

# THE EFFECT OF ADDING AMINO ACID (LYSINE) TO FEED THE GROWTH PERFORMANCE OF GOURAMI

Silvana Wahyu Nurkartika<sup>1</sup> and Junianto<sup>2</sup>

<sup>1</sup> Student, Faculty of Fisheries and Marine Science, Padjadjaran University, Indonesia

<sup>2</sup> Lecture, Faculty of Fisheries and Marine Science, Padjadjaran University, Indonesia

## ABSTRACT

Gourami is generally cultivated and is a mainstay as a source of animal protein, but it still faces obstacles in terms of cultivation, namely slow growth, and low survival. A solution is needed to help the growth of gourami, one of which is feeding. Feed is one of the most important factors affecting the growth and survival of fish. Optimal feeding will result in good growth. Because one of the factors inhibiting the growth of gourami is feed. The purpose of this article is to study the effect of adding feed amino acids (lysine) on the growth performance of gourami. The conclusion of this article is that amino acid (lysine) can help the growth of gourami by adding it to commercial feed. The slow growth of gourami which was fed without the addition of the amino acid pure lysine may be related to an imbalance in the amino acid composition of the experimental feed. It cannot be denied that the addition of amino acid (lysine) to gourami feed can help its growth become faster.

## Kata Kunci

Amino Acids, Feed, Gourami, Growth

## I. INTRODUCTION GOURAMI FISH GROWTH

Gourami is a freshwater fish that has high commercial value compared to other freshwater fish [1]. The Ministry of Fisheries and Marine Affairs (2015) explained that the amount of gourami production in 2010 reached 55,331 tons and continued to increase until 2012 with a total production of 82,794 tons, whereas when viewed from the production value, it can be seen that gourami is a pond aquaculture production with the highest value compared to fish. Other pond cultivation, namely in 2011 reached Rp. 137,292,865,980, - [2]. Although it has long been cultivated commercially, gourami still faces obstacles in cultivation, namely slow growth and low survival. Factors that affect the slow growth rate are poor seed quality, an unfavorable environment, and feeding that is not in accordance with the needs [3].

The fish feed formula must contain a sufficient source of energy and essential amino acids, essential fatty acids, certain vitamins, and minerals to promote fish growth. The nutritional value of protein in each fish can be determined by the amino acid composition [4]. The balance of essential amino acids has a major influence on the effectiveness of using feed protein for growth. Lysine is one of the essential amino acids in fish. In addition, lysine is also a raw material for feed sources of protein, especially from vegetable ingredients. The need for lysine in each fish is very important because it can be used as a basis for determining the composition of the essential acids needed in feed manufacture. The slow growth of fish fed without the addition of the amino acid pure lysine may be related to an imbalance in the amino acid composition in the experimental feed. The limiter in this case becomes amino acids. Meanwhile, the content of other amino acids which is sufficient or even more cannot be utilized to compile body protein (growth) due to a limited population, which in turn results in slow fish growth [3]. Free amino acids in the form of glutamine, glutamate, and taurine are feed additives that can improve fish growth performance [1,4].

## II. GOURAMI FISH GROWTH

### 2.1 Survival Rate

The survival rate is one of the parameters used in a study. This parameter is by observing the growth of gourami every day. This is done to see the development of the addition of amino acids in carp feed. The success in fish survival is determined by stimulation when the food has nutritional requirements. The requirements for nutritional content are protein, fat, carbohydrates, vitamins, and minerals. Also, there are physical aspects that need to be fulfilled with the shape, size of the food, the technique of offering food, and the frequency of offering food.

### 2.2 Feed Digestibility

Lysine is an essential amino acid that functions to provide energy through the process of transamination, deamination, and entry into the Krebs cycle. In the preparation of the fish feed, we needed to pay attention to the balance between protein and energy [16,17]. Using feed with low energy content can cause the fish to use some of the protein as a source of energy for metabolism, whereas high energy content in the feed can limit the amount of consumed food. The lower the amount of feed consumed, the lower the digestibility value [9].

The feed consumed by fish will undergo a digestive process before the feed is absorbed into the bloodstream. The higher the feed digestibility value, the greater the opportunity to use feed as an energy source and fish growth. Based on the results of the review conducted by Usman (2014), it is said that the value of feed digestibility in fish that has been added with amino acids has a high value [5]. One of the causes of this low digestibility value can be due to the high content of nucleic acids in the feed. Also, Schneider et al. (2004) stated that SPC has a low digestibility value compared to other protein sources due to the presence of cell walls and high nucleic acid content. This wall is composed of complex heteropolysaccharides in the structure of complex carbohydrates and proteins such as mannoproteins and glucans which are difficult to swallow by fish. Also, Lee (2002) states that the high ash content in the material can harm the digestibility of nutrients and feed ingredients.

Food substance digestibility is defined as the amount of food that is not excreted through feces with the assumption that the food substance is digested by the animal [8]. The measurement of digestibility is an attempt to determine the amount of feed substance absorbed in the digestive tract. The amount left in the animal's body or the amount of the digested feed ingredient is the difference between the excreted and consumed feed substance [9]. Rough protein digestibility is the amount of consumed feed protein that is not excreted through the feces. Digestible energy is the total feed energy consumed that is not excreted through feces. The lysine additions to commercial feed are expected to improve the digestibility of crude protein and thus, the energy of gourami.

### 2.3 The efficiency of Feed Utilization

The efficiency of feed use is used as one of the observations. This is done to see the effect of amino acids on gourami feed. It can be seen from the use of feed, that experiments can be carried out on the addition of lysine to each feed with different amounts. Besides, observe the growth of the gourami. Gourami which has a fast growth can be ascertained that the addition of lysine at a predetermined dose affects gourami. To overcome the optimal amino acid lysine in feed, analysis can be carried out using polynomial regression analysis. The fish growth response method to a given feed amino acid dose is the most commonly used and accurate. However, it depends on the growth response, because the amino acid requirement can be calculated statistically using polynomial regression analysis, "dashed line" regression analysis, or by specific mathematical methods.

The efficiency of the use of deficient amino acids in feed decreases with the protein content of the feed. In high feed protein content, more amino acids are reformed as an energy source. Thus, the expression of amino acid requirements in protein percent is more in line with feeds with low protein content. The slow growth of fish fed without the addition of the amino acid pure lysine may be related to an imbalance in the amino acid composition in the experimental feed. The limiter in this case becomes amino acids. Meanwhile, the content of other amino acids which is sufficient or even more cannot be utilized to compile body protein (growth) due to a limited population, which in turn results in slow fish growth.

### 2.4 Gourami Fish Growth Rate

The fish growth rate is one indicator that can be assessed in seeing the effect of feeding with the addition of amino acid (lysine) in gourami. In its growth, gourami has obstacles to grow fast. As it is not suitable for the environment, the amount of feed that is not suitable for the needs is the reason for the slow growth of gourami. However, if increasing the production of giant gourami is difficult, it may be possible to increase the growth of each fish. There are several known strategies for increasing fish growth rate. The use of recombinant growth hormone (rGH) in the fish diet is an easy method that can yield quick results in fish growth [8].

Cowey (1994) reported that diets with a high content of free amino acids (> 20%) were less effective for fish growth than diets whose feed protein only came from feed raw materials (whole protein). The efficiency of using pure amino acids by fish has also been reported depending on the protein content of the feed, where the efficiency is low at high feed protein content and vice versa (Williams et al., 2001). This is also related to the faster absorption rate of free amino acids compared to amino acids from protein.

### III. Conclusion

The conclusion of this article is that amino acid (lysine) can help the growth of gouramy by adding it to commercial feed. The slow growth of gouramy which were fed without the addition of the amino acid pure lysine may be related to an imbalance in the amino acid composition of the experimental feed. It cannot be denied that the addition of amino acid (lysine) to gouramy feed can help its growth become faster.

### References

- [1] Yuli Andriani et al. (2018) "Kecernaan Pakan dan Kinerja Pertumbuhan Yuwana Ikan Gurami (*Osphronemus goramy*) Lacepede, 1801 Yang Diberi Pakan Dengan Penambahan Glutamin". *Jurnal Ikhtologi Indonesia*, 19 (1):1-11
- [2] Elisa N. Firtiana et al. (2014) "Efek Penambahan Senyawa Asam Amino Sulfonat Taurin Pada Pakan Komersil Terhadap Pertumbuhan dan Kelulushidupan Juvenile Ikan Gurami". *Jurnal Ilmiah: Biologi Eksperimen dan Keanekaragaman Hayati* Vol.2 No.2 November 2014: hal 63-67
- [3] Lina Wafia Asmi et al. (2017) "Resistensi Ikan Gurami (*Osphronemus gouramy*) Terhadap Infeksi *Aeromonas hydrophila* Setelah Perendaman Ekstrak Air Panas *Spirulina plantesis*". *Jurnal Biosains Pascasarjana* Vol. 19 (2017) pp
- [4] Giri. I. Nyoman et al. (2009) "Kandungan Asam Amino Lisin Optimal Dalam Pakan Untuk Pertumbuhan Benih Ikan Kerapu Sunu". *J. Ris. Akuakultur* Vol. 4 No. 3, Desember 2009: 357-366.
- [5] Apriliani Maranatha (2019) "Karakteristik Profil Asam Amino Pada Daging Ikan Patin (*Pangasius Sp.*) Berdasarkan Habitat".
- [6] Usman et al. (2014) "Performansi Pertumbuhan Ikan Bandeng Dengan Pemberian Pakan Tepung Bioflok Yang Disuplementasi Asam Amino Esensial". *J. Ris. Akuakultur* Vol. 9 No. 2 Tahun 2014: 271-282
- [7] Diah Oktavia Sari (2019) "Teknik Pembenhian Ikan Gurame (*Osphronemus Gouramy*) Di Unit Kegiatan Budidaya Air Tawar Sendang Sari".
- [8] Darmawan Setia Budi et al. (2015) "Growth Response and Feed Utilization of Giant Gourami (*Osphronemus goramy*) Juvenile Feeding Different Protein Levels of the Diets Supplemented with Recombinant Growth Hormone". *HAYATI Journal of Biosciences* January 2015 Vol. 22 No. 1, p 12-19 EISSN: 2086-4094
- [9] D Setiyawan et al. (2019) "Effect of lysine in addition to commercial feed on crude protein and the energy digestibility of gourami (*Osphronemus gouramy*)". *IOP Conf. Series: Earth and Environmental Science* 236 (2019) 012067
- [10] Dewi N Setyowati et al. (2007) "Survival Rate dan Growth of Post Larvae of Several Giant Gouramy (*Osphronemus goramy*) Subspecies". *Jurnal Perikanan (J. Fish. Sci.)* IX (1): 149-153
- [11] Netti Aryani et al. (2017) "Influence of Feeding Rate on the Growth, Feed Efficiency and Carcass Composition of the Giant Gourami (*Osphronemus goramy*)". *Pakistan J. Zool.*, vol. 49(5), pp 1775-1781, 2017.
- [12] Sukumaran Mithun et al. (2016) "Evaluation of gross protein and lipid requirements in formulated feed for honey gourami, *Trichogaster chuna* (Hamilton 1822)". *J World Aquacult Soc.* 2018;1-15.
- [13] A. Azrita et al. (2020) "Effects of Feeding Frequency on Growth Performance and Feed Conversion Ratio of Gurami Sago (*Osphronemus Goramy*) Fingerlings in A Recirculating Aquaculture Pond System". *IOP Conf. Series: Earth and Environmental Science* 430 (2020) 012029
- [14] Nasir Ahmad et al. (2017) "Pengaruh Kadar Protein Yang Berbeda Terhadap Pertumbuhan Ikan Gurami (*Osphronemus Gouramy*)". *JURNAL AGROQUA* Vol.15 No. 2 Tahun 2
- [15] Afrinda Maloho, Juliana, Mulis (2016) "Pengaruh Pemberian Jenis Pakan Berbeda terhadap Pertumbuhan dan Kelangsungan Hidup Benih Ikan Gurame (*Osphronemus gouramy*)". *Jurusan Budidaya Perairan, Fakultas Perikanan dan Ilmu Kelautan, UNG*
- [16] Yudha Galih Wibawa, Mohamad Amin, Marini Wijayanti (2018) "Pemeliharaan Benih Ikan Gurame (*Osphronemus Gouramy*) Dengan Frekuensi Pemberian Pakan Yang Berbeda". *Jurnal Akuakultur Rawa Indonesia*, 6(1) :28-36 (2018)
- [17] Gunawan a dan Munawwar Khalil (2015) "Analisa proksimat formulasi pakan pelet dengan penambahan bahan baku hewani yang berbeda". *Acta Aquatica* 2:1 (April, 2015): 23-30
- [18] Syahrizall, Z. Rustam dan S. Hajar (2015) "Pemeliharaan Ikan Gurami (*Osphronemus Gouramy Lac.*) Dalam Wadah Akuarium Diberi Pakan Cacing Sutra (*Tubifex Sp*) Pada Strata Vertikal". *Jurnal Ilmiah Universitas Batanghari Jambi* Vol.15 No.4 Tahun 2015
- [19] Ach. Khumaidi, Aris Hidayat (2018) "Identifikasi Penyebab Kematian Massal Ikan Gurami (*Osphronemus gouramy*) Di Sentra Budidaya Ikan Gurami, Desa Beji, Kecamatan Kedung Banteng, Kabupaten Banyumas, Jawa Tengah". *Journal of Aquaculture Science* Oktober 2018 vol 3 (2): 145-153
- [20] Mulyasari, Widanarni, Muhammad A. Suprayudi, Muhammad Zairin Jr., Mas T. Djoko Sunamo (2016) "Screening of probiotics from the digestive tract of gourami (*Osphronemus goramy*) and their potency to enhance the growth of tilapia (*Oreochromis niloticus*)". *AAFL Bioflux*, 2016, Volume 9, Issue 5
- [21] Weismann G. F. Lucas, Ockstan J. Kalesaran, Cyska Lumenta (2015) "Pertumbuhan dan kelangsungan hidup larva gurami (*Osphronemus gouramy*) dengan pemberian beberapa jenis pakan". *Jurnal Budidaya Perairan* Mei 2015 Vol. 3 No. 2: 19 - 28