Original Research Article

APPLICATION OF THE USE OF GARLIC EXTRACT AS A PRESERVATIVE INGREDIENT FOR CARP WITH ORGANOLEPTIC TESTS AND pH TESTS

ABSTRACT

This research is to analyze how long carp can be preserved at low temperatures with the addition of the natural preservative garlic. This research was conducted from 24 October 2023 to 3 November 2023. The research location was at the Fisheries Product Processing Technology Laboratory, Faculty of Fisheries and Marine Sciences, Padjadjaran University, Jalan Raya Jatinangor KM 21, Sumedang-Indonesia. The assessment is carried out through organoleptic tests and pH measurements. The concentrations of garlic solution used were 15%, 20%, and 25%. The suitability level of carp is determined based on Indonesian National Standards 2729:2013, where the limit for suitability for consuming fresh fish is 5. Based on research results at a concentration of 15% carp can still be declared fit until the 3rd day because after the 3rd day it starts to occur. decrease in terms of organoleptic values of eyes, meat, smell and texture. At a concentration of 20% carp can still be declared fit until the 7th day because the organoleptic value of the eyes, flesh, smell and texture begins to decline to unfit levels. And at a concentration of 25% carp can still be declared viable until the 9th day. And the pH test results on day 7 had reached a value of 6.0.

Keywords: Carp; Organoleptic; pH;Fish preservation; Garlic extract

1. INTRODUCTION

Fish is an aquatic commodity that easily experiences quality degradation. Fish is also a source of animal protein which is easily damaged by bacteria, yeast and fungi [10]. In fish, high water content is a medium that can make spoilage bacteria grow well [4]. In carp, the water content in them is around 79.65% [9].

The market value for fishery products is determined by the degree of freshness and durability. Therefore, one way to overcome this is by preserving it. The usual way of preserving is by storing fishery products at low temperatures. Storage at low temperatures is an effort to inhibit microbial or enzyme activity by storing it in a refrigerator (refrigerator) or freezer [10]. Storage at low temperatures is intended to inhibit the growth of spoilage

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I read this paper carefully and, i offer the name is more suitable. Because you dont analyzed chemical composition analyzes and for this reason you shouldn't use "ingredient" in the title. You don't have information about garlic extract affected or not the product's ingredient. Isn't it? If you need use 'ingredient' you should analyzed food composition.

Comment [IK2]: Please give the celcius range?

Comment [IK3]: Why you selected garlic(antimikrobial, .. etc.) , brief please.

Comment [IK4]: You can write only day (storage period)

Comment [IK5]: Not need to write this in abstract, you can write inside the paper.. Please give information about your research conditions, why you select this parameters, natural additivies and also PLEASE EXPLAİN WHAT İS YOUR STUDY AİM AND WHAT YOU FİND AFTER THİS STUDY (IT İS IMPORTANT) PLEASE EXPLAIN IT IN ONE SENTENCE.

Comment [IK6]: Please explain each pH value for each concentration and storage day… because in the title you use 'pH test' for this reason it is important to explain in abstract

Comment [IK7]: For what reasons it is easy to degrade, please explain and give citiation.

Comment [IK8]: Please explain, which water activity ranges can bacteria, yeast and fungi grow in?

Comment [IK9]: You should provide more than one reference confirming this range.

Comment [IK10]: What are the other methods? Why is cold storage preferred over other methods?

bacteria, therefore fish that will be stored at low temperatures must be cleaned first to reduce microorganisms that may be present in the fish.
When preserving fish, natural preservatives can be added to make the fish store longer. Natural preservatives are used because they are considered not to cause toxins in the body and are considered safer. Examples of natural preservatives are garlic, cloves, carrots, and so on.Adding garlic and carrot extracts within 7 days resulted in a water content < 60%, ash content < 2% and the amount of microbial contamination < 5.0 x 104 colonies/gram [10]. This is in accordance with SNI standards.
Garlic contains allicin which functions to kill gram-positive and negative bacteria. Garlic is also a natural preservative that has antimicrobial properties. According to [3], the benefit of garlic is that it reduces the number of aerobic bacteria and other microorganisms with the resulting benefit being that food lasts longer. Based on research by [9], the use of garlic extract in African catfish has a significant effect on organoleptic values, texture, smell and eyes. And the concentration that gives good results is a concentration of 20% with a storage time of 6 days.
Based on the description above, the problem that can be formulated is what is the effect of the application of garlic as a preservative for carp at low temperature storage based on organoleptic tests and fish pH tests. This research is to find out how long carp can be preserved at low temperatures with the addition of the natural preservative garlic

2. MATERIAL AND METHODS

This research was conducted in October 2023 at the Fisheries Products Technology Laboratory, Faculty of Fisheries and Marine Affairs, Padjadjaran University. The aim of this research was to determine the effectiveness of garlic concentration on the organoleptic quality of goldfish (Cyprinus carpio).

In this research, the materials used were goldfish (Cyprinus carpio) weighing 210-250 grams per fish, 1.5 kilograms, and 1.2 kilograms of garlic obtained from the Cileunyi market, and 8 liters of distilled water. The tools used are styrofoam, plastic wrap, plastic containers, knives, choppers, scales, labels, and refrigerators.

The method used for organoleptic testing of hedonic quality is by using the fresh fish scoring test, Indonesian National Standard 2729:2013. The results obtained from the organoleptic assessment of hedonic quality were then analyzed, then the freshness level of the carp was determined according to the criteria of the Indonesian National Standard 2729:2013.

2.1 Fish Preservation Procedures

2.1.1 Making Garlic Extract

In this study, 4 garlic extract concentration treatments were used, namely 15, 20, and 25%. To obtain garlic extract with a concentration of 15%, 150 grams of garlic has been crushed, blended and dissolved in 1 liter of distilled water. Leave the garlic solution for 25 minutes, then filter to separate the dregs

2.1.2Fish Preparation, Soaking Treatment, and Storage

The carp used in the research were brought to the laboratory in an insulated box (cool box) and kept fresh with ice. The fish is then weeded and washed clean.
Soak the fish in garlic extract for 15 minutes. The concentration of garlic extract solution used is 15%; 20 % ; 25 %. Use 1 liter of distilled water so that the entire surface of the fish is submerged. After soaking, the fish is then drained, placed in a styrofoam container, then

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Comment [IK12]: Please give citiation about past references, which natural additivies considered safer? For which reason?

Comment [IK13]: Please give the citiations for each (garlic, carrots.. Etc.)

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Comment [IK16]: What is SNI standarts? Please explain before than use and give citiation.

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Comment [IK18]: Please give information about other concentrations and overall storage period.

Comment [IK19]: Which temperature ranges, please give the information about it.

Comment [IK20]: Previously, you should give information about how the application of using garlic changes the pH value in carp fish.

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covered with cling wrap and stored in the refrigerator. Observations were made on days 0, 3, 7, 9, and 10.
The parameters observed include pH and organoleptic. The pH value is measured using a pH meter. One g of sample was taken and then crushed until smooth. The finely ground sample was put into a test tube containing 10 ml of distilled water, shaken until homogeneous. The homogenate is then measured with a pH meter that has been previously calibrated. The method used for organoleptic testing of hedonic quality is using the fresh fish scoring test Indonesian National Standard 2729:2013. The data obtained from the results of the organoleptic assessment of hedonic quality were then analyzed, then the freshness level of the carp was determined using criteria based on Indonesian National Standard 2729:2013.

Comment [IK23]: Please explain which temperature range? For example 4C?

Comment [IK24]: Please seperated pH analyzes and organoleptic analyses, after explain it.
Give the model name the pH meter.
Give the information about hedonic test panelist, what type of panelist and number of panelist etc..

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3. RESULTS AND DISCUSSION

3.1 Organoleptic Test Value of Eyes in Carp

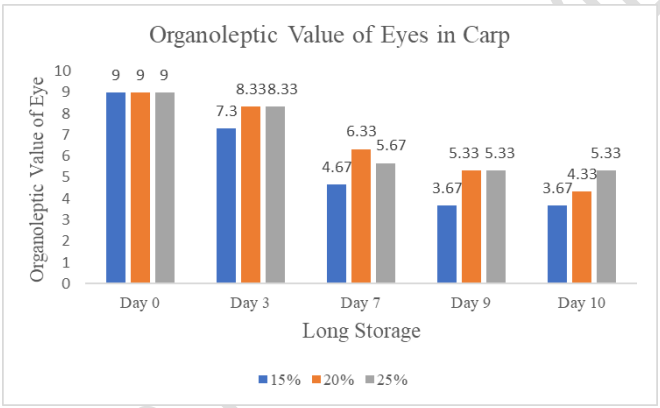

Fig. 1 Organoleptic Value of Eyes in Carp

The eyes are the main and easiest freshness indicator seen by consumers when buying fish. One of the important things on the body of the fish that is used as a parameter for the freshness of the fish is the appearance of the eyes [8]. From the results of the analysis of the organoleptic value of carp eyes in all treatments on day 0, it has a very high organoleptic value of 9 with convex eyeball criteria, clear cornea and pupils, and specific shiny. However, the organoleptic value of carp eyes appeared to decrease with the length of storage at low temperature. The organoleptic value of carp eyes appeared higher with the addition of higher concentrations of garlic. The decrease in the organoleptic value of carp eyes varied, on day 3 the highest eye organoleptic value in the addition of 20% and 25% garlic concentration was 8.33, on day 7 the highest eye organoleptic value in the addition of 20% garlic concentration was 6.33, on day 9 the highest eye organoleptic value in the addition of 20% and 25% garlic concentration was 5.33, and on day 10 the highest eye organoleptic value in the addition of 25% garlic concentration was 5.33. On the final day of observation of the organoleptic test (day 10) the highest carp eye value has the criteria of a slightly sunken eyeball, cloudy cornea, slightly grayish pupil and not shiny. The level of feasibility of carp consumption is determined based on the Indonesian National Standard 2729:2013, where the limit of feasibility of fresh fish consumption is 5. The results of the organoleptic value of carp eyes show that the consumption feasibility standard is not below the value of 5, namely on day 10 with a garlic concentration level of 25% with a value of 5.33.

Comment [IK26]: How about other organoleptic freshness factor?

The decrease in the organoleptic value of the eyes of different carp is caused by differences in the concentration of garlic given, the higher the concentration of garlic given, the better the organoleptic value of the eyes and the longer the carp is stored. The organoleptic value of the eyes decreases, this is because the activity of the compounds in garlic decreases. Garlic contains only a small amount of active substances that can inhibit bacterial growth so that to become a strong antibacterial, a higher concentration of garlic is needed [12].

3.2 Organoleptic Test Value of Meat in Carp

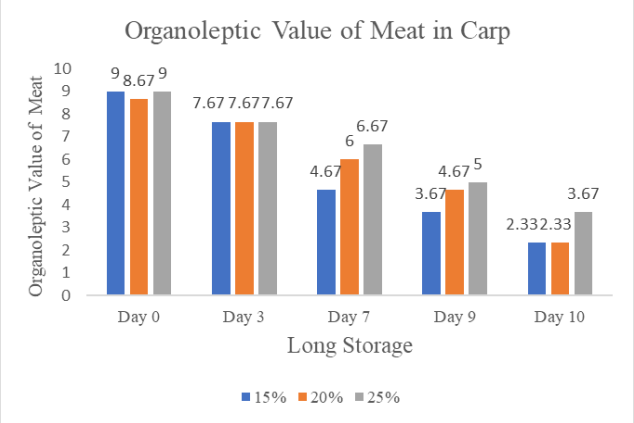

Fig. 2 Organoleptic Value of Meat in Carp

Meat is one of the parameters that determine the freshness of fish. From the results of the analysis of the organoleptic value of carp meat in all treatments on day 0, it has the highest organoleptic value with the addition of 15% and 25% garlic concentration of 9. On day 0, the organoleptic value of adding 20% garlic concentration is 8.67, this is because the fish meat at the time of the first observation has a slight wound that allows the meat to be contaminated by bacteria which can accelerate the decline in fish quality. The organoleptic value of carp meat on day 3 in all treatments of adding garlic concentration decreased by 7.67, on day 7 the highest organoleptic value of carp meat was the addition of 25% garlic concentration of 6.67, on day 9 the highest organoleptic value of carp meat was the addition of garlic concentration of 5, and on day 10 the highest organoleptic value of carp meat was the addition of 25% garlic concentration of 3.67. On the final day of observation of the organoleptic test (day 10), the highest carp meat value has the criteria for dull meat incision and less strong meat tissue.The results of the organoleptic value of carp meat show that the consumption feasibility standard is not below the value of 5, namely on day 9 with a garlic concentration level of 25% with a value of 5.

Referring to the quality standards of fresh fish Indonesian National Standard 2729-2006, the organoleptic value of fish meat can be said to be fresh if there has been no change in the fish meat. This is indicated by the criteria of fish meat which is still solid and chewy and difficult to tear the meat with the spine. The decrease in organoleptic value in carp meat is due to the activity of compounds in garlic decreasing along with the length of storage, the quality of fish meat decreases and begins to rot due to microbial activity.

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3.3 Organoleptic Test Value of Odor in Carp

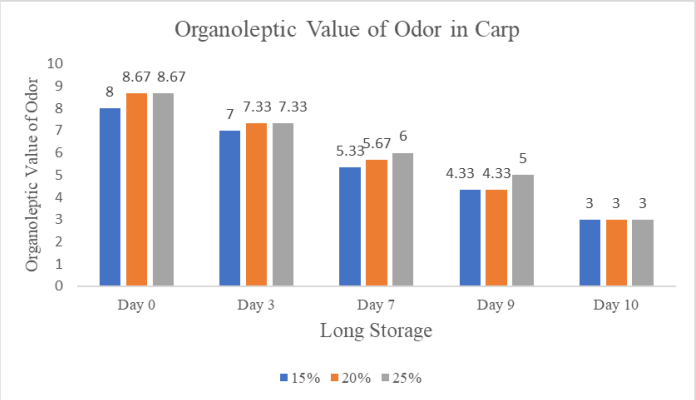

Fig. 3 Organoleptic Value of Ododr in Carp

Comment [IK28]: Rewrite 'odor'

Odor is one of the easy-to-use parameters for determining fish freshness. Odor is more influenced by the sense of smell. In general, the odors that can be received by the nose and brain are mostly a mixture of four types of odors, namely fragrant, sour, rancid and burnt [13]. The organoleptic value of fish odor appears to be higher at higher garlic concentrations. However, the sensory value at all levels of garlic concentration will decrease with the length of storage. The sensory value of carp odor at 0 days of storage with the addition of 15% garlic was 8, the addition of 20% garlic was 8.67, and the addition of 25% garlic was 8.67. The criteria are fresh smelling, specific type. After 10 days of storage, the organoleptic value of the odor of carp with the addition of 15%, 20% and 25% garlic decreased to 3. This shows that organoleptically the rotten smell and ammonia smell began to smell. The level of suitability for consuming carp is determined based on the Indonesian National Standard 2729:2013, where the limit for suitability for consuming fresh fish is 5. The odor of carp with the addition of 15% and 20% garlic began to be rejected by panelists on the 9th day of storage while the smell Carp treated with the addition of 25% garlic began to be rejected on the 10th day of storage. Fish spoilage is characterized by oxidative rancidity due to fat oxidation reactions, giving rise to an undesirable rancid odor [6].

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3.4 Organoleptic Test Value of Texture in Carp

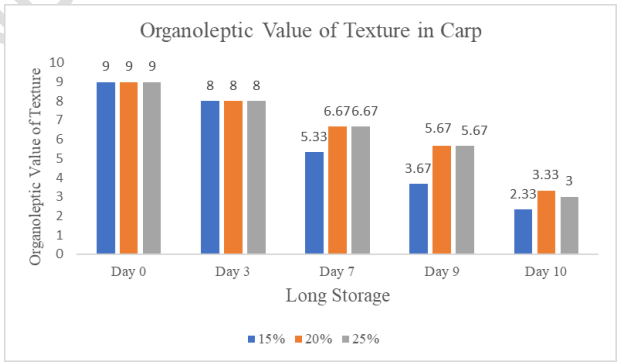

Fig. 4 Organoleptic value of Texture in Carp

Texture is everything related to mechanics, taste, touch, sight and sound, including evaluation of moisture, dryness, hardness, smoothness, roughness and fat [11]. Texture factors include touch by hand, tenderness, and ease of chewing [7]. The organoleptic value of carp texture appears to be higher at higher garlic concentrations. However, the organoleptic value at all levels of garlic concentration decreased with the length of storage. The organoleptic value of the texture in each treatment decreased with different results, the organoleptic value of the carp texture after 0 days of storage was 9. The criteria included dense, compact and elastic flesh when pressed with a finger. After 10 days of storage, the organoleptic value of carp texture with the addition of 15% garlic decreased to 2.33, the addition of 20% garlic decreased to 3.33, and the addition of 25% garlic decreased to 3. Organoleptically the texture was very soft, finger marks wouldn't disappear, and the flesh was easily torn from the spine. The level of suitability for consumption of carp is determined based on the Indonesian National Standard 2729:2013, where the limit for suitability for consumption of fresh fish is 5. The texture of carp with the addition of 15% garlic began to be rejected by panelists on the 9th day of storage while the texture of carp with The treatment with the addition of 20% and 25% garlic began to be rejected on the 10th day of storage. The decrease in texture quality is caused by the work of microbial enzymes which modify the fish meat to become softer. Texture is also influenced by water retention which is related to denaturation of fish proteins. The decline in fish quality is characterized by a change in the texture of the meat to become softer which is caused by the breakdown of muscle tissue through an enzymatic process and the release of mucus from the surface of the skin by bacteria [2].

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3.5 pH Levels of Carp

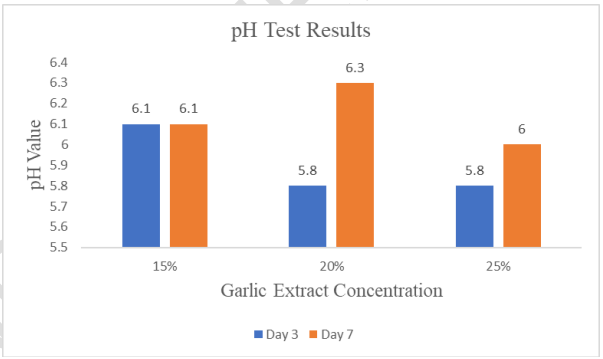

Fig. 5 pH Test Results

The pH value is an index used to determine the freshness of fish. In the spoilage process in fish, changes in the pH of the flesh play a very important role because it affects the autolysis process and bacterial attack. In the research conducted, the pH of each treatment can be seen in table 1. A good pH for preserved fish is between 2.0–5.5, while a pH of 6.0–8.0 is a good medium for the growth of microorganisms [1]. Based on the research results, the pH value when administering 15% garlic extract on days 3 and 7 has a constant value. However, giving 20% and 25% garlic extract has a pH value that increases on the 7th day. On the seventh day there is an increase in pH, this is due to the process of protein breakdown in fish flesh by enzymes and bacteria resulting in the formation of alkaline compounds such as ammonia. [5]. Storing fish at low temperatures slows down enzyme

Comment [IK31]: How about carp fish? Please citiation especially.

activity in the fish's body. The lower the temperature used, the more inhibited enzyme activity is [5].

4.CONCLUSION

From the results of the organoleptic assessment and pH test of carp with the addition of garlic, a garlic concentration of 25% is still acceptable for the suitability of the fish until the 9th day. The addition of a garlic concentration of 20% until the 7th day is the acceptable limit for the suitability of the fish. And a garlic concentration of 15%, the acceptance limit is under 7 days. From the results of the pH test that has been carried out, on the 7th day at a garlic concentration of 25% it has reached 6.0.

Comment [IK32]: Which temperature ranges? Give the C value..

Comment [IK33]: What is the general purpose of this study and what have you determined?

Comment [IK34]: Please explain overall work, why you selected this subject and what you find after this work?

Comment [IK35]: Acceptable for which properties?

Comment [IK36]: What is initial pH value of each concentrations? And how much affected pH of garlic concentrations during period?

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REFERENCES

Comment [IK39]: If you can, please give more references about work area, especially information. It is help for getting this paper stronger. GOOD LUCK

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