The Effect Of Different Temperature On Survival Rate And P38 Mapk (*Mytogen Activity Protein Kinase*) Of *Pangasius Djambal*

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Abstract

The low survival value of seedlings is due to stress. Naturally cells in fish respond to the presence of environmental stressors by producing stress proteins such as mitogen-activated protein kinases (MAPKs). MAPKs are one of the important cellular signaling systems in fish as a response to the presence of environmental stressors. This study uses a completely randomized design method, 3 treatments 3 replications. The treatments given were (A) 28°C temperature treatment, (B) 30°C temperature treatment, (C) 32°C temperature treatment, observations made were measurements of p38 mapk levels, survival and physical and chemical parameters. From observations of tissue staining (p38 MAPK) in the above table shows that the best results obtained in treatment B (30°C) because there are many negative MAPK, so that at experience 30°C the fish did not significant stress, and the highest survival rate was 83.3 %.

Keyword : Survival rate, p38 MAPK, Pangasius djambal

Introduction

Pangasius djambal is one of the Pangasius species groups originating from the public waters of Riau, Jambi, South Sumatra, Kalimantan, Java and several other provinces in Indonesia. This fish has great potential as an export commodity because it has white flesh which is preferred by overseas consumers such as the United States and Europe (Hadinata, 2009).

The low survival value of seedlings is due to stress. Changes in temperature in the environment of maintenance media can affect the life of fish and can even cause stress. High temperatures can cause oxygen to decrease and reduce fish appetite. Although fish can acclimatize at relatively high temperatures, but to a certain degree an increase in temperature can cause fish death. Drastic changes in temperature up to 5°C can cause stress to the fish or kill it (Cholik et al., 1986). Kubilay and Ulukoy (2002) state that stress is the inability of an organism to maintain the condition of homeostasis due to the disruption of the individual by external stimuli called stressors.

Naturally cells in fish respond to the presence of environmental stressors by producing stress proteins such as mitogen-activated protein kinases (MAPKs). MAPKs is one of the important cellular signaling systems in fish as a response to the presence of environmental stressors, so this stress protein has the potential to be used as a molecular biomarker (Santoso 2010). The application of molecular biomarkers is important in aquaculture efforts for biomonitoring waters that are the source of water or the maintenance media for aquatic organisms. Early detection of the presence of stressors in the aquatic environment can prevent the failure of aquaculture businesses due to decreased production.

Material and Metods

The materials used include: test fish in the form of Pangasius djambal seeds measuring 15 cm with 95 male sex from BBI Tulungagung Regency. The feed used is commercial feed T-78 (-2) CP Prima production. Feeding is done adlibitum.

The work method used in this study is the experimental method, which is a set of actions and observations, which are carried out to check or blame hypotheses or recognize the causal relationship between symptoms. This research was conducted with 3 treatments and 3 replications. The treatments given were (A) 28^{o}C temperature treatment, (B) 30^{o}C temperature treatment, (C) 32^{o}C temperature treatment, observations made were measurements of p38 mapk levels, survival and physical and chemical parameters.

Result and Discussion

P38 MAPK

The detection of p38 MAPK expression uses the immunohistochemical method, which is a technique to detect the presence of various components contained in cells or tissues by using the principle of antigen (Ag) and antibody (Ab) bonding reactions.

Immunohistochemical techniques can be used to study the distribution of specific enzymes and detect the presence of various active components contained in cells or tissues such as proteins and carbohydrates (Furuya et al. 2004). From the observations of tissue staining (p38 MAPK) in the above table shows that there are a lot of negative MAPK in the control, while in treatment A (28^{o}C) there are many positive MAPK, in treatment B (30^{o}C) there is a negative MAPK, and in treatment C (C) 32^{o}C) there is a positive MAPK. From the above results it can be concluded that the best results are obtained in treatment B (30^{o}C) because there are many negative MAPK, so that at 30^{o}C the fish do not experience significant stress.

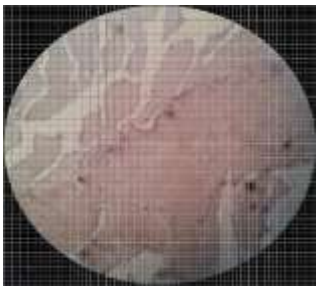

Figure 1. Control

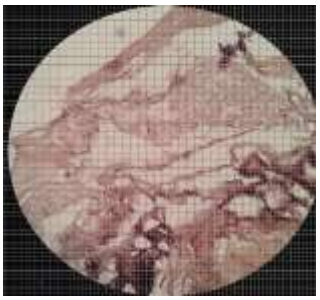

Figure 2. Treatment temperature 28^{o}C

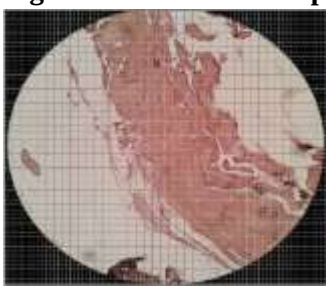

Figure 3. Treatment temperature 30^{o}C

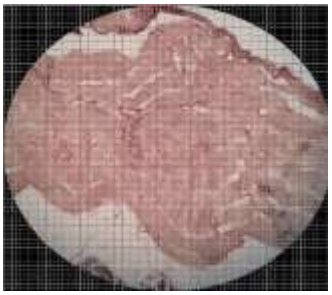

Figure 4. Treatment temperature 32^{o}C

There are two immunohistochemical staining methods, namely the direct method and the indirect method. The direct method uses only one antibody, the primary antibody that has been labeled. The indirect method uses two antibodies, the primary antibody without

labeling and the secondary antibody that has been labeled. There are also several indirect methods, including the avidin-biotin method, the peroxidase method, and the tyramin amplification method. But the method often used in laboratories is the peroxidase method, because it is 100-1000 times more sensitive than other methods (Ramos & Vara 2005).

The principle of immunohistochemical staining of the peroxidase method, that is, antigens that are present in tissues, is bound with specific primary antibodies. Then the primary antibody bound to the antigen is then bound to a secondary antibody (primary antiantibody) that has been labeled by the peroxidase enzyme. The addition of a substrate containing chromogen and H2O2 will give rise to brown and H2O deposits. Brown sediment is the result of decomposition of the substrate (chromogen and H2O2) by the enzyme peroxidase. Brown color that appears indicates a positive reaction (+), which means that in the network there are antigens. If there is no antigen in the tissue, brown color will not appear (Ramos & Vara 2005).

Survival Rate

Based on the results of research on different temperature changes on survival rate, it was found that the following survival rates:

Table 1. Survival rate (%):

Treatment	Temperature	Repeat			Average
		1	2	3	%
K	(-)	6	6	8	66,7%
A	28^{O}C	6	8	7	70%
B	30^{O}C	7	8	10	83,3%
C	32^{O}C	3	0	5	26,7%

From the table above shows that the smallest SR was obtained in treatment C (32ºC) because at that temperature experienced severe or significant stress so that many died. While the largest SR was obtained in treatment B (30ºC) because at that temperature did not experience significant stress or were said to be at optimal temperatures.

Temperature can also affect the growth of . Fish are cold-blooded animals so that the body's metabolism depends on the temperature of the environment, including fish immunity. High temperatures cause the fish to actively move, do not want to stop eating and metabolism rapidly increases so that the stool becomes more. This causes oxygen demand to rise, while the availability of oxygen in water will decrease so that the fish will lack oxygen in the blood, consequently the fish become stressed and prone to disease. Lesmana (2002) states that the environmental factor that most regulates the speed of growth is water temperature.

During the study oxygen was still in the range between 3.5-4.8 mg / L by giving aeration so that dissolved oxygen remained stable, according to Boyd's statement (1990), fish growth and survival were good at DO values> 3.5 mg / L.

Conclusion

Provision of different temperatures affect the survival of (Pangasius djambal) seeds at the time of maintenance, because the results of calculations show very significant different results which means it is very influential in maintenance.
The best temperature in this study was obtained in treatment B (30ºC) with a SR value of 83.33% with the results of MAPK there were many negatives

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