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The Effect of Tobacco Extract (*Nicotiana tobacum*) as A Anesthetic Material Against Hematological Conditions Gold Fish (*Cyprinus corpio*) With Method Dry Transport

Pengaruh Pemberian Ekstrak Tembakau (*Nicotiana Tobacum*) Sebagai Bahan Anastesi Terhadap Kondisi Hematologi Ikan Mas (*Cyprinus Corpio*) Dengan Metode Transportasi Kering

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ABSTRACT

The need for carp (*Cyprinus carpio*) from year to year continues to increase with the increase in population. Consumer demand for fish consumption has experienced a shift, from fresh (frozen) fish to live fish. The obstacles often faced by cultivators are death before the fish arrive at their destination, the cause of fish death is due to stress and physical damage due to mishandling. To avoid the high mortality rate of carp during the transportation process, fish entrepreneurs have begun to develop a dry transportation system, namely a system of transporting live fish using non-water transportation media. In the transportation of live fish without water media, the fish are made in a state of calm or stunning. Anesthesia can be done by giving an anesthetic in which the fish becomes unconscious during the transportation process. The advantage of stunning this fish is that it makes it easier to carry out the transportation process without water media, makes the fish not move much during the transportation process and minimizes the risk of fish being injured so as to allow a longer transportation time. One of the natural ingredients that can be used for anesthesia is tobacco (Nicotiana tabacum). The purpose of this study was to determine the effect of anesthetic tobacco extract (N. tobacum) on the hematological condition of carp (C. carpio) by dry transportation method. The treatments tested were soaking tobacco extract as fish anesthetic before transportation with different concentrations, namely, in treatment 1 (P1) without soaking tobacco extract, treatment 2 (P2) soaking tobacco extract 1 ml, treatment 3 (P3) soaking tobacco extract 2 ml, treatment (P4), soaking extract 3 ml. The results of this study that the use of tobacco leaf extract as an anesthetic in the dry transportation system causes hematological levels to increase and decrease but are still in normal levels, the best dose of tobacco extract is 1ml/L with a stunning speed of 917 minutes, recovery time is 239 minutes and has an SR value of 76%.

ABSTRAK

Kebutuhan ikan mas (*Cyprinus carpio*) dari tahun ketahun terus meningkat dengan bertambahnya jumlah penduduk. Permintaan konsumen terhadap ikan konsumsi sudah

mengalami pergeseran, dari ikan segar (beku) menjadi ikan hidup. Kendala yang sering dihadapi oleh pembudidaya adalah kematian sebelum ikan sampai di tempat tujuan, penyebab kematian ikan diakibatkan stres dan kerusakan fisik karena kesalahan penanganan. Untuk menghindari tingginya tingkat kematian ikan mas saat proses transportasi, pengusaha ikan mulai mengembangkan sistem transportasi kering, yaitu sistem pengangkutan ikan hidup dengan media pengangkutan yang bukan air. Pada transportasi ikan hidup tanpa media air, ikan dibuat dalam kondisi tenang atau pemingsangan. Anastesi dapat dilakukan dengan pemberian bahan bius dimana ikan menjadi tidak sadar pada saat proses transportasi berlangsung. Keuntungan dari pemingsangan ikan ini adalah memudahkan untuk melakukan proses pengangkutan tanpa media air, membuat ikan tidak banyak bergerak selama proses transportasi serta memperkecil resiko ikan terluka sehingga memungkinkan waktu transportasi yang lebih lama. Salah satu bahan alami yang dapat digunakan untuk anestesi yaitu tembakau (*Nicotiana tabacum*). Tujuan dari penelitian ini untuk mengetahui pengaruh pemberian anastesi ekstrak tembakau (*N. tobacum*) terhadap kondisi hematologi ikan mas (*C. carpio*) dengan metode transportasi kering. Perlakuan yang diuji cobakan yaitu perendaman ekstrak tembakau sebagai bahan anestesi ikan sebelum transportasi dengan konsentrasi yang berbeda yaitu, pada perlakuan 1 (P1) tanpa perendaman ekstrak tembakau, perlakuan 2 (P2) perendaman ekstrak tembakau 1 ml, perlakuan 3 (P3) perendaman ekstrak tembakau 2 ml, perlakuan (P4), perendaman ekstrak 3 ml. Hasil dari penelitian ini bahwa penggunaan ekstrak daun tembakau sebagai bahan anastesi pada sistem transportasi kering menyebabkan kadar hematologi mengalami peningkatan dan penurunan namun masih dalam kadar yang normal, dosis ekstrak tembakau yang terbaik yaitu 1ml/L dengan kecepatan pemingsangan 917 menit, waktu pulih sadar 239 menit serta memiliki nilai SR sebesar 76 %.

Kata Kunci	*Ikan Mas, Ekstrak Daun Tembakau, Metode Kering, Hematologi*
Keywords	*Carp, Tobacco Leaf Extract, Dry Method, Hematology*
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INTODUCTION

Carp (*Cyprinus carpio*) is a type of freshwater fish that is very popular with people, because its meat tastes very good and has high nutritional value. The need for goldfish continues to increase from year to year with increasing population (Wihardi et al., 2014). According to 2014 KKP data, goldfish production in West Nusa Tenggara province reached 3,458.92 tons (Statistik.kkp.go.id).

The increase in fish consumption is also accompanied by increased consumer awareness of food safety. Consumer demand for consumption fish has experienced a shift, from fresh (frozen) fish to live fish. This is because live fish apart from having good taste and quality, food safety is also guaranteed. An obstacle often faced by farmers is death before the fish reaches their destination. Where the causes of death include stress and physical damage due to mishandling. To overcome this, anesthesia during the transportation of live fish is absolutely necessary because the fish become resistant to environmental conditions during the transportation process (Cahyono et al., 2012).

One of the most effective ways to distribute fish is by transporting live fish. Fish transportation is usually carried out using a wet system and a dry system. To avoid the high death rate of goldfish during the transportation process, fish entrepreneurs are starting to develop dry transportation systems. Wimadani (2020), stated that transportation of live fish without water (dry system) is a system for transporting live fish using non-water transportation media. When transporting live fish without water, the fish are kept in a calm or unconscious condition. Dry system transportation of live fish has several advantages, namely it can reduce stress on fish, reduce metabolic rate and oxygen use, reduce mortality due to physical treatment (vibration, noise and light), does not produce feces and does not need water media so the carrying capacity is greater (Ahdiyah, 2011).

Anesthesia can be done by administering an anesthetic agent so that the fish becomes unconscious during the transportation process. According to Arsyad (2014), anesthesia in fish is influenced by the thickness of the skeletal skin covering the fish's nerves. The bigger the fish, the thicker the frame that covers the nerves, so the anesthesia process will take longer. The principle of anesthesia is to reduce the metabolism of an organism so that in minimum environmental conditions it is able to maintain its life longer. The advantage of stunning this fish is that it makes it easier for farmers to carry out the transportation process without water, makes the fish not move much during the transportation process and reduces the risk of the fish being injured, thereby allowing for a longer transportation time (Wimadani, 2020).

One natural ingredient that can be used for anesthesia is tobacco (*Nicotiana tabacum*). The use of tobacco as an anesthetic is a way to live and not experience stress during the transportation process. Based on the toxicity criteria of the Department of Agriculture's Pesticides Commission (1983), tobacco leaf extract is a pesticide that is classified as moderately potent. If the system for coordinating stimulation from the body's organs to the central nervous system is disturbed, it can cause loss of body balance, numbness and uncontrolled movements.

Therefore, the use of tobacco extract as an anesthetic agent can be carried out to determine the effect of giving tobacco extract as an anesthetic agent on the survival of goldfish that will be kept during the transportation process.

METHODS

Fish rearing activities from this research were carried out for 7 days, namely February 26 to March 7 at the Fish Production and Reproduction Laboratory, Department of Fisheries and Marine Sciences, Faculty of Agriculture, Mataram University. Extract making activities were carried out at the Analytical Chemistry Laboratory, Faculty of Mathematics and Natural Sciences, UNRAM. Meanwhile, fish hematology observation activities were carried out at the Fish Health Laboratory, Department of Fisheries and Marine Sciences, Mataram University.

This research was carried out using a Completely Randomized Design (CRD) method with 4 treatments and 3 replications so that there were 12 experimental units. The concentrations used in this research experiment used tobacco extract with concentrations: Treatment 1: 0 ml dose of tobacco extract as control, treatment 2: 1 ml/l dose of tobacco extract, treatment 3: 2 ml/l dose of tobacco extract, treatment 4: Tobacco extract dosage 3ml/l

The tools and materials used in this research are 45 L containers, aerators, microscopes, trays, syringes, cameras, stationery, calculators, vehicles, rulers, scales, thermoform boxes, erythrocyte pipettes, leukocyte pipettes, hemocytometers, ependorf tubes, jars, buckets, measuring cups, filters, pH meters, DO meters, thermometers, hand tally counters. Carp seeds measuring 7-10 cm, tobacco extract, blood, feed, fresh water, ice cubes, sawdust, hayem solution, turk solution, newspaper, 96% ethanol, distilled water, EDTA 10%.

Research Preparation

a. Preparation of containers

Before carrying out research, we first prepare a bucket container for anesthesia, a container for maintenance, a styrofoam box for transporting fish. The tools are washed clean and then dried until ready to use.

b. Providing goldfish seeds

The fish used are fish selected that are healthy, have no defects, have active movements and are responsive to stimuli. The fish were obtained from goldfish farmers in Lingsar. The fish used are alive and have just been taken from the pond, then anesthetized immediately after which they are transported from Lingsar, Narmada, Kopang, Central Lombok, Bartais, Bundaran Gerung Provincial Hospital, then end up back at the Aquaculture Laboratory, Mataram University.

c. Preparation of tobacco leaves

This tobacco leaf is a type of musk tobacco. Before use, the tobacco leaves are washed with fresh water and then cut into pieces. The pieces are dried in the sun for 4 to 5 days. After that, the dried tobacco leaves are made into powder using a blender).

d. Making tobacco extract

Tobacco leaf powder was weighed by how much to use. The tobacco powder used was 900 grams and 5 liters of 96% ethanol. The extraction container used is a snack jar with a capacity of 5L. Simplicia is extracted using a solvent which is stirred several times in the room, then the jar is covered with aluminum foil to avoid light or humidity and stored in a closed room. The extraction results were filtered using flannel cloth, then separated from the ethanol with a rotary evaporator after which it was injected using a GCMS device. The results obtained from this extraction were 450 ml of tobacco extract.

e. Provision of sawdust

The sawdust is made from teak wood and then to carry this powder we use plastic and send it in sacks. Before use, sawdust must be washed thoroughly using fresh water and then dried in the sun for 1 to 2 days depending on weather conditions..

Research Implementation

a. Anesthesia

The goldfish were put into buckets one by one, 10 of them into each container which had been given tobacco extract at different doses, then the time of fainting speed was observed in each treatment except for the control because the fish were not treated with tobacco extract.

b. Packaging

Sawdust is placed on the ice cubes evenly. Fish that have been stunned with tobacco leaf extract are then wrapped in newspaper and then placed in a styrofoam box containing ice and sawdust with an initial temperature of 15ºC. Each styrofoam box contains 10 fish. After that, sawdust is added on top, the Styrofoam box is closed tightly and taped. After the transportation process is carried out, the packaging is unpacked with a transportation time of 6 hours.

c. Transportation

The unconscious fish are then packaged for transportation. Transportation starts from Lingsar, Narmada, Kopang, Central Lombok, Bartais, Provincial Hospital, Gerung Roundabout, then ends back at the Aquaculture Laboratory. Mataram University.

d. How to wake up a fainted fish

The way to handle fish after anesthesia is to put the fish one by one into a container with new water and use aeration.

e. Hematological observation

Referring to research conducted by Fitria, (2019), red blood cell calculations can be done by:

1. Blood is sucked with a pipette containing a red stirrer to a scale of 0.5 (pipette to measure the number of red blood cells).
2. Hayem's solution is added to a scale of 101, stirring the blood in the pipette by swinging the hand holding the pipette in a figure eight shape for 3-5 minutes so that the blood is mixed evenly. Hayem's solution functions to kill white blood cells.

3. The first drop of blood solution in the pipette is discarded, then dripped onto the hemocytometer and covered with a cover glass.

The number of red blood cells was counted using a microscope at 400X magnification. The total number of erythrocytes is calculated as 10 small squares and converted according to the total number of small squares to obtain the number of red blood cells per ml.

Fish Culture

The first maintenance carried out is to prepare 12 aquariums that have been cleaned and filled with 20 liters of water, then aerate them. After the transportation time is complete, the goldfish seeds are taken and then put into the aquarium according to the treatment label, at the specified time and observed until the seeds regained consciousness and was maintained for 7 days accompanied by feeding twice a day, namely at 08.00 and 16.00. After 7 days of maintenance, repeated observations were carried out for hematological tests.

Parameter

a. Stunning speed

Observation of the speed of stunning of the fish was carried out after the fish was anesthetized and the time of fainting was recorded and the behavior of the goldfish was observed after the fish was anesthetized.

b. It took a long time to recover

Observations regarding the length of time for recovering to consciousness were carried out after the fish had finished being transported, after which the goldfish were taken and then put into a container box according to the treatment label that had been determined and observed until the fish recovered consciousness and its behavior was observed.

c. Hematological observation

Hematological observations took the form of counting total erythrocytes and total leukocytes and were carried out 3 times, namely when the fish had not been anesthetized, the second time after the fish had been transported and the third time after maintenance for 7 days.

d. Survival rate (SR)

Goldfish survival was observed after the study ended by comparing the number of fish at the beginning and end of the study, and calculated using the following formula (Effendy, 2013):

$$SR = \frac{Nt}{N_0} x100\%$$

Information:

SR = Survival rate

N_t = Number of individuals at the end of treatment (day t)

N_0 = Number of individuals at the start of the study (day 0)

e. Growth in absolute weight and absolute length

The absolute weight growth of this goldfish is calculated using a formula (Effendie, 1997)

W = Wt – Wo (g)

Keterangan:

W = absolute growth (g)

Wt = final weight (g)

Wo = initial weight (g)

Meanwhile, the absolute length increase is calculated using the formula Effendie (1997):

Pm = Lt - Lo

Pm = Absolute length increase (cm)

Lt = Final average length (cm)

Lo = Initial average length (cm).

f. Water Quality

As research supporting data, the water quality parameters observed were pH, temperature, DO. Measurements of pH, temperature, DO were carried out at the beginning and end of the study.

Data Analysis

The data analysis used in this research uses qualitative descriptive data, namely using data as a source to find the knowledge you want to know. Hematology test data obtained in this study was analyzed using the anova test (analysis of variance) with a 95% confidence interval. If the test results between treatments for the length of transportation time on the survival rate of goldfish seeds are significantly different, then a further Duncan test will be carried out.

RESULT AND DISCUSSION

Result

Stunning Speed Time

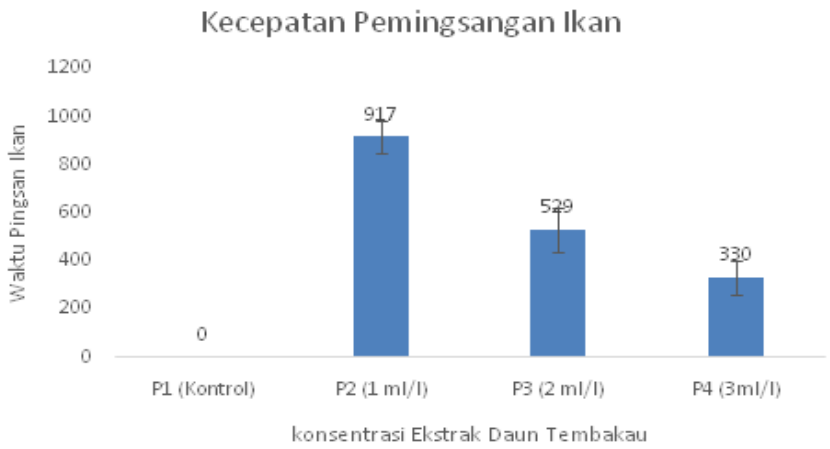


Figure 1. Fish Stunning Speed

Based on the results of data analysis (Figure 1), it can be seen that the treatments given provided different stun times so that the dose of tobacco extract for P2 was the treatment with the longest stun speed compared to treatments P3 and P4, whereas for P1 the stun speed was not calculated because the fish were not given treatment. The speed of stunning time for goldfish fry in this study ranged from 4 minutes 12 seconds to 16 minutes 30 seconds. The results of further tests on fish stunning speed showed that P1 was not significantly different from P2, while P2 was significantly different from P3, P3 was significantly different from P4, while P4 was significantly different from P1.

Long Time to Recover

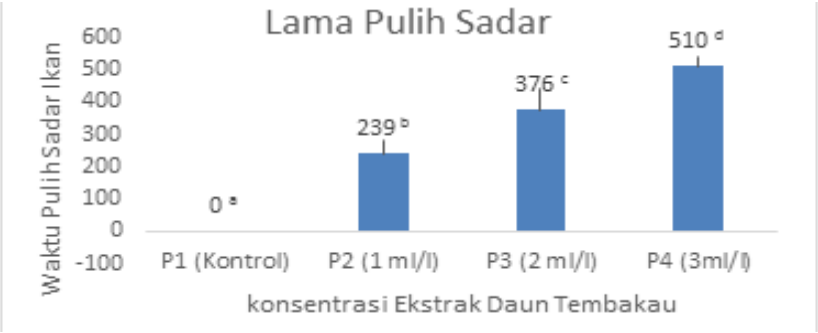


Figure 2. Long Time to Recover

In Figure 2, it can be seen that treatment P2 is the treatment with the fastest recovery time compared to P3 and P4, while P1 did not observe the time to recover consciousness because it was not treated (control). The speed of recovery time for goldfish fry in this study ranged from 3

minutes 10 seconds to 8 minutes 13 seconds. The time to recover consciousness of the fish after transportation showed that giving a dose of tobacco extract on the time to recover consciousness of the fish had a significantly different effect (P<0.05), where P1 was not significantly different from P2 while P2 was significantly different from P3, P3 was significantly different from P4 and P4 are significantly different from P_1.

Erythrocytes Before Transport

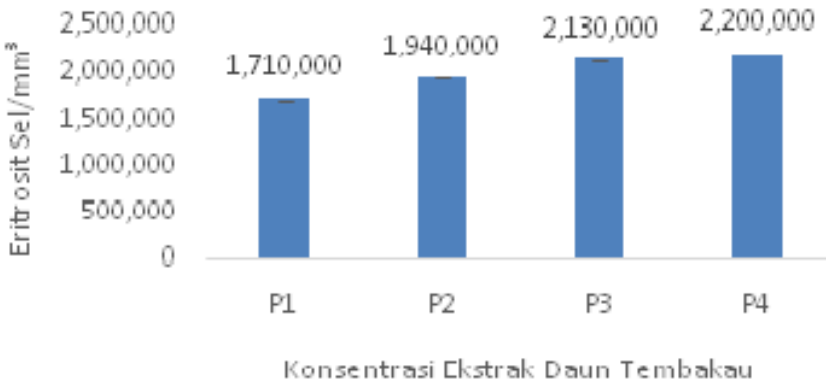


Figure 3. Erythrocytes Before Transport

Based on the results of data analysis (Figure 3), it can be seen that the erythrocyte value in this study has the lowest total value in P1, then for P2 it is 1,940,000, P3 is 2,130,000 while the highest value is shown in P4, namely 2,200,000.

Erythrocytes After Transport

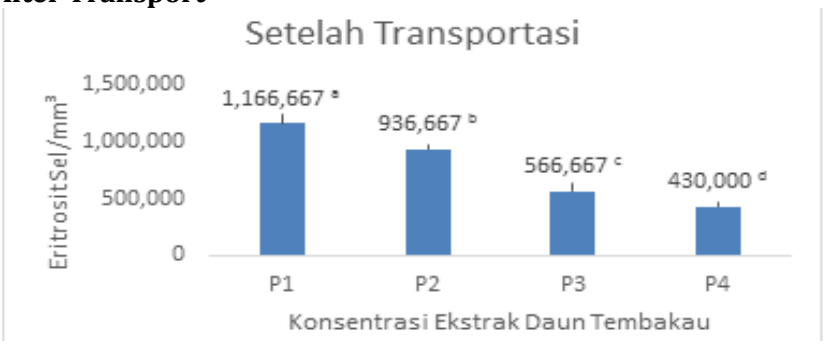


Figure 4. Erythrocytes After Transport

In Figure 4, it can be seen that the treatment given in calculating total erythrocytes after transportation shows that the erythrocyte value for each treatment has a different total value, where the erythrocyte value after transportation in this study for the highest value is shown at P1, namely 1,166,667, then followed by P2, namely 936,667, and for P3 the value is 566,667, while for P4 the lowest value is 430,000.

Erythrocytes After Maintenance

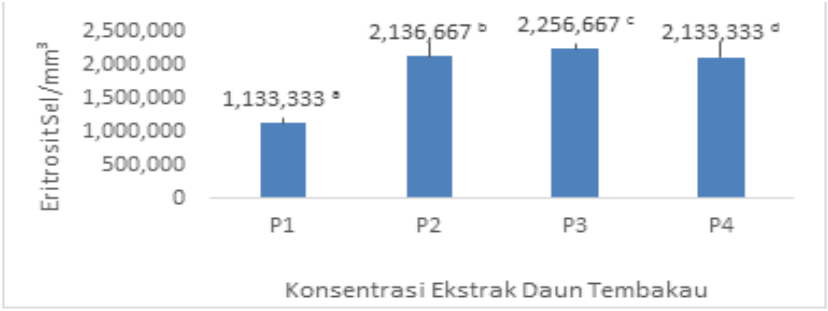


Figure 5. Erythrocytes After Maintenance

Based on the results of data analysis (Figure 5), it can be seen that the treatment given to the total erythrocyte count after transportation shows that the erythrocyte value for each procedure has a different value, the lowest value is shown in P1, namely 1,133,333, followed by P2 with a value of 2,136,667 and for P3, namely 2,256,667, while the highest value is shown at P42,133,333.

Leukocytes Before Transport

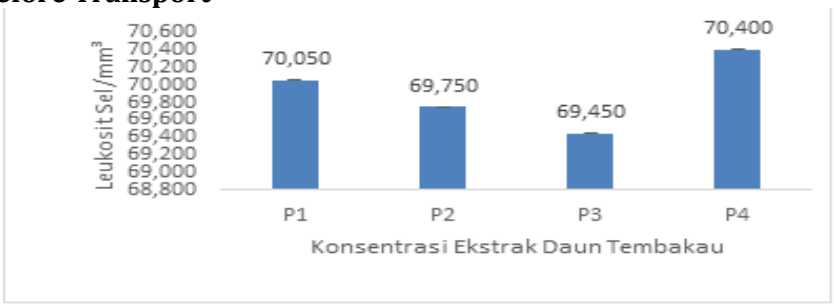


Figure 6. Leukocytes Before Transport

Based on (Figure 6), the total erythrocyte count before transportation shows that the erythrocyte value for each treatment has a different total erythrocyte value, where the leukocyte value for P1 is 70,050 and for P2 with a value of 69,750, followed by P3 with the lowest value, namely 69,450, while for P4 the value the highest is shown at 70,400.

Leukocytes After Transport

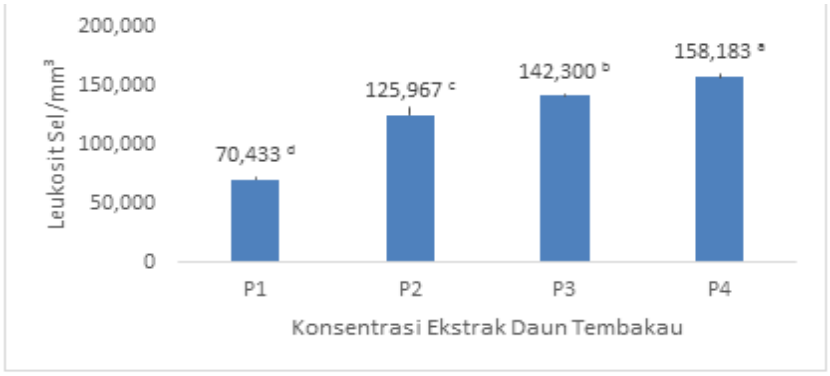


Figure 7. Leukocytes After Transport

Based on (Figure 7), it can be seen that the treatment given to the total erythrocyte count after transportation shows the P1 value with the lowest value, namely 70,433, then followed by P2, namely 125,967, then for P4 with a value of 142,300, while P4 is shown with the highest value, namely 158,183.

Leukocytes After Maintenance

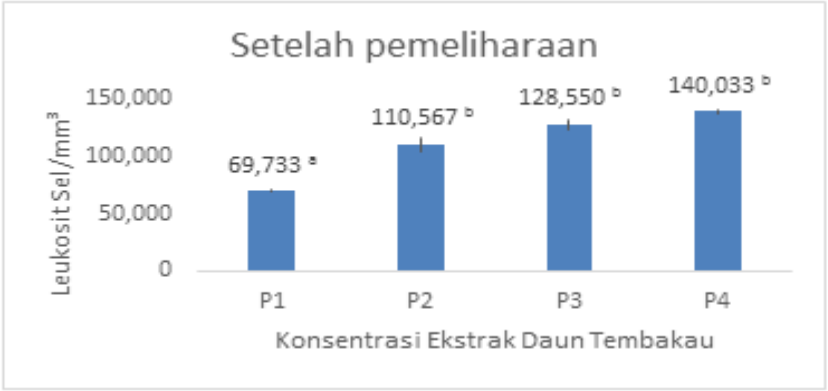
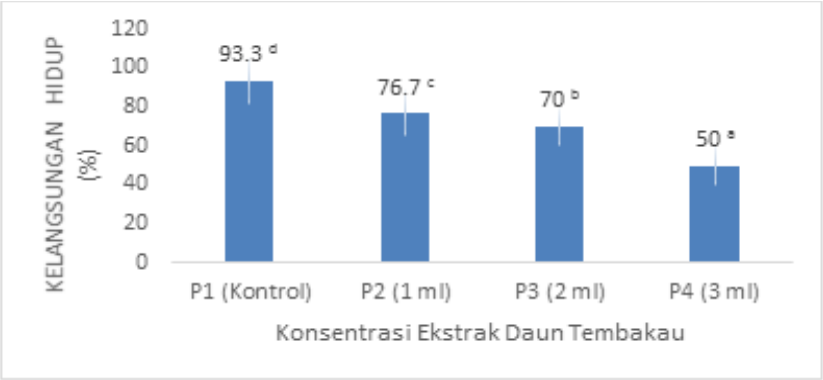


Figure 8. Leukocytes After Maintenance

Based on (Figure 8), it can be seen that the leukocyte value after transportation in this study for P1 was 69,733, followed by P2, namely 110,567 and for P3 with a value of 128,550 while for P4 with a value of 140,033.

Survival Rate (SR)



Gambar 9. Survival rate (SR)

Based on the results of data analysis (Figure 9), it can be seen that the highest goldfish seeds were found in P1, namely 93.3%, for P2, namely 76.7%, then followed by P3, namely 70%, while the lowest value was shown in P4, namely 50%.

Goldfish Absolute Weight Growth Rate

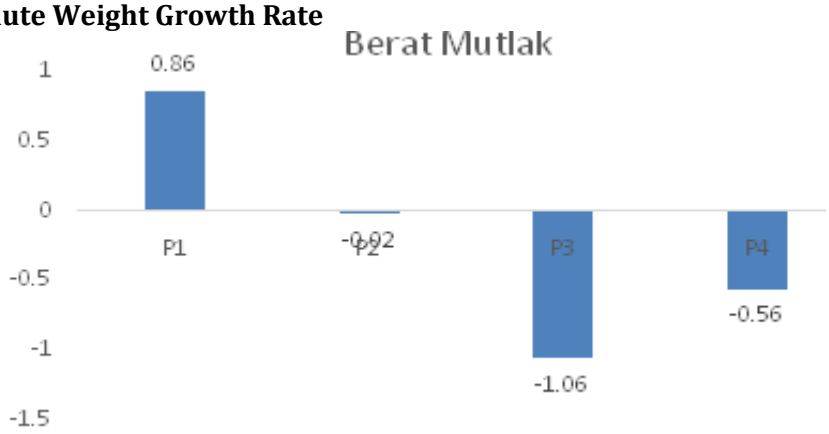
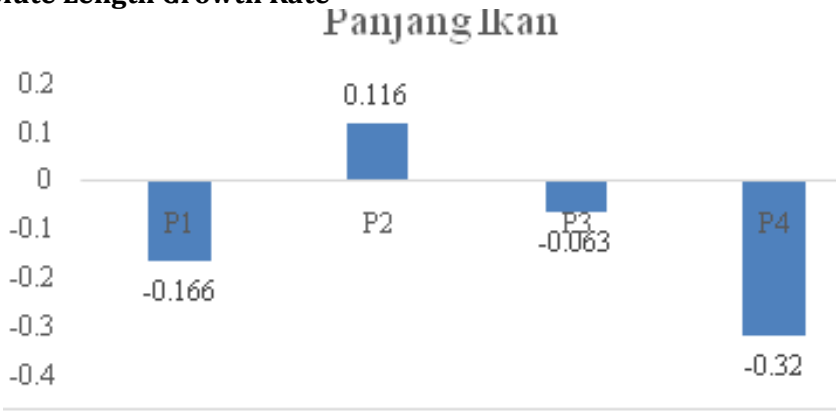


Figure 10. Goldfish Absolute Weight Growth Rate

Based on (Figure 10), it can be seen that the treatments given showed that the highest absolute weight growth for carp was in treatment P1 with a value of 0.86 grams, while for the other treatments there was a decrease in absolute weight.

Goldfish Absolute Length Growth Rate



Gambar 11. Goldfish Absolute Length Growth Rate

Based on the results of data analysis (Figure 11), it can be seen that the absolute length growth of goldfish was highest in P2 with a value of 0.116 cm, while for other treatments it decreased.

Water Quality

Table 3. Water quality measurement results

Parameter	Treatment				Literatur
	P1	P2	P3	P4	
Temperature (°C)	28.1-28.3	28.2-28.3	28.2-28.3	28,1-28,3	25-32°C (Darwis, 2019)
DO	3.1-3.3	3.4-3.2	3.3-5.2	3.1-3.6	>4 (Wirahadi *et al*., 2014)
pH	7.1-7.2	7.1-7.3	7.1-7.2	7.1-7.2	8.5-8.6 (Salikin *et al.,* 2014)

Discussion

Based on Figure 5, it is known that the highest value in P1 is 917 minutes, while in P4 the lowest value is 330 minutes. Nurkholifah (2022) stated that a relatively fast and good induction time can reduce fish stress levels. Good anesthetic agent to induce in less than 15 minutes.

The fish's fainting phase begins with the fish rising to the surface of the water then starting to stand still and the movement of the fins begins to decrease and then the fish's body is unbalanced. According to Muammar (2021), during the stunning process, fish show 3 behavioral response phases, namely: light fainting phase, heavy fainting phase and collapse phase. The light phase is indicated by slow reactivity to external stimuli, slow operculum movement and active swimming movements. The severe fainting phase is characterized by no reactivity to external stimuli, except with strong pressure, slow movement of the operculum.

Based on Figure 6, it shows that the highest value for conscious recovery is in P4 with a value of 510 minutes, while the lowest value is in P2 with a value of 239 minutes. Arlanda (2018) stated that it takes less than 10 minutes for a fainted fish to recover from consciousness until it can carry out normal swimming movements, whereas if it takes less than 15 minutes, the fish will die. This is also in accordance with the statement from Ilhami (2015), namely that the length of time for fish to stun is inversely proportional to the time for fish to recover consciously, where a longer stunning time for fish means a faster time for fish to recover consciously. The less extract given during anesthesia, the faster the time for the fish to recover consciousness and return to normal. Meanwhile, the more extract given, the longer it will take for the fish to recover and return to normal.

The results of calculating the number of erythrocytes before transportation based on the results of the ANOVA test showed that the fish erythrocyte value was not significant so no further tests were carried out, this is thought to be because the fish whose blood samples were taken were in normal condition or not experiencing stress. According to Dianti (2013) the number of erythrocytes in fish generally ranges from 1.05 to 3.0 x 10^6 cells/$mm^{3.}$

The results of further tests of erythrocytes after transportation showed that P1 was significantly different from P2, P3 and P4, while P2 was significantly different from P3, P4 and P1. The value of P3 is significantly different from P4, P1 and P2, while the value of P4 is significantly different from P1, P2 and P3. Where the highest value is in P1 with a value of 1,166,667 cells/mm^3, while the lowest value is in P4 with a value of 430,000 cells/mm3. The decrease in erythrocyte values in fish is thought to be due to interference due to the large number of active compounds from tobacco in the form of nicotine which interfere with kidney performance and function. Rahma (2015), stated that the decrease in the number of erythrocytes causes fish to be unable to take in large amounts of oxygen even though the availability is sufficient, as a result the fish experience disorders that occur in the blood tissue (anemia), resulting in fish lacking appetite.

The results of further Duncan test of erythrocytes after transportation showed that P1 was significantly different from P2, P3 and P4, while P2 was significantly different from P3, P4 and P1. The value of P3 is significantly different from P4, P1 and P2, while the value of P4 is significantly different from P1, P2 and P3. The highest value is in P1 with a value of 1,133,333 cells/mm^3, while the lowest value is in P4 with a value of 2,133,333 cells/mm^3. The high value of erythrocytes

indicates that the fish is experiencing stress. Royan (2014) stated that stress conditions can have a bad impact on fish, and can affect fish health in the form of cell function disorders, one of which is erythrocytes.

The results of calculating leukocytes before transportation based on the results of the ANOVA test showed that the fish leukocyte value was not significant so no further tests were carried out, this is thought to be because when the blood samples were taken the fish were not experiencing stress or were in normal condition. Hartika (2014) stated that the number of fish erythrocytes generally ranges from 20,000 to 3,000,000 cells/mm^3.

The results of further Duncan leukocyte tests after transportation showed that P1 was significantly different from P2, P3 and P4, while P2 was significantly different from P3, P4 and P1. The value of P3 is significantly different from P4, P1 and P2, while the value of P4 is significantly different from P1, P2 and P3. It is known that the highest value is in P1 with a value of 70.443 cells/mm^3, while the lowest value is in P4 with a value of 158.183 cells/mm^3. Putri (2022), the increase in white blood cells (leukocytes) in the blood is because leukocytes function as the body's immune system, which reacts quickly to the entry of foreign substances (antigens) in the fish's body.

The results of further leukocyte tests after transportation showed that P1 was significantly different from P2, P3 and P4, while P2 was significantly different from P3, P4 and P1. The value of P3 is significantly different from P4, P1 and P2, while the value of P4 is significantly different from P1, P2 and P3. It is known that the highest value is in P1 with a value of 140.033 cells/mm3, while the lowest value is in P4 with a value of 69.733 cells/mm3. According to Arlanda (2018) The low value of leukocytes in the blood is due to regular feeding and good maintenance so that fish that are kept after being given anesthetics are in good condition.

Based on the results of the Duncan test, it shows that P1 is significantly different from P2, P3 and P4, while P2 is significantly different from P3, P4 and P1. The value of P3 is significantly different from P4, P1 and P2, while the value of P4 is significantly different from P1, P2 and P3. The SR range for the treatment given tobacco leaf extract (P2-P4) gave a value of 50-76.7%, while for the control treatment the SR value was 93.3%. Khalil (2013), that the survival rate of fish greatly influences physical activity during anesthesia, during the transportation process there will be fish mucus that will come out due to stress due to anesthesia and the fish will flounder due to excessive physical activity.

The results of the analysis of absolute weight growth calculations for goldfish had no real influence on growth because maintenance was only carried out for 7 days. According to Rudiyanti (2010) regarding the sublethal effect of giving tobacco extract on fish weight, where the higher the concentration of the extract given is thought to be able to affect fish growth because the fish's behavioral patterns become abnormal, one of which is food refusal, the existence of food refusal can cause energy to be obtained from consumption. Feed is prioritized for adaptation and maintenance of body tissue as a result of environmental disturbances.

The results of calculating the absolute length growth of goldfish had no real influence on growth because maintenance was only carried out for 7 days. According to Selfiana (2020), length growth is influenced by 2 factors, namely internal factors and external factors, several external factors such as the physical, chemical and biological properties of waters, while internal factors such as hereditary characteristics, resistance to disease and the ability to utilize food..

The water quality showed a not too big difference between the start of rearing and the end of the research because when the fish were reared they were filtered once every 2 days. The temperature range obtained at the beginning and end of this study was between 28.1-28.3. The temperature range obtained in this study is still optimal for goldfish growth. According to Darwis (2019) stated that the optimum range value for goldfish growth is between 25-32OC.

The DO range obtained at the beginning and end of this study was between 3.1-3.6 mg/L. This DO range is still within normal conditions for goldfish growth. The range of soluble content values that is good for keeping goldfish is >4 mg/L (Wihardi, et al., 2014).

The pH range at the beginning and end of the study was between 7.1-8.5. This temperature range was still normal for goldfish growth. The optimum pH value range for keeping goldfish is between 8.5-8.6 (Salikin*et al*., 2014).

CONCLUSION

Conclusion

The conclusion obtained from the results of research carried out is that the use of tobacco leaf extract as an anesthetic in dry transportation systems causes hematological levels to increase and decrease but are still within normal levels. The best dose of tobacco extract is 1ml/L with a stunning speed of 917 minutes. the time to recover consciousness was 239 minutes and had an SR value of 76, %.

Suggestion

There are suggestions for further research so that the use of tobacco extract can be used with different methods and lengths of fish.

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