between 0%, 10%, 20%, and 30% treatments, the results did not have a significant effect (P> 0.05), but the use of water hyacinth flour in P3 feed (30%) was 9.99% had feeding efficiency which tends to be higher than feed without using water hyacinth flour (5.52%). While the use of water hyacinth flour of 10% in treatment P1 has a value of feeding efficiency which tends to be higher at 12.10%.

The low value of efficiency of feeding in treatment P0 (0%) of 5.52% feed affected the protein stored in the body of catfish fry by 12.06% during the study compared to the treatment of water hyacinth flour feed P1 (14.23%), P2 (14.97%), and P3 (16.02%) (Appendix 4). It is suspected that catfish seeds are adaptive to vegetable feeds such as water hyacinth flour.

The lower the feed efficiency value, the lower the protein quality of the ration. According to Tacon (1982), crude fiber in fish seed feed should not exceed 4%, because it will reduce protein quality.

The crude fiber content in feed without water hyacinth meal was high at 1.75% compared to feed water hyacinth flour P1 (1.49%), P2 (1.69%), and P3 (1.63%) (Table 3) so that a lot of feed is wasted inedible, because it is not completely digested by the fish seeds. Feeding efficiency is influenced by several factors including: the amount of feeding, protein consumption, protein quality, energy and protein balance (Wahju, 1972). Feeding efficiency has a significant relationship with the quality and amount of feed, that is, the higher the quality and consumption of feed, the higher the efficiency of feeding, so that growth increases.

Protein Retention

Protein retention is an illustration of the amount of protein provided, which can be absorbed and used to build or repair damaged body cells, and is used by the fish's body for daily metabolism. According to Dani (2005) that the speed of fish growth is determined by the amount of protein that can be absorbed and utilized by fish as a building material. Therefore, in order for fish to grow normally, the feed given must have sufficient energy content to meet the energy needs of metabolism and have a protein content that is high enough to meet the needs for cell development. new body cells.

The results of calculating catfish protein retention in each treatment during the study can be seen in Table 6.

Table 6. Retention of catfish protein(%) in each treatment during the study

Test	Treatment (fermented water hyacinth flour)			
	Control (0%)	P1 (10%)	P2 (20%)	P3 (30%)
1	7,16	13,73	13,67	10,04
2	8,30	10,83	11,92	11,00
3	7,81	13,53	8,36	11,74
4	8,05	11,92	13,75	12,05
Total	31,32	50,01	47,70	44,84
Average	7,83	12,50	11,93	11,21

In this study, the high crude fiber content in feed P0 (0%) of 1.75% could reduce the palatability of the feed, even in feed P2 (20%) the amount of feed given tended to be the highest (153.83 g), the crude fiber content was also relatively high at P2 (20%) which is equal to 1.69% after P0 (0%). The protein content of the feed consumed was highest in the P2 treatment (20%) of 12.67% (Appendix 4). Increasing the feed consumed with good quality will provide an opportunity for the livestock body to retain more nutrients, so that the protein needs for growth are met (Wahju, 1972). As for the relatively low feed quality (protein content) of feed P0 (0%) (3.80%), it is suspected that the high crude fiber content in P0 (1.75%) causes low digestibility, and has an impact on the efficiency of feeding P0 (5 ,52%).

Catfish Seed Graduation (Clarias batracus)

The survival rate of catfish seeds during the study can be seen in Table 7.

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Table 7. Survival (%) of catfish seeds during the study

Test	Treatment (fermented water hyacinth flour)			
	Control (0%)	P1 (10%)	P2 (20%)	P3 (30%)
1	20	80	80	20
2	40	30	70	30
3	10	70	0	50
4	10	60	90	60
Total	80	240	240	160
Average	20	60	60	40

The survival rate for catfish ranges from 20-60%. The low survival rate of catfish indicated that the water hyacinth flour content in the feed increased the survival rate of catfish seeds to P3 (30%) compared to no water hyacinth feed treatment. It was suspected that feed containing fermented water hyacinth flour contained 14.20% protein which supported the growth and survival of the catfish fry. It can be seen that the protein in P2 and P3 increased by giving water hyacinth flour. Meanwhile, the protein in the water hyacinth feed also contains sufficient protein content to support the growth and survival of these catfish seeds, due to the fact that catfish are cannibals (eating each other). This is evident from the large number of pieces of fish found in the aquarium. In accordance with the opinion of Armiah (2010) that the factors that affect the high or low survival rate are biotic factors including competitors, density, population, age and the ability of organisms to adapt to the environment in cultivation, mortality is a determinant of the success of maintenance efforts.

The results of measuring water quality in each treatment during the study can be seen in Table 8.

Table 8. Data on the results of water quality measurements during the study

Treatment	Water quality parameters								
	Temperature (^{0}C)			pH			DO (ppm)		
	Start	Mid	End	Start	Mid	End	Start	Mid	End
Control	27	26	27	7	7,5	7,16	5,09	3,77	3,72
P1	27	26	27	7	7,5	7,14	4,52	3,67	4,08
P2	27	26	27	7	7,5	7,18	4,45	3,88	3,81
P3	27	26	27	7	7,5	7,21	4,76	3,98	3,98

Water quality measurements (temperature, pH, and DO) at each treatment during the study supported the life of catfish fry kept in aquariums. Temperature ranges from 26-27 oC, pH ranges from 7-7.5, and DO ranges from 3.67-5.09 ppm. Water temperature is a factor that influences activity, movement, fish eating, growth, and breeding. In general, the appropriate temperature for all fish in the tropics is 23.8-32.2 oC. Water temperature also greatly influences the amount of dissolved oxygen, carbon dioxide, nitrogen and in water, temperature also plays an important role in thermal stratification (Purwadaria, 1998). The lower the temperature, the more soluble gas content Wardoyo (1981) stated that generally fish can adapt to an environment that has an acidity range of 5-9, most freshwater fish species have a suitable pH between 6.5-7 ,5. Meanwhile, according to Lovell (1988) that the optimum water temperature for catfish is 26-32 oC with a pH of around 6.5-8.6, and dissolved oxygen of 3 mg/L.

V. CONCLUSION

1. Water hyacinth can be used in the manufacture of fermented water hyacinth flour for raw materials for catfish seed feed formulations.

2. The use of water hyacinth flour up to a level of 30% did not provide a significant difference between treatments on the growth and efficiency of feeding catfish fry.

VI. RECOMMENDATION

Fermented water hyacinth flour can be used as an alternative feed to support high growth in catfish at a rate of 10% usage in feed.

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VII. REFERENCES

[1] Bittner, A. 1989. Aquaculture. Bogor Indonesia Foundation. Jakarta. 265 p.

[2] Brett, J.R. dan T.D.D.Groves. 1979. Physiological Energetics dalam W.S. Hoar, D.J.Randall dan J. R. Brett (Eds): Fish Physiology Vol VIII. Academic Press, New York.

[3] Cho, C.Y., C.B. Cowey, dan R. Watanabe. 1985. Finfish Nutrition in Asia. Methodological Approaches Research Centre. Ottawa. 154 Hal.

[4] Dani, N., Agung B. P., and L. Shanti. 2005. Composition of Artificial Feed to Increase Growth and Protein Content of Tawes Fish (Puntius javanicus Blkr.). ISSN: 1411-321x. 7(2): 83-90.

[5] West Java Fisheries Service. 1996. West Java Fisheries Statistics 1995/1996. Department of Agriculture.

[6] Djajasewaka, H. 1985. Fish Feed. PT. Yasa Guna. Jakarta.

[7] Duthu, G. W. and Kilgen. 1975. Aquarium Studies on the Selectivity of 16 Aquatic Plants as Food by Fingerling Hybrids of the Cross Between *Cytenopharyngodon idella* and *Cyprinus carpio.* J. Fish Biol. 7: 203-208.

[8] Efawani, T. Dahril, R. M. Putra, Nuraini, and Dahlia. 2016. Utilization of Tofu Dregs and Water Hyacinth as Organic Feed for Catfish Cultivation in Teluk Uncle Village, Kampar Kiri District, Kampar District, Riau. LPPM UR. Pekanbaru. 22 Hal.

[9] Ensminger, M. E., J. E. Oldfield, danW. W. Heinemann. 1990. Feed and Nutrition. Second Edition. The Ensminger Publishing, Co.

[10] Harris, R. S. and E. Karmas. 1989. Evaluation of Nutrition in Food Processing. Second Issue. ITB, Bandung.

[11] Hartadi, H. S., Reksohadiprodjo, and A. D. Thillman. 1986. Feed Composition Table for Indonesia. Gadjah Mada University Press. UGM. Yogyakarta.

[12] Hepher, B. 1988.Nutrition on Pond Fishes. Cambridge University Press, Great Britain.

[13] Hoar, W.S., D.J. Randall, dan J.R. Brett. 1979. Fish Physiology Volume VIII. Academic Press.Inc.

[14] Ichwan, M. 1997. The Relationship of Food Eaten by Motan Fish with its Natural Environment in Lake Baru, Buluh Cina Village, Siak Hulu District, Kampar Regency, Riau Province. Essay. Faculty of Fisheries, University of Riau, Pekanbaru. 64 p. (Unpublished).

[15] Isnansetyo, A. 1992. Artemia Nutrition which is Enriched with Omega-3 Essential Fatty Acids. Marine Cultivation Bulletin. 5:20-50.

[16] Lovell, R. T. 1988. Nutrition and Feeding of Fish. Van Nostrand Reinbold. New York. P. 11-19.

[17] Mudjiman, A. 1984. Fish Food. Independent Spreader, Jakarta.

[18] Mundriyanto, H., Rsmaedi, Sularto, and O. Praseno. 1996. Effect of Feeding Method on the Growth of Tilapia. Indonesian Fisheries Research Journal.2(3): 8-25.

[19] N. R. C. 1993. Nutrient Requirements of Warm water Fishes and Shelfish. Nutritional Academy of Sciences. Washington DC. 181 Hal.

[20] Purwadaria, T. A. P. 1998. Correlation Between Mananase and Cellulase Enzyme Activities on Fermented Oil Palm Mud Fibers with Aspergillus niger. JITV. 3: 230-236.

[21] Saanin, H. 1984. Taxonomy and Key Identification of Fish. Binacipta, Jakarta. 245 p.

[22] Schneider, B. H. dan W.P. Flatt. 1975.The Evaluation of Feeds Through Digestibility Experiment. The University of Georgia Press, New York.Rice Rest.Inst. Los Banos. Philippines. Hal.407-418.

[23] Tacon, A.G.J. 1986. The Nutritional of Feeding of Farmed Fish and Shrimp.FAO of the United Nations. Brazil.117 Hal.

[24] Vahl, O. 1979.An Hypothesis on the Control of Feed Intake in Fish. Aquaculture.17:221-229.

[25] Wang, J.Q., S.A. Flichinger, K.Be, Y. Liu, and H. Xu. 1989. Daily Food Consumption and Feeding Rhythm of Silver Carp (*Hypophthalmichthys molitrix*) During FrytoFingerling Period. Aquaculture. 83:73-79.

[26] Wardoyo, S. T. H. 1981. Water Quality Criteria for Agricultural and Fishery Training Purposes. Environmental Impact Analysis. PPLH-UNDP-PUSDI-PSL, IPB, Bogor. 40 p.