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EVALUATION OF THE EFFICIENCY OF ST. JOHN'S WORT EXTRACT (*Hypericum perforatum L.*) IN ANESTHESIA OF COMMON CARP (*Cyprinus carpio*)

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Abstract

Six concentrations (300, 400, 500, 600, 700 and 800) mg/L of *Hypericum perforatum* weed aqueous extract was used to anesthetize of common carp *Cyprinus carpio*, the results showed that the aqueous extract of *Hypericum perforatum* weed which was partial and total anesthesia on these fish, and the correlation was inverse between the concentration used and the time of arrival to partial and total anesthesia, while the correlation 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 800 mg / l. The average partial anesthesia time was 45 minutes, the average total anesthesia time was 22 minutes, and the average total recovery time was 31.3 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 (31.5 mg/100 ml) compared to control fish (25.5 mg/100 ml), and this indicates that fish were not subjected to stress as a result of being anesthetized with the extract. The study recommends the possibility of using the aqueous extract of *Hypericum perforatum* weed in fish hatcheries to reduce injuries, bruises and wounds that occur to fish during the processes of handling and injecting them with the hormone or during the process of collecting eggs and sperm to reduce the economic losses resulting from this, as an alternative to narcotic chemicals harmful to fish and the environment.

Keywords: *Hypericum perforatum*, Anesthesia, *Cyprinus carpio* and Fish.

1. Introduction

Fish are exposed to stress during transport, fishing, overcrowding, and differences in water quality, especially lack of dissolved oxygen (Zahl *et al*., 2012). This has a clear effect on the physiological state and the survival rate of the fish, which leads to outbreaks of disease and thus causes large losses in the production of fish (Davis, 2010).

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Weber *et al*. (2009) indicated that use of narcotic substances is very useful in reducing stress and Matin *et al*. (2009) show that it is also useful in reducing deaths resulting from transport fish and handling it, as well as reducing the susceptibility to disease, as well as using anesthesia for fish during Artificial reproduction, weighing, education, grading, blood sampling and treatment. Anesthesia is a condition that prevents the feeling of pain and other sensations and occurs under the influence of various substances such as analgesia, hypnosis, or relaxation substances which is prevents unnecessary

movement or active movement of the muscles, which is intended in the field of fish anesthesia (Alvarez Lajenchere and Moreno, 1982). Anesthesia works to inhibit involuntary activity and reduce muscle contraction, so high doses or if fish remain for a long time in the anesthetic will lead to a breakdown in the respiratory and circulation process (Tytler and Hawkins, 1981).

The significant decrease in respiratory efficacy is an important indication that anesthesia should be stopped (Dziaman *et al*., 2005). Hoseini and Ghelichpour (2012) explained that knowing the suitable concentration to be used in anesthesia is very necessary because an increase in the dose will have an opposite effect, and the researchers indicated that the most common substances used in anesthesia are MS222 Tricaine methanesulfonate, Benzocaine, Etomidiate, Metomidiate and 2 Phenoxiethanole and Equinaldine and Equinaline Sulphate.

Mercy et al (2005) indicated That the materials used in anesthesia must have three advantages, which are they be active, meet safety requirements and cheap, these features must be enhanced by their ability to anesthetize the fish within 3 to 15 minutes. The effect of anesthetic agent for fish depends on several factors such as the temperature of the water, the size and type of the fish,The fish's response to anesthesia and the dose depends on, age, sex, and sexual maturity, as well as non-life factors such as temperature, salinity, and others (Sneddon, 2012). In recent years, anesthetic agents extracted from medicinal herbs have been used, such as the aqueous extract of *Peganum harmala* (Abdel-Fattah et al., 1997) and Clove oil extracted from the stems, leaves and buds of the clove plant (Wagner et al., 2003). The use of different concentrations of *Hypericum perforatum* for the process of anesthetizing the fish instead of chemicals that cause harm to the fish when it accumulates in the body, and the use of natural materials for the anesthesia process due to its low risk and presence at any time of year , and it does not need a large cost because of its cheap price.

2. Materials and Methods

Fish that appeared in good health were selected 30 common carp, Fingerlings their weights was (7.72 ± 0.85 g) were brought from the fish farm of Marine Science Center, University of Basrah, and then the fish were placed in Aquarium (in the laboratory) for the purpose of acclimatization, the water temperature was 24 °C. Four concentrations were used for the purpose of the experiment, namely 300, 400, 500, 600, 700 and 800 mg/liter. The experiment Aquarium were filled with water, and oxygen pumps were placed in them in order to provide constant oxygen. Different concentrations *viz*., 300, 400, 500, 600, 700 and 800 mg/liter from the aqueous extract of *Hypericum perforatum* after grinding it as 50 mg was dissolved after weighing the sensitive scale in 100 ml of hot water (to prepare the first concentration, noting 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 present experiments were conducted to find out the effect of different concentrations of the aqueous extract of *Hypericum perforatum* on common carp Fingerlings (for each concentration, two repetitions with control with two more), the concentrations *viz*., 300, 400, 500, 600, 700 and 800 mg/L were used to determine its effect on fish anesthesia (partial and total anesthesia) (Figures - 1 and 2). In addition to the partial and total recovery time (Figures - 2 and 4). The results of the current study showed that there is an anesthetic action of *Hypericum perforatum*. When using concentrations 500, 600, 700 and 800 mg/100 liters. No significant differences were found in blood glucose masters of the anesthetized fish after total anesthesia compared to control fish ($p \geq 0.05$) (Figure 5).

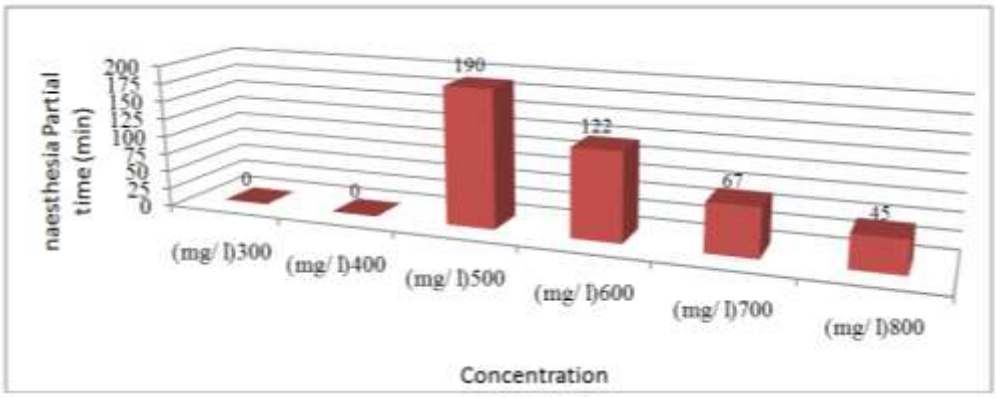

Figure - 1: Time of partial anesthesia for common carp Fingerlings with different concentrations of *Hypericum perforatum*

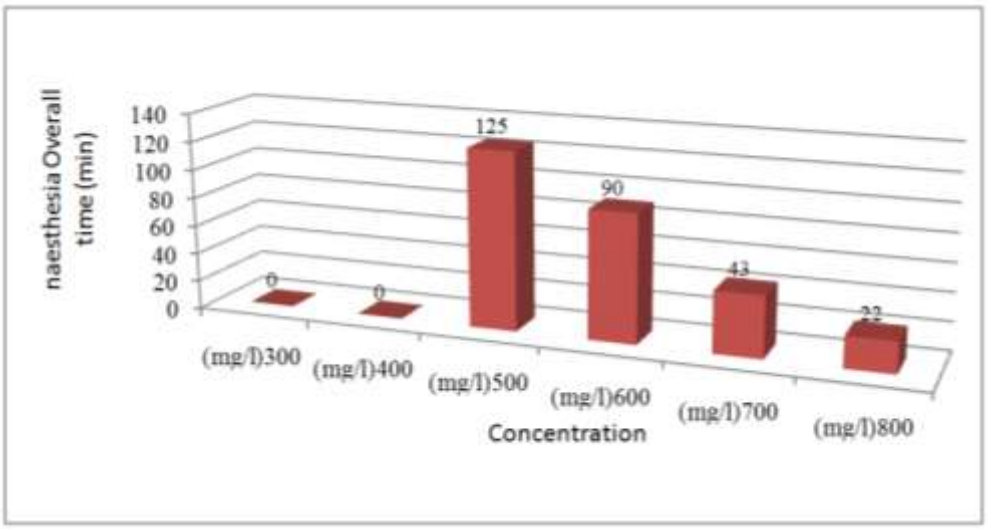

Figure (2): Time of total anesthesia forcommon carpFingerlings with different concentrations of *Hypericum perforatum*

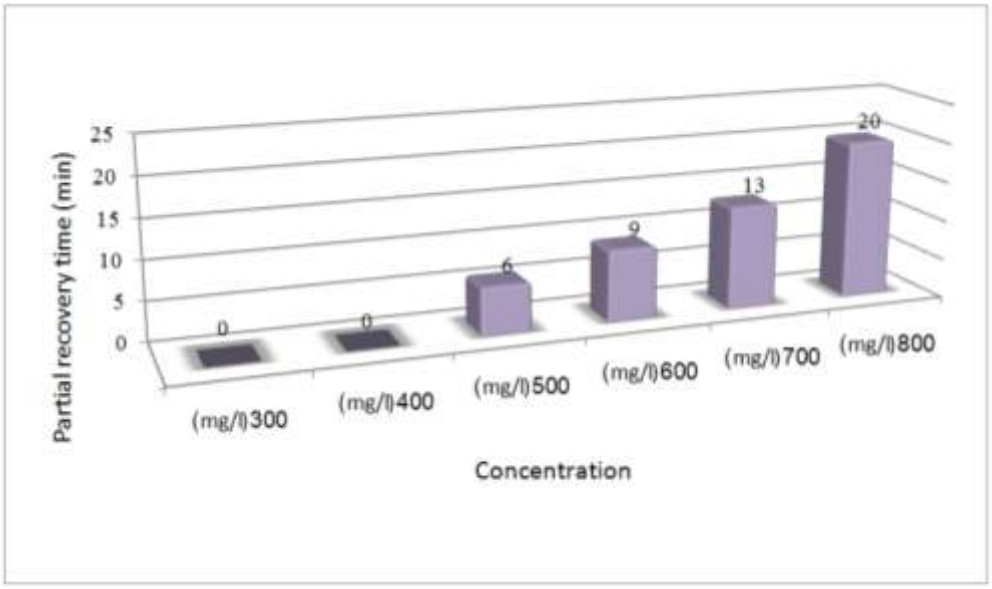

Figure - 3: The partial recovery time of common carp Fingerlings with different concentrations of *Hypericum perforatum*

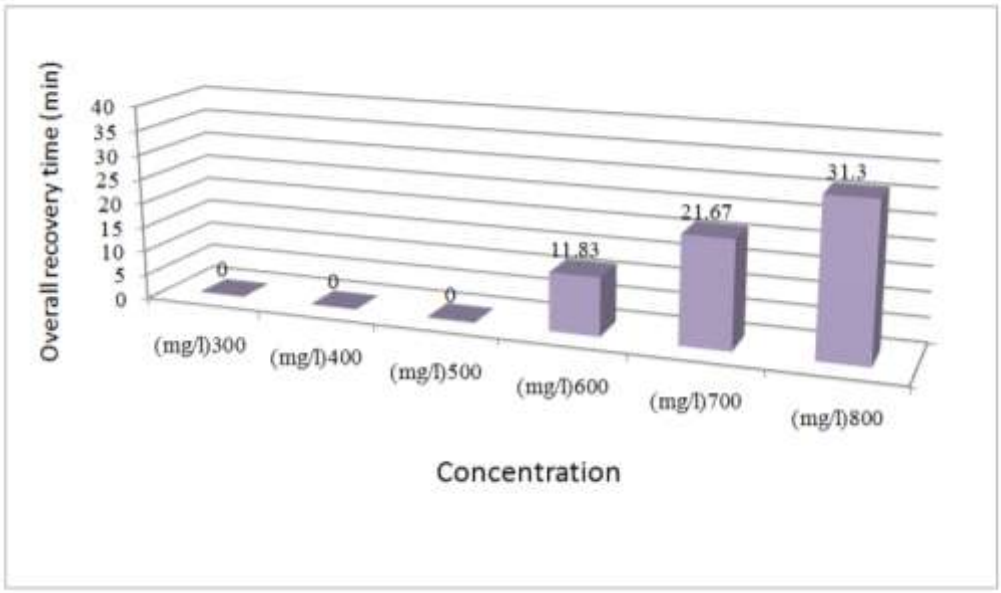

Figure - 4: Total recovery time for common carp Fingerlings with different concentrations of *Hypericum perforatum*

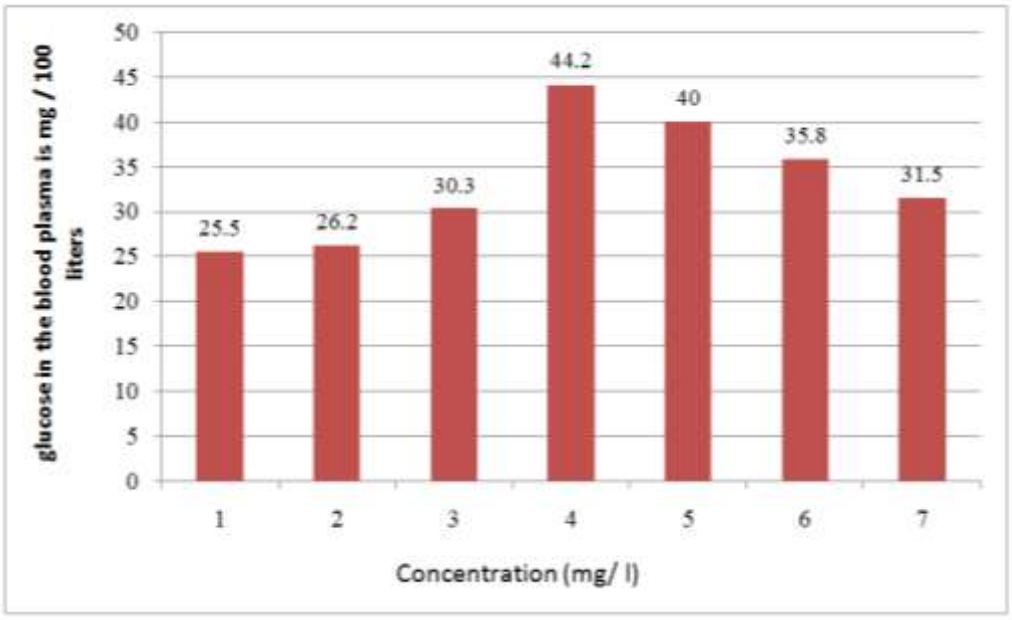

Figure - 5: Glucose level in blood plasma of common carp Fingerlings fish after total awakening of fish anesthetized with *Hypericum perforatum*

4. Discussion

The use of toxic and narcotic substances is one of the oldest and most common methods used in fishing in the world, and many narcotic substances have been found for use in the field of fish anesthesia for the purpose of reducing stress during the transport of live fish (Martinz-Inversen *et al*., 2003). As drugs are considered substances that have a direct effect on the nervous system, as they cause loss of feeling and movement and thus facilitate the process of transporting fish, and when fish are placed in an anesthetic solution, they absorb it mainly through the process of breathing through gills and partly through the skin, causing general anesthesia (Mercy *et al*., 2013). The use of chemicals may cause many and dangerous diseases for fish when they accumulate in the body, so researchers have tended to use natural materials for the process of anesthetizing fish, due to the lack of risk, as they are cheap and

available (Martinz Porchas *et al*., 2009). The use of some concentrations of *Hypericum perforatum* aqueous extract showed positive results in anesthetizing fish. The reason for the anesthetic action in *Hypericum perforatum* is phloroglucinol (eg: hyperforin and adiprofurin), which are organic compounds used in the manufacture of pharmaceuticals, and it can be used as a topical treatment for wounds, scrapes, burns and muscle pain. The results of the follow up of the behavior of common carp in the anesthesia solution of *Hypericum perforatum* showed that the fish went through three stages during anesthesia: (i) Decreased activity of the fish, (ii) Increased breathing speed and (iii) Signs of loss of balance with the onset of vertical swimming and decreased respiratory movements.

Finally, the reversal on the side and down in respiratory motions, this is consistent with the behavior of fish when anesthetized with natural extracts (Al-Jashami *et al*., 2003). The results of the current study showed that the concentration of the narcotic used was correlated directly with the time of the occurrence of partial and total anesthesia, and the current study also recorded the inverse relationship between the concentration of the narcotic substance and the time of the occurrence of partial and total recovery. Tilapia fish is also in agreement with Pirhonen Hoskonen and (2006) in their study of the effect of clove oil on anesthesia of tilapia fish and Al-Niaeem *et al*. (2017) in their study of the effect of nutmeg on 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 reflects positively or negatively on health indicators in fish. The level of glucose in the blood at any time is a functional indicator of several factors, including stress, and therefore glucose in the blood plasma is a factor Important (Martinz-Porchas *et al*., 2009). The fish of the present experiment did not suffer from stress due to the use of narcotic substance, as the glucose concentration in the current study did not differ in common carp Fingerlings after total awakening when compared to the control group

5. Conclusions and Recommendations

We conclude from the current study that there was no anesthetic effect of the aqueous extract of *Hypericum perforatum*. The present study recommends using a concentration of 800 mg/100 liters of aqueous extract of *Hypericum perforatum* for anesthesia of common carp Fingerlings.

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