

Effectiveness of Ketapang Leaf Extract (*Terminalia Capta L*) in Water Media on Crude Egg Hatching

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Abstract—Ketapang leaves are one of the leaves that are already known bioactive materials contained therein which can be utilized in aquaculture media. This study aims to analyze the use of ketapang (*Terminalia capta L.*) leaf extract in water media on the hatchability of cork fish eggs (*Channa striata*). The research is expected to provide knowledge about the benefits of ketapang leaves in aquaculture media and the hatchability of cork fish eggs. The study was conducted at the Fish Seed Center (BBI) Bantimurung, Maros Regency. The test sample came from BBI Bantimurung. The study used 4 experimental methods with 3 replications each addition of ketapang leaf extract on water media, namely media without ketapang leaf extract (A), the addition of ketapang leaf extract 10 ppm (B), the addition of ketapang leaf extract 20 ppm (C), addition of 30 ppm ketapang leaf extract (D). The results showed that the treatment significantly affected the hatchability of cork fish eggs. The highest average hatchability of eggs in treatment D with a concentration of ketapang leaf extract was 30 ppm. Water quality parameters under optimal conditions, namely temperature 27.5-28 0C, pH 7.1-7.5, DO 4.5-5.5 ppm, NH₃ 0.001-0.016 ppm. Ketapang leaf extract can increase the hatchability of cork fish eggs to a concentration of 30 ppm.

Keywords: Ketapang leaf extract, egg hatchability, cork fish.

I. INTRODUCTION

Cork fish is a freshwater fish that is sought after by the public for consumption. Besides having a savory taste, cork fish has soft flesh. Cork fish has long been believed by the public to have efficacy in helping to accelerate surgical wound healing and health recovery after illness or surgery. Cork fish contains nutrients that are very good for health, namely high protein, especially albumin and essential and non essential amino acids which are quite complete. Contains essential fatty acids, minerals especially zinc or zinc (Zn). Essential amino acids are not produced by the body so they need to be taken from outside. Meanwhile according to Shafri and Mannan (2012) that cork fish contain non essential amino acids such as glutamate acid (14.253%), arginine (8.675%), and aspartic acid (9.571%) which are relatively high, so cork fish are very important in helping wound healing.

Cork fish demand on the market from year to year also increased. The amount of *Channa striata* production from aquaculture in 2010 alone reached more than 15,000 tons and increased in 2016 to more than 20,000 tons (FAO statistical data for 2020). While prices in the Makassar local market are around Rp. 40,000 / kg (small size) and sometimes reaches Rp. 70,000 / kg (large size). However, the production of aquaculture is still far less than the results of fishing activities in nature, due to the lack of people doing business in cork fish farming. One obstacle is that the strategic hatchery method has not been found to support increased production through the success of artificial spawning, hatching eggs and larval survival. The success of cultivation depends on the initial stage of seed maintenance, and the initial stage of seed maintenance is the hatching process. All stages of aquaculture including the incubation period and hatching of eggs are strongly influenced by the quality of aquaculture, because water quality is a limiting factor for fish growth and survival.

One of the strategies carried out by farmers in anticipating low production due to poor water quality and disease attacks during maintenance is the use of ketapang leaves on the culture media. Ketapang leaves can produce humic acid which can reduce pH. Ketapang leaves are also known to contain flavonoids, saponins and alkaloids which can function as antibacterial. So that the use of ketapang leaves can optimize the conditions of aquatic water quality and fish health that support the growth and survival of fish.

Several previous studies on the use of ketapang leaves in water media, namely [1] using dried ketapang leaves on water media and significantly affected the growth of tilapia seeds in the administration of 6 g. , regarding the use of ketapang leaf extract as an antibacterial in betta fish and increasing the survival of betta fish at a concentration of 500 ppm. about the effectiveness of ketapang leaf extract in inhibiting the growth of *A. hydrophila* at a concentration of 1500 ppm, and at *A. salmonicida* at the optimum treatment concentration of 100-200 mg / mL [2]. Then the previous research found about soaking carp eggs in ketapang leaf extract with the best results on the soaking dose of ketapang leaf solution 2 g / L [3] and the use of dried ketapang leaves at a dose of 0.5 g / L gave the highest results in hatching eggs and accelerated development of embryonic development [4]. Research on the effect of soaking ketapang leaf extract on the hatchability of fish eggs is still lacking, so it is necessary to study the effect of the use of ketapang leaf extract on cork fish eggs which have important economic value.

II. METHOD

1. *Research Preparation*

a. Preparation of ketapang leaf extract

Old ketapang leaves are cleaned and dried in the sun to dry water. Then ground into powder or flour then brewed using water that has been heated at a temperature of 50 0C with a ratio of 1: 10 (1 gram of powder and 10 mL of water). Stirred repeatedly and allowed to stand for 15 minutes (Amrullah, 2013). Then filtered using whatman paper no. 42. Soaking and filtering can be repeated 2-3 times on the same filtrate. The extracted extracts are put together in one place, and ready to use.

b. Egg preparation

The eggs used are cork fish eggs originating from artificial spawning results at BBI Maros. The number of eggs used is 240 healthy eggs from sorting. Each aquarium or test pool is filled with 20 eggs.

2. *Experiment*

The egg incubation container is filled with water with a volume of 50L and aeration is carried out. Each water medium was added with ketapang leaf extract according to treatment. The eggs are spread evenly into the aquarium and the aeration is tightened. Daily observations of the eggs were carried out until the third day.

3. *Research parameters*

Research parameters include:

a. Hatching Rate (egg hatchability)

Egg hatchability is calculated using the formula trial :

$$HR = \frac{\text{The number of eggs that hatch}}{\text{Total eggs}} \times 100 \%$$

b. Water Quality

Water quality parameters are measured every day during the experiment. The parameters measured include, pH, temperature, dissolved oxygen (DO), and ammonia (NH₃).

III.RESULTS AND DISCUSSION

1. Egg Hatchability

The average hatchability of cork fish eggs can be seen in Table 1.

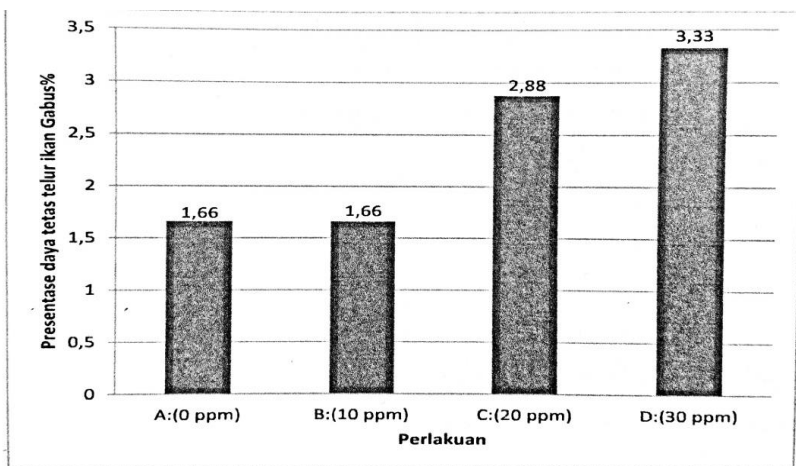
Table 1. Average Hatchability of Tilapia Eggs with the addition of Ketapang Leaf Extract in Water Media

Number	Treatment	Average (%) \pm SE
1.	A (0 ppm)	11.667 \pm 1.667 ^a
2.	B (10 ppm)	16.667 \pm 1.667 ^a
3.	C (20 ppm)	28.333 \pm 2.887 ^b
4.	D (30 ppm)	50.000 \pm 3.333 ^c

Note : Different superscript letters in the same column show different effects between treatments

The results of the analysis of variance showed a significant effect ($P < 0.05$) on the hatchability of cork fish eggs. The treatment that produced the highest hatchability of eggs in the ketapang leaf extract treatment was 30 ppm (D).

The histogram of the average hatchability of cork fish eggs is shown in Figure 1 to see the trend of increasing egg hatchability as an increase in the concentration of ketapang leaf extract.



Gambar 4 . Histogram persentase daya tetas telur ikan Gabus (*Channa striata*)

Based on Figure 1, it appears that the egg hatchability increases with increasing concentration of the use of ketapang leaf extract to a concentration of 30 ppm. This shows that Ketapang leaf extract can have a positive influence on the condition of fish eggs so it can increase the hatchability of eggs. Dried ketapang leaves are

known to release organic acids such as humic and tannin. The leaves contain organic acids, tannins and flavonoids. the sap contained in ketapang leaves can neutralize the pH of the water and absorb toxic substances that are harmful to the health of fish [5]. Humic acid is known to reduce pH, which can improve water quality. But giving too much or too much dried ketapang leaf can also make the pH of the water lower. However, administration with a concentration of 30 ppm still has an impact on increasing the hatchability of cork fish eggs.

Ketapang leaves are also known as antimicrobial ingredients because they contain tannins, saponins and flavonoids [6]. The content of the active ingredient is thought to protect eggs from attacks of fungal infections, so that the hatchability of eggs is higher in media using ketapang leaf extract. Previous research [7]. reported that administration of Ketapang leaf extract (EDK) by 0.2 g / L can reduce the rate of fungal infections in tilapia (*Oreochromis niloticus*) eggs. According to [8], this happens because the ketapang leaves have compounds in the form of flavonoids, saponins, phenolics, and tannins, which function as antifungal agents.

2. Water Quality Parameters

Water quality parameters of hatching media until the last day of hatching eggs in optimal conditions. The water quality parameters during the incubation and hatching periods can be seen in Table 1.

Table 1. Water quality During Incubation and Hatching of Eggs

Parameter	Treatment (ppm)				Optimal Value (Boyd, 1982)
	0	10	20	30	
Suhu (°C)	27,5-28	27,6-28	27,5-28	27,7-28	23-36
pH	7,1-7,5	7,2-7,6	7,1-7,5	7,1-7,5	4-8
DO (ppm)	4,5-4,8	4,8-5,5	5,1-5,2	5,1-5,2	3-6
NH ₃ (ppm)	0,001-0,003	0,001-0,003	0,001-0,003	0,003-0,016	< 0,5

Water quality is the most important thing in cultivation, because water quality is a limiting factor for aquatic organisms. The value of water quality parameters during the egg incubation period is in the optimal range and the range is almost similar in all treatments. Only a few difference on ammonia (NH₃). Ammonia value on the addition of 30 ppm ketapang leaf extract requires an increase in ammonia concentration in water increases compared with administration of extracts whose concentration is lower. So there is a possibility that increasing the provision of ketapang leaf extract will result in increased ammonia concentration also in the water.

Comparison of water quality between the control treatment (0 ppm) and treatment D (30 ppm) is not significant, so it can be said that the administration of ketapang leaf extract into water with a concentration of 30 ppm has no impact on water quality degradation, and even tends to have an impact as a stabilizer. It is seen that the concentration of dissolved oxygen (DO) increases with the administration of ketapang leaf extract to the water media. Dissolved oxygen in water is very influential in the

development of embryos in eggs that are used to metabolize and metabolize. Another important factor to consider during egg incubation is water temperature. Temperature also greatly affects the metabolism and development of the embryo, the rate and rate of hatching of eggs [9]. This happens because temperature can control molecular activity in metabolism. The increase in temperature will be followed by the rate of absorption of the yolk, the rate of development and the rate of metabolism in an unequal acceleration [10]. The optimum temperature for hatching eggs in each fish species is different. Research report [9] explained that the optimal temperature for hatching manvis eggs (*Pterophyllum scalare*) is 30 °C. while [11] reported that hatching black ghost fish eggs (*Apteronotus albifrons*) can take place in the temperature range of 24-30 °C.

IV. CONCLUSION

The conclusions from the results of the study are as follows:

1. Egg hatchability increases with increasing concentration of ketapang leaf extract to a concentration of 30 ppm in the media
2. Ketapang leaf extract can be an agent (stabilizer) in maintaining water quality stability.

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