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Application of the Hormone rEIGH (Recombinant Growth Hormone) in Gel Feed in Spurring the Growth Rate of Male Gift Tilapia (Oreochromis niloticus) Sex Reversal Results

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ABSTRACT

This study aims to analyze the efficiency of gel feed as a growth hormone carrier agent on survival rate, relative growth rate, feed conversion ratio (FCR), feed consumption rate, from the average condition factor of male gift tilapia resulting from sex reversal treated with rEIGH hormone. using gel feed at different doses. This research was conducted in April-May 2017 at the Hatchery of the Faculty of Marine Science and Fisheries, Hasanuddin University, Makassar. The test animals used were tilapia seeds aged 57 days which were stocked at a density of 22 fish/aquarium with a size of 37x40x34 cm. The test feed given was gel feed containing different rEIGH hormone doses. Parameters measured were survival, relative growth, food conversion ratio (FCR), feed consumption rate, and condition factors. This study used a completely randomized design (CRD) with 4 treatments and 3 replications. Gel feed containing rEIGH at doses of 0.015, 0.030 and 0.045 g/kg feed, as well as control (without rEIGH) were given three times a day for 1 month. The results of the analysis of variance (ANOVA) showed that the test feeds containing different rEIGH hormone doses had no significant effect ($p>0.05$) on survival, relative growth, FCR, feed consumption level, and the average condition factor of the tested fish.

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1. INTRODUCTION

GIFT (Genetically Improvement of Farmed Tilapia) Tilapia is the 3rd and 6th generation which were introduced to Indonesia in 1994 and 1996 from the Philippines, through the Bogor Freshwater Fisheries Research Institute (Balitkanwar) as a member of the INGA (International Network for Genetics). in Aquaculture). GIFT tilapia is a superior tilapia produced from improving the genetic quality of tilapia from 8 countries (Taiwan, Egypt, Thailand, Ghana, Singapore, Israel, Senegal, Kenya) through breeding programs, namely crosses and family selection.

Growth is defined as an increase in size, both length and weight.
Growth in organisms can occur simply by increasing the number of cells, and can also occur as a result of increasing cell size so to get good growth in fish, providing good feed is one thing that can be done.

Feed is the main energy source for fish metabolism. As animals that live in aquatic environments where the source of carbohydrates is less than on land which is a source of energy for fish metabolism. Fish adapt by using energy that comes from protein and fat. The need for protein is influenced by various factors including fish size, water temperature, feed levels, energy content in digestible feed, and the quality of the protein contained (Furuichi, 1988 in Anonymous, 2016). good for fish which are usually made by themselves in order to find out what mixture is contained in one of the artificial feeds that is being developed at this time and can be tried, namely gel feed.

Gel feed is artificial feed formulated from several quality, affordable and environmentally friendly raw materials using seaweed flour as a thickening agent and made by cooking and has a water content of around 50-70% (Saade et al., 2013)) According to Ballestrazzi et al. (1994), who explained that the retention of a protein is a parameter to show the magnitude of the contribution of protein consumed in feed to the increase in body protein. Protein retention needs special attention to see the contribution of protein consumed in feed to fish body weight gain. The protein retention value also indicates the quality of the protein contained in the feed, the higher the protein retention value, the better the quality of the feed.

Tilapia will show good growth if given a balanced feed formulation, which contains ingredients such as protein, carbohydrates, fats, vitamins, minerals, and fiber. According to Ballestrazzi et al. (1994), who explained that the retention of a protein is a parameter to show the magnitude of the contribution of protein consumed in feed to the increase in body protein. Protein retention needs special attention to see the contribution of protein consumed in feed to fish body weight gain. The protein retention value also indicates the quality of the protein contained in the feed, the higher the protein retention value, the better the quality of the feed.

Table 1. The nutritional needs of tilapia

Protein content	Number of needs	reference
Proteins	Larvae 35 %	Santiago et al. (1982)
	Seed-Consumption 25-30 %	Santiago et al. (1986)
Amino acid		Santiago et al. (1986)
Arginine	4.2 %	
histidine	1.7 %	
Isoleucine	3.1 %	
leucine	3.4 %	
Lysine	5.1 %	
Metione + Cystin Phenylalanine	+3.2 % (Cys 0.5)	
Tyrosine Thereonin	5.5 % (Tyr 1.8)	
tryptophan	3.8 %	
Valin	1.0 %	
	2.8 %	
Fat 6-10%	6-10 %	
Essential fatty acids (1982)	0.5 %	Jauncey & Ross
Carbohydrate Phosphorus 30-40 %	<0.9 %	Takeuchi et al. (1982
Carbohydrate	30-40 %	Watanabe et al. (1980)
Digestibility of energy (DE)	2500 – 4300 Kcal/kg	Jauncey & Ross (1982)

Source: BBAT Sukabumi (2005) and Indrayani (2011) in Anonymous (2016).

2. METHOD

2.1 Types of research

The research method used in this study is the experimental method. The experimental method is a form of observation under artificial conditions, where these conditions are created and regulated by the researcher. That is, basically conducting an experiment to see the results, and the results of the experiment will confirm how the causal position is between the variables being investigated

2.2 Research Variables

The variables in the study consisted of independent variables which were GIFT O tilapia fish with a feeding trial.

2.3 Research design

This study used a completely randomized design (CRD) with 4 treatments and 3 replications. Gel feed containing rEIGH at doses of 0.015, 0.030 and 0.045 g/kg feed, as well as control (without

rEIGH) were given three times a day for 1 month. The results of the analysis of variance (ANOVA) showed that the test feeds containing different rEIGH hormone doses had no significant effect (p>0.05) on survival, relative growth, FCR, feed consumption level, and the average condition factor of the tested fish.

2.4 Sampling location

The research sample to be carried out uses the GIFT tilapia species.

2.5 Time and Place of Research.

This research was conducted at the Hatchery of the Faculty of Marine Science and Fisheries, Hasanuddin University, Makassar, South Sulawesi Province in April-May 2017. Nutritional analysis and feed preparation were carried out at the Animal Feed Chemistry Laboratory, Faculty of Animal Husbandry and Laboratory of Nutrition and Feed Management Technology, Faculty of Science Maritime Affairs and Fisheries, Hasanuddin University.

2.6 Tools and materials

The following tools are used in the fish test: Electric digital scales 500 g Measuring feed raw materials; Aquarium 37 x 40 x 34 cm; pH/litmus paper; Spectrophotometer Spectonic; Feed box 10 x 7.5 x 6 cm; Quantum gas stove Apparatus for cooking test feed; Aluminum blade/cutter Test feed cutter; Ceramic Mortar.

The materials used in the tests: GIFT tilapia O. niloticus As a test fish; Fresh water as media for test fish; Label Paper Marking on the container; ATK supplies Notebook & pen Recording research activities; Gel Feed As a test feed.

2.7 Research procedure

This research consists of two stages, namely the preparation stage and the implementation stage. The preparatory stage consists of processing raw materials, making test feed, preparing research tools and containers, acclimatizing test fish. While the implementation stage consists of raising test fish, giving test feed, and measuring water quality. Observation of the weight and measurement of the seeds of Gift tilapia (O. niloticus) was carried out once every 10 days during sampling.

2.8 Data analysis.

To analyze the effect of treatment on survival, relative growth, feed conversion ratio, feed consumption rate, and condition factors of the tested fish after being given gel feed containing rEIGH growth hormone, analysis of variance (ANOVA) was used, then the influential data was continued with the W test. -Tuckey to analyze which treatment is best.

3. RESULTS AND DISCUSSION

3.1 Research result

3.1.1 Survival, Relative Weight Growth and FCR

The growth of different rEIGH on the test feed did not have a significant effect (p>0.05) on the average survival of the test fish. The same survival rates in this study indicated that all the tested feeds had the same nutrient contribution in maintaining the viability of the test fish. In this study, the feeding was carried out three times a day and given in satiation (until full), so that the needs of the test fish for the test feed could be fulfilled. the test did not give a significant effect on the average relative growth rate of the tested fish. The average feed conversion rate of test fish in each treatment ranged from 2.99–3.91%.

Based on the results of the analysis of variance (Anova) that has been carried out, it shows that the addition of different rEIGH growth hormone to the test feed does not have a significant effect (p>0.05) on the average feed conversion of the test fish. Feed conversion is the ratio between the amount of feed given and the weight of the fish produced. The smaller the value of feed conversion means the efficiency level of feed utilization is better, conversely if the feed conversion is large, the efficiency level of feed utilization is not good.

According to Iskandar and Elrifadah (2015), which states that whether or not a feed quality is not only seen from the feed conversion value, but can also be shown from the value of feed efficiency. The value of feed efficiency is obtained from the results of a comparison between the body weight gain of the fish and the amount of feed consumed by the fish during the rearing period. The greater the feed efficiency value, the more efficient the fish are in utilizing the feed consumed for their growth.

3.1.2 Feed consumption and condition factors.

The average feed consumption rate of the test fish for 30 days of rearing. The results of the analysis of variance (ANOVA) showed that the addition of different rEIGH growth hormone to the test fish did not have a significant effect on the average feed consumption level of the test fish. The process of eating in fish starts from the level of appetite consumption, then continues with the response to stimulation and finding sources of stimulation, determining the location, type of feed, and catching feed. If the taste of the feed is in accordance with the wishes of the fish, then the feed will be consumed. Conversely, if the taste of the feed is not good, then the feed will be left or not eaten. The average level of feed consumption between each treatment was almost the same and not much different (p>0.05).

Table 2. Amount of feed consumed by test fish fed gel with different doses of rEIGH hormone.

Hormone dosage (%)	Feed consumption (g) ± SD	
	Gross weight	Dry Weight
A (0)	619.40 ± 11.25a	129.21 ± 2.35 B
B(0.015)	619.03 ± 1.85a	130.86 ± 0.39
C(0.030)	619.50 ± 6.81a	127.56 ± 1.40
D(0.045)	613.46 ± 3.66a	147.54 ± 0.88

The average condition factor of the test fish for 30 days of rearing. The results of the analysis of variance (ANOVA) that has been carried out show that the addition of rEIGH growth hormone at different doses to the test feed does not have a significant effect (p>0.05) on the average condition factor. average test fish.

Table 3. The average condition factor of the tested fish fed with gel feed with doses different rEIGH hormones.

Hormone dosage (%)	FK (%) ± SD
A (0)	31.56 ± 0.84
B(0.015)	32.68 ± 2.09
C(0.030)	33.49 ± 2.05
D(0.045)	33.35 ± 0.88

3.1.3 Water Quality Analysis

The range of results of the analysis of water quality parameters includes temperature, pH, ammonia, and dissolved oxygen as measured at the Productivity and Water Quality Laboratory, Hasanuddin University.

Table 4. Water quality parameters includes temperature, pH, ammonia, and dissolved oxygen

Dose hormone (%)	Water quality parameter values			
	Temperature	(0C) Dissolved Oxygen pH (ppm)	Dissolved oxygen (ppm)	NH3 (ppm)
A (0)	25 – 29	6.7 – 7.0	4.48 – 8.3	0.002 – 0.064
B(0.015)	25 – 29	6.7 – 7.0	5.12 – 6.4	002 – 0.013
C(0.030)	25 – 29 6	6.7 – 7.0	5.12 – 6.08	0.002 – 0.013
D(0.045)	25 – 29	6.7 – 7.0	4.48 – 6.4	0.003 – 0.013
Optimum	25-30a	7.0 – 8.0a	3.59-9.65b	<0.3 ppm

Note: a. Djarijah (2002)
b. Handayani (2006)
c. Cholik et al. (1986).

The water quality during maintenance was still in optimal conditions in each test container, this was because the maintenance media was controlled, so that the water quality remained in optimal conditions, thus creating an environment suitable for the test fish habitat. During maintenance the temperature was recorded between 25-29°C.

3.2 Discussion

This study aims to analyze the efficiency of gel feed as a growth hormone carrier agent on survival rates, relative growth rates, feed conversion ratios, feed consumption rates, and average condition factors for male gift tilapia resulting from sex reversal treated with rEIGH hormone using gel feed at different doses.

The results of this study are expected to be one of the reference materials in tilapia maintenance to stimulate the growth process quickly and can provide knowledge in assisting

aquaculture activities so as to minimize feed consumption levels and the length of the rearing process.

Gel feed is one of the practical artificial feeds given to cultivators because the raw materials used in gel feed formulations are easy to obtain and do not require a long time or are efficient in the manufacturing process. The results of another study showing different growth were Muhammad's first study (2014) which observed "Growth response of red tilapia fed feed containing recombinant growth hormone at different doses", stated that differences in growth response between fish given rEIGH and controls were seen to start second to eighth week of maintenance. At doses of 0.03, 0.30 and 3.00 mg/kg feed increased growth by 24.07%, 27.66% and 31.67% respectively compared to control fish (without adding egg yolk).

4. CONCLUSION

Based on the results of this study it can be concluded that the survival rate, relative weight growth rate, FCR, feed consumption rate, and average condition factor GIFT tilapia given different rEIGH hormone treatments in gel feed showed no significant effect either between treatment or with control. Treatment of rEIGH hormone on gel feed did not affect survival rates, relative growth rates, FCR, feed consumption rates, and average condition factors for GIFT tilapia reared for 30 days.

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Based on the results of this study, it is suggested that the use of rEIGH growth hormone in gel feed should be measured for the absorption of the hormone content in it and it is necessary to re-examine at relatively higher doses than before to see a better effect as a growth hormone carrier agent.

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