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Life Science Archives (LSA)

ISSN: 2454-1354

Volume – 6; Issue - 5; Year – 2020; Page: 1975 – 1981

DOI: 10.22192/lsa.2020.6.5.6

Research Article

EVALUATING THE EFFICIENCY OF THE AQUEOUS EXTRACT OF LAVENDER (*Lavandula angustifolia*) MILLER IN ANESTHESIA OF COMMON CARP *(Cyprinus carpio)* FINGERLINGS

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Abstract

Six concentrations (100, 200, 300, 400, 500 and 600) mg/l of aqueous extract of *Lavandula angustifolia* were used as an alternative to MS-222 to anesthetize common carp Fingerlings *Cyprinus carpio*, besides, to observe its behavior during anesthesia, MS-222 is a carcinogen for workers in this sector and to fish consumers with very low concentrations and polluting the aquatic environment, as well as their high prices compared to the *Lavandula angustifolia*. The results showed that aqueous extract of lavender had partial and total anesthesia on these fish, and the relationship was inverse between the concentration used and the time of arrival to partial and total anesthesia, while the relationship was positive between the concentration used and the time of reaching the total recovery of the fish. The best results were achieved using a concentration of 600 mg/l. The average partial anesthesia time was 27.5 minutes, the average total anesthesia time was 18.5 minutes, and the average total recovery time was 14 minutes. The behavioral observations of the fish showed variation, ranging from slow swimming with a rapid increase in respiratory movements from time to time to the fish swimming close to the surface to the fish laying on the bottom in addition to slow breathing. The results showed that there were no significant differences ($p > 0.05$) in the blood plasma glucose concentration of fish after total recovery compared to control fish. This indicates that the fish were not subjected to stress as a result of anesthesia with the aqueous extract of the lavender plant.

Article History

Received : 30.07.2020

Revised : 16.08.2020

Accepted: 22.09.2020

Keywords: *Lavandula angustifolia,* Anesthesia, *Cyprinus carpio* and Blood plasma glucose.

1. Introduction

The process of anesthesia is very important in Aquaculture to reduce stress while dealing with fish (weighing, grading, transport and taking blood samples) (Küçük and Çoban, 2016). Anesthesia works to inhibit involuntary activity and reduce muscle contraction, so high doses or fish stay for a while Prolonged doping will lead to a breakdown in the respiratory and circulation process (Dziaman *et al*., 2005). Several anesthetics have been used to anesthetize fish such as MS222 (Tricaine methanesulfonate), Benzocaine and Etomidate (Mercy *et al*., 2013).

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LSA ISSN: 2454-1354

Lavender, *Lavandula angustifolia* is a plant that belongs to the Lamiaceae family lavender is a perennial plant that can last up to 20 years. It has many medicinal uses and of very low toxicity is sometimes used as an antiseptic and antimicrobial. The essential oil of the lavender herb was also used for many purposes in folk and traditional medicine, as it was considered an analgesic, antibacterial, antifungal, antidepressant, calming, and anesthetic and scar remover (Anonymous, 2007; Denner, 2009). Many considerations must be taken into consideration before using any substance to anesthetize fish, including the efficiency and the possibility of obtaining the drug, as well as its being safe and cheap (Mylonas *et al*., 2005).

In recent years, anesthetic agents extracted from medicinal herbs have been used, such as Clove oil extracted from the stems, leaves, and buds of the clove plant (Wagner *et al*., 2003). On the level of local studies, some plant extracts were used as an anesthetic for fish, Al-Niaeem *et al*. (2017) aqueous extract of nutmeg (Nutmeg powder, Myristica fragrans) in anesthesia of common carp and Al-hamadany *et al*. (2019) aqueous extract of the poppy plant (Poppy, Papaver nudicaule) and use Lemon balm, *Melissa officinalis* in anesthesia of common carp (Resen *et al*., 2020). The use of different concentrations of *Lavandula angustifolia* Miller for the anesthetizing fish instead of chemicals that cause great harm to live organisms.

2. Materials and Methods

Aquarium for acclimatizing, experiment, and recovery Oxygen pumps for providing oxygen in Aquarium. A device for measuring the blood Glucose of fish stop watch to calculate the time. A sensitive scale for measuring the weight of the fish measuring the weight of the sample concentration ruler for measuring the length of the fish used in the experiment. Fish that appeared in good health were selected 30 common carp Fingerlings The average length 7.2 ±0.1 cm, the weight was 3.46±0.2 g were brought from the Fish farms ponds of Marine Science Center, University of Basrah, and then the fish were placed in Aquarium (in the laboratory) for acclimatization, the water temperature was 24 °C. Six concentrations were used for the experiment, which are 100, 200, 300, 400, 500 and 600 mg/l. The experiment Aquarium was filled with water, and oxygen pumps were placed in them to provide constant oxygen.

Different concentrations were prepared from the aqueous extract of the *Lavandula angustifolia* Miller after grinding it, as 50 mg was dissolved after weighing the sensitive scale in 100 ml of hot water. Below boiling point (to prepare the first concentration, given that the amount of the substance is according to the amount of water in the experiment Aquarium), and left for 60 minutes (Al-Niaeem, 2006).

3. Results

The current experiments were conducted to find out the effect of different concentrations of the aqueous extract of the (*Lavandula angustifolia*) Milleron the common carp Fingerlings. The following concentrations were used (100, 200, 300, 400, 500 and 600 mg/l).

The first experiment

The use of *Lavandula angustifolia* Miller at a concentration of 100 mg/L in anesthesia of common carp Fingerlings, as shown in Table 1 and 2, and the mean blood Glucose content in the blood plasma of the fish was 27 mg/100 liters.

Table - 1: The first sample of common carp during anesthesia with lavender herb (100 mg/l)

Experience criteria	Time in hour
Time began to experiment	11:00
Time of partial anesthesia	Did not give any anesthesia
Time of total anesthesia	Did not give any anesthesia
Transfer time to the convalescence pool	-
Partial recovery time	-
Total recovery time	-

Table - 2: The first sample of common carp during anesthesia with lavender herb (100 mg/l)

Experience criteria	Time in hour
Time began to experiment	1:00
Time of partial anesthesia	Did not give any anesthesia
Time of total anesthesia	Did not give any anesthesia
Transfer time to the convalescence pool	-
Partial recovery time	-
Total recovery time	-

Table - 3: The first sample of common carp during anesthesia with lavender herb (500 mg/L)

Experience criteria	Time in hour	Time in minutes
The time the experiment began	11:00	-
Time of partial anesthesia	11:45	45
Time of total anesthesia	12:10	70
Transfer time to the convalescence pool	12:10	-
Partial recovery time	12:25	15
Total recovery time	12:30	20
The Glucose level in the blood	45 mg/100 L	-

Table - 4: The second sample of common carp during anesthesia with lavender herb (500 mg/L)

Experience criteria	Time in hour	Time in minutes
The time the experiment began	1:00	
Time of partial anesthesia	1:40	40
Time of total anesthesia	2:00	60
Transfer time to the convalescence pool	2:00	
Partial recovery time	2:20	20
Total recovery time	2:30	30

Table - 5: The first sample of common carp during anesthesia with lavender herb (600 mg/liter)

Experience criteria	Time in hour	Time in minutes
The time the experiment began	12:26	
Time of partial anesthesia	12:56	29
Time of total anesthesia	1:2	35
Transfer time to the convalescence pool	1:2	
Partial recovery time	1:10	10
Total recovery time	1:14	12
The Glucose level in the blood	35 mg/100 liters	

Table - 6: The second sample of common carp during anesthesia with lavender herb (600 mg/liter)

Experience criteria	Time in hour	Time in minutes
Fish length		
The time the experiment began	12:2	
Time of partial anesthesia	12:22	20
Time of total anesthesia	12:27	25
Transfer time to the convalescence pool	12:28	
Partial recovery time	12:34	9
Total recovery time	12:44	16
The Glucose level in the blood	33 mg / 100 liters	

Second experience

The (*Lavandula angustifolia*) Miller was used at a concentration of 200 mg/L, 300 mg/L, and 400 mg/L in anesthesia of common carp, and it did not give any anesthesia to the fish.

Third experience

The use of (*Lavandula angustifolia*) Miller at a concentration of 500 mg/ L in anesthesia of common carp, as shown in Table - 3 and 4, the mean blood Glucose level in the blood plasma of control fish was 25 mg/100 L.

Fourth experiment

The use of (*Lavandula angustifolia*) Miller at a concentration of 600 mg/L in anesthesia of common carp, as shown in Table - 5 and 6.

4. Discussion

Anesthetics were used to reduce the negative effects of the physiological stress of fish in various aquaculture activities (Gholipour *et al*., 2011). The use of natural herbal materials for the process of anesthetizing fish instead of chemicals that cause great harm to live organisms, including fish, and these substances may cause many and dangerous diseases for fish when they accumulate in the body, so scientists and researchers have tended to use natural materials for the anesthesia process due to their low risk and presence in any Also, it does not need much cost due to its cheap price, as researchers and scientists used many types of herbal materials to anesthetize fish (Martinz Porchas *et al*., 2009).

The use of some appropriate concentrations of aqueous extract of lavender has shown positive results in the anesthesia of fish, and the lavender herb is considered safe, inexpensive, and has good efficacy. The anesthetic cause of the lavender herb is due to some volatile oils, the most important of which is lavender oil (28.92 %) due to its strong sedative properties, and one of the most important chemical components of lavender oil is the compound Linalool (3,7-Dimethyl-1,6-octadien-3-ol) which has multiple

commercial applications and is also considered a type of terpenes and this substance has other names such as β-linalool, linalyl alcohol, linaloyl oxide, allo-osiminol (Kasper *et al*., 2010; Ibrahim *et al*., 2019). Fismer and Pilkington (2010) showed that lavender oil stimulates sleep and is often used as an alternative treatment for insomnia.

The results of the current study showed a positive relationship between the concentration of the drug used and the time of the occurrence of partial and total anesthesia, while the inverse relationship was recorded with the time of the occurrence of the partial and total recovery, and this is consistent with what Sado (1985) showed in his study on some types of tilapia fish and the effect of the drug Quinaldine. It also agrees with what Hoskonen and Pirhonen (2006) indicated in their study of the effect of clove oil doses on anesthesia of tilapia fish and Al-Niaeem et al. (2017) in their study of the effect of nutmeg in anesthesia of common carp, and the existence of an inverse relationship between time of total anesthesia and time of total recovery.The physiological characteristics of the organism, including fish, express the internal state of the body, and it is one of the scientific criteria that reflect positively or negatively on health indicators in fish, and the percentage of glucose in the blood at any time is considered a functional indicator of several factors, including stress, and therefore glucose in blood plasma is a factor Important. The glucose concentration in the current study did not differ in the fingerlings of common carp after total recovery when compared to the control treatment, and this positive result indicates that the fish did not suffer from stress due to the use of anesthetics (Martinz-Porchas *et al*., 2009).

5. Conclusions and Recommendations

We conclude from the current study that there was no anesthetic effect of the aqueous extract of (*Lavandula angustifolia*) Miller on common carp Fingerlings when using concentrations (100, 200, 300 and 400 mg/L), but there was an anesthetic action of (*Lavandula angustifolia*) Miller when using the concentration 500 mg/L and 600 mg/L. The present study recommends the use of a concentration of 600 mg/l of aqueous extract of *Lavandula angustifolia* in anesthesia of common carp Fingerlings.

Acknowledgment

The authors are indebted to the Department of fisheries & marine resources, College of Agriculture, the University of Basrah for the support of this project.

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DOI Number	**DOI: 10.22192/lsa.2020.6.5.6**
Thomson Reuters Researcher ID	**L – 5547 – 2016**
ISI Impact Factor	**4.206**

How to Cite this Article:

Samer S. Alshkarchy, Khalidah S. Al-Niaeem and Amjed K. Resen. 2020. Evaluating the efficiency of the Aqueous extract of Lavender (*Lavandula angustifolia*) Miller in Anesthesia of Common Carp *(Cyprinus carpio)* Fingerlings. *Life Science Archives*, 6(5): 1975 – 1981.

DOI: 10.22192/lsa.2020.6.5.6