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# THE EFFECT OF ANESTHESIA OF BASIL (*Ocimum basilicum*) LEAF EXTRACT WITH DIFFERENT DOSES ON THE SURVIVAL OF CATFISH (*Pangasius* sp.)

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## ABSTRACT

The purpose of this study was to determine the effect of anesthesia of basil leaf extract with different doses on the survival of striped catfish. This research was conducted in Kedungsari Village, North Magelang District, Magelang City, Jawa Tengah in January 2022. The study was carried out using a Completely Randomized Design (CRD) with 3 treatments and 4 replications. The treatments were anesthesia with doses of 10%, 15%, and 20%, the catfish that had fainted was put in Styrofoam for 7.5 hours. The variables observed included the duration of anesthesia, the duration of fainting, the length of recovery time, and survival. The results showed that the dose of basil leaf extract had the best concentration of basil leaf extract, which was 20% with 2.5 minutes of stunning time, 25.74 minutes of fainting time, and 6.13 minutes of recovery time. The highest survival rate of catfish using basil leaf extract was found at a concentration of 20%, 15% while the lowest survival rate was at a concentration of 10% treatment.

**Keywords:** Anesthesia, Basil Leaf Extract, Survival Rate, Catfish

## 1. INTRODUCTION

Striped catfish (*Pangasius* sp.) is one of the freshwater fish commodities in Indonesia. This fish is much favored by the public because it is thick-fleshed, slightly spiny, and has a delicious taste. The economic value of catfish ranges from IDR 35,000-45,000/kg besides the affordable price, it is also easy to cultivate on limited land and water sources[1]. Based on KKP[2], the national consumption size of striped catfish production has increased from 719,619.02 kg in 2015 to 1,027,032 tons in 2018. Live fish is believed to be healthier and free from preservatives, such as the use of formalin, which is currently rampant in Indonesian fishery products. The price of live fish is much higher than the price of dead fish. This can be used as a promising market opportunity.

Supporting this promising market opportunity requires the support of economical, effective, and efficient live fish transportation handling technology. Handling in the transportation system, according to Abid et al.[3] is necessary to maintain the survival rate of fish to their destination. Stress and physical exertion during the fish transportation process can cause the quality of the product to decrease. The consequence of this impacts the economic value of fish farming production.

One of the live fish transportation technologies according to Abid et al.[3] is a dry system without using water as a medium of transportation. In this system, fish are made in a state of unconsciousness (*anesthesia*), so that they can achieve a high standard of living outside the water medium. Fish anesthesia is an action that makes the condition of the fish body lose feeling due to low respiratory and metabolic activity, so the fish undergoes physiological changes from a conscious state to unconsciousness. Materials administered to biota generally work through nerve impulses by inhibiting sodium delivery through selective sodium

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ion channels in the membrane thereby reducing the metabolic rate. One of the plants that can be used as a stunning medium is basil leaves (*Ocimum* sp.).

Basil according to Idrus et al.[4] is a small plant whose leaves are usually eaten as fresh vegetables, easy to obtain, and cheap. The utilization of basil leaves has been carried out, namely as an aroma substitution in the manufacture of antioxidant herbal soap[4], testing the potential of basil leaf essential oil as a vegetable insecticide against fruit flies[5], and the effect of basil essential oil as an antidepressant in mice in terms of immobility time in the tail suspension test [6]. Another benefit of basil leaves is that they can be used as a medicine to cure several diseases, including headaches, coughs, diarrhea, and kidney failure because basil leaves contain active components.

According to Hendrawati[7], the components contained in basil leaves are tannins, flavonoids, steroids/triterpenoids, essential oils, hexauronic acid, pentose, xylose, methyl homoanisic acid, molludistin, and ursolic acid. The main component contained in the essential oil of basil leaves is eugenol. According to Sumira[8], eugenol in large quantities has properties as a stimulant, local anesthetic, carminative, antimitotic, antiseptic, and antispasmodic. The use of anesthetic agents according to Husen & Sharma[9] will reduce metabolic rate and oxygen demand, reduce general activity, increase ease of handling, and reduce the stress response that will occur in fish. The selection of anesthetics should consider various factors, including efficacy, cost, and ease of use, as well as toxicity to fish, humans, and the environment. Anesthetics are important to minimize stress and physical damage during the transportation process.

The reason for using basil leaves is that so far it is still rare for anesthesia to use basil leaves in the transportation of aquatic biota, especially catfish. This plant is not seasonal so it is not difficult to get this plant. In addition, natural anesthetic materials that have been studied to be applied in fish transportation include rubber seed extract, clove oil, cassava extract, and banana liver, which are thought to be used to stun fish[10]. Based on this, it is important for this study entitled "effect of anesthetizing basil leaf extract (*Ocimum basilicum*) with different doses on the survival of striped catfish (*Pangasius* sp.)".

## 2. RESEARCH METHOD

### Time and Place

The research was conducted in January 2022 in Kedung Sari Village, North Magelang Sub-district, Magelang City, Jawa Tengah.

### Methods

The method used in this research is an experimental method that is arranged using a Completely Randomized Design (CRD). This study consisted of 3 treatments with 4 replications and each treatment consisted of 1 catfish so the number of containers used was 12 pieces with a size of ±1500 g. The treatment given in this study by giving a dose of basil leaf extract, the following is the research treatment carried out:

P1 : The dosage of basil is 10%
P2 : The dosage of basil is 15%
P3 : The dosage of basil is 20%

This design is used because the environmental conditions, tools, materials, and media used are homogeneous; this experiment is carried out under controlled conditions and overall has the same chances[11].

### Data Analysis

Analysis of data obtained from observations during the study of the length of time of anesthesia, the length of time to faint, the length of time to recover, and survival. From the results of the data obtained, analysis of variance (ANOVA) was carried out and BNT or LSD further tests were carried out to determine differences between treatments, using the

SPSS 22 program with a confidence level of 95%.

## 3. RESULT AND DISCUSSION

### Length of Time for Stunning, Fish Recovery & Survival

Observations The length of time for stunning the best basil leaf extract catfish is 2.5 minutes, the length of time the best catfish faints is 25.74 minutes, and the length of time for the best recovery is 6.12 minutes. The best survival rate is obtained at a concentration of 20% while the lowest survival rate is in the 10% concentration treatment.

The results of striped catfish showed that the length of stunning time using basil leaf extract is best at 20% concentration with a time of 2.5 minutes, then 15% and 10% concentrations. These results indicate that the higher the concentration of basil leaf extract, the faster the stunning time, due to the higher content in it. This is following the statement of Hanum[12], which states that the greater the concentration of extract given, the faster the fainting time and the longer the conscious time required.

These results also show that stunning using basil leaf extract includes ideal anesthetic ingredients, this is by the Afandi[13], The ideal anesthetic is an anesthetic that can stun fish for less than 3 minutes and resuscitate them for approximately 5 minutes.

The stunning time of catfish is largely influenced by the content of chemical compounds saponin and essential oils that can paralyze the nervous and respiratory systems so that they can play a role in the anesthesia process. This is by Puspito[14]. The main content of essential oil is eugenol where eugenol's ability to block the transmission of nerve impulses and the active ingredients of saponin work by paralyzing the nervous and respiratory systems.

### Length of Fainting Time

The average fish is conscious at 16.4 minutes; the occurrence of fish consciousness is so fast due to the provision of low doses compared to other treatments. The 15% treatment made the fish conscious at 20.3 minutes and the 20% treatment was the best treatment with an average consciousness at 25.74 minutes. This proves that the treatment with a dose of 20% can make fish unconscious with the longest or best time compared to treatments with other doses. Increasing the dose of anesthetic will cause the fish to pass out longer[2]. The treatment of 20% concentration showed the longest fainting time.

From these results it can be concluded that the dose of anesthesia is directly proportional to the average length of time the catfish faints, the higher the dose of anesthesia used, the longer the average length of time the fish faints. This happens because catfish will regain consciousness when the anesthetic effect of basil leaf extract is lost, so the higher the dose of anesthesia given, the longer the fish will faint. When the influence of the anesthetic material begins to decrease, the fish will gradually recover consciousness[15]. This is also reinforced by Ningsih[16] that the higher the dose given, the longer the fainting time of the fish.

### Survival Rate

The best survival rate was obtained at a concentration of 20% while the lowest survival rate was at a concentration of 10%. It can be concluded that the dose of anesthesia is directly proportional to the average survival rate of catfish, the higher the dose of anesthesia used, the higher the average survival rate of fish. A high dose of anesthesia can maintain the survival of striped catfish and can reduce the metabolic rate and oxygen consumption to prevent the mortality rate of tilapia fish seeds during transportation[17].

The higher concentration of basil extract produces a long level, due to the hermetic effect of the anesthetic substance of the basil leaves[18]. Meanwhile, the low survival and mortality rate of catfish is

thought to occur due to the increased metabolism of fish when kept in Styrofoam for 7.5 hours, during which time the fish have begun to wake up but have not fully realized this is evidenced by the results of the length of time unconscious with an average time conscious in Styrofoam 16.4 minutes at a concentration of 10%, 20.35 minutes at a concentration of 15%, and 25.74 minutes at a concentration of 20%, this causes fish stress and death.

Zonneveld et al.[19], some of the factors that cause stress and death are increased fish metabolism. Fish that begin to realize, the metabolic process is increasing and the need for ready-to-use oxygen for respiration will also increase If the ready-to-use oxygen needed is very little, the fish will become weak and experience stress[20].

Striped catfish have an additional respiratory device located in the swimming bubble that can bind oxygen directly, but cannot be used because the mechanism of the additional respiratory device can only be used in hypoxic conditions and will develop a swimming bubble. Whereas in the anesthesia process, catfish are not in hypoxic conditions and catfish metabolism increases when the fish are already in styrofoam in dry conditions. This is also supported by the statement of Phuong et al.[21] that striped catfish can live in hypoxic conditions because they have a swimming bubble that functions to take oxygen from the air, so they can live and grow in low-oxygen media. However, hypoxic conditions will increase the frequency of air intake which requires energy so that it can reduce the growth rate of striped catfish[22].

The mechanism of fish respiration uses a swimming bubble, fish that are in a state of hypoxia take in oxygen and diffuse it through the wall of the swimming bubble, then oxygen enters through an expanding capillary network, and the air is taken as much as possible, then on the back wall of the swimming bubble there is a thin wall that functions as a means of secreting respiratory waste where carbon dioxide will be removed from the body[23].

## 4. CONCLUSION

Based on the results and discussion, it can be concluded that anesthesia with different doses has an effect on the length of time for stunning and the length of time for fainting, while the length of time for recovery and survival (SR) has no effect. Sedation with a dose concentration of 20% is considered the most effective or the best with a stunning time of 2.5 minutes, a fainting time of 25.74 minutes, a recovery time of 6.13 minutes, and a survival rate of 75%.

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