The sensory profile of *Lutjanus* sp and *Cephalopholis* sp kept in Atung *Parinarium glaberimum* Hassk powder, ice and its combination

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**Abstract.** Nowadays bioactive compound from plant are used to support pharmacological industry, while in food industry it is encouraged as preservatives, either as antioxidant or antibacterial. Atung plant (*Parinarium glaberimum* Hassk) is endemic in Mollucas. Fruits of Atung have been used for hundred of years by the local fishermen when they go fishing. Efforts to preserved fresh food especially fish were continually pursue by using natural preserver which contained bioactive compound as anti-bacteria both patogen and spoilage. The purpose of the study was to investigate the effectivenes and to get information on the sensory quality of post-harvested using *Lutjanus* sp. and *Cephalopholis* sp. kept in atung, ice and a combination of atung and ice. The fishes were kept in 0.3% atung (W/W), ice (1:1) and a mixture of atung and ice, with shelf-life of freshness of 0, 6, 12, 18, 24 and 30 hours. Sensory quality test was conducted by using descriptive test with scale ranged from 1-9. Quality parameters observed were the appearance consist of eyes, gill, body surface, slime, flesh and stomach; odour; and consistency. Firstly, the results showed that treatment atung and ice is the prime sensory quality was at 18th with scale values of 8.2 and 18th with scale values of 8.2 for *Lutjanus* sp. and *Cephalopholis* sp., respectively. Secondly, the results showed that sensory quality of postharvested fresh *Lutjanus* sp. kept in atung and ice was the best treatment and with longer shelf-life of freshness, i.e 36 hours at 6.1 scale. Application of atungs powder were more practical, efficient and cheaper than ice. As an alternative preservative fresh fish food by the fishermen. It is the best strategy in Mollucas because atung is endemic plant. It’s can be applied to archipelago community in Mollucas with the characteristic of small islands.

1. Introduction

Back to nature has become a central issue, therefore studies directed to natural bioactive products either from plants or animals should be encouraged. The use of natural bioactive products either for medical purposes or for food is of great advantage because there is no side effect to the users. Nowadays extract from plant are used to support pharmacological industry, while in the food industry it is encouraged as preservatives, either as antioxidant or antibacterial such as *Atung* (*Parinarium glaberimum* Hassk).

Mollucas has many species of coral fishes including the following one that was used during this experiment i.e *Cephalopholis* sp., *Lutjanus* sp., *Mulloideichthys* sp., *Aphareus* sp., and *Melichthys* sp.. There are however problems encountered by fishers when come to the aspect of preserving their catch. Ice usage is one of the solution however it is not cheap as electricity remain to be critical component to produce it. As such we have to find alternative method that suit to our traditional fishing practice.

The escalation of dangerous synthetic chemical preservatives used by salted fish processors, such as formalin, borax, bleach and kututox, were to be the concern of many researcher in 2009 - 2016; the wide spread of salted fish contaminated by formalin and the use of borax in several markets in Indonesia have been reported [1, 2, 3, 4, 5, 6, 7]. On the other hand the study of *Atung* seeds as a food preservative has been proven as a food anti-bacterial food and anti-oxidant, as a broad-spectrum anti-bacterial includes pathogenic and destructive bacteria [8, 9]). *Atung* is evidently to be 9 times more effective than BHT synthetic antioxidants [10]. Application of *atung
for fresh fish handling has been carried out for shrimp, small fresh pelagic fish and loin tuna export quality. Research on Atung shelf-life was pioneered to preserve fresh prawn, and apparently could increase the freshness from 3 to 17 hours, so that transportation and marketing were unimpeded. Treatment with atung fruit could also suppress the growth of microbes. It was a preliminary research that needed to be extend and deal with the basics [11]. Furthermore, Atung were used in several activities such as, research, community service and patent [12, 13, 14]. The purpose of the study was to investigate the effectiveness from atung and to get information on the sensory quality of post-harvested using Lutjanus sp. and Cephalopholis sp. kept in atung, ice and combination of atung and ice.

2. Materials and Method

2.1. Samples material
Atung fruits used were mature seed have average weight of 10 g, collected from Hutumuri village in Ambon Island. Average weight of Lutjanus sp. was 250 g and Cephalopholis sp. was 200 g Collected by fishermen after four hours post-harvested in the Hutumuri beach. The fishes were then kept cool in Styrofoam box with size 100 cm x 50 cm x 50 cm.

2.2. Atung powder preparation
Atung fruits were cut longitudinally section into two part, after that to get the seed. Then the seed were grilled and air-dried. When the seeds dried, they were kept in plastic poliethylene. Each package is 250 g. Atung powder ready to be used.

2.3. Experimental treatments
They were four treatments of preservative in this research: 1). 0.3% atung (W/W), 2). ice (ice:fish = 1:1), 3) a mixture of atung and ice, and 4) a control (without atung and ice). Time Interval of shelf life of freshness was six hours with six grade i.e 0, 6, 12, 18, 24 and 30 hours. Observation of each treatment with two replications.

2.4. Procedure handling of fishes
Firstly, Lutjanus sp. and Cephalopholis sp. were cleaned with fresh water. Secondly, drained and then smeared with 0.3% atung powder (w/w); and chilled with ice (ice: fish = 1:1) (w/w). The control treatment was prepared the same way. Afterwards, the fishes were keep in Styrofoam box ice.

2.5. Data analyses
Sensory profile analyses of the fish samples was done for 0, 6,12,18,24 and 30 hours. Data of sensory quality consist of three part. Sensory quality of appearance i.e gill, eyes, body surface's slime, flesh and stomach; odour; and consistency. Sensory quality test by using descriptive test panel with scale ranged from 1-9 [15]. There was 22 panellist consist of two were experts and 20 were semi-trained. Data were tabulated and presented in histogram.

3. Result and Discussion

3.1. Shelf life of freshness of Lutjanus sp. and Cephalopholis sp. preserve with atung
Table 1 showed that the prime sensory profile of post-harvested Lutjanus sp.and Cephalopholis sp. preserved at the 18th hours at 22 hours post-harvested. The value was 8.1 for appearances, 8.2 for odor, and 8.3 for consistency, with the average is 8.2.

The prime sensory profile of post-harvested Lutjanus sp.: preserved with ice was at the 18th hours at 22 hours post-harvested with value 8.2 of appearances, 8.0 with value of odour; and 8.1 with value of consistency and average is 8.1.
Table 1. Sensory profile of *Lutjanus* sp. and *Cephalopholis* sp. preserve with atung

| Species            | Shelflife of freshness (hours) and it's sensory value |
|--------------------|-------------------------------------------------------|
|                    | Reject with Atung | Prime with Atung | Reject with Ice | Prime with Ice |
| *Lutjanus* sp.     | 30 and (6.1)     | 18 and (8.2)     | 30 and (6.6)    | 18 and (8.1)   |
| *Cephalopholis* sp | 24 and (6.8)     | 18 and (8.2)     | 30 and (6.2)    | 12 and (8.2)   |

Treatment with *átung* and combine *átung* and ice showed highest appearance value and longest shelf-life of freshness. These values was influenced by the activities of deteriorating and number of bacteria. In both treatments, *átung* which contained bioactive compound has inhibit the activities of bacteria, which in turn, prohibited the deterioration of the fish [11, 16]. Generally, seeds of certain plants could be used as food preservative to prohibit biological deterioration caused microbes [17, 18]. Furthermore, *átung* seeds had cells and tissues where certain bioactive compounds of secondary metabolites were stored and deposit [26, 27, 28]

3.2. Profile sensory with preservative material treatment of *Lutjanus* sp.

3.2.1. Sensory profile of appearance of *Lutjanus* sp. Sensory profile appearances (eyes, gill, body surface's slime, flesh and stomach) in average values is presented in Figure 1.

Figure 1 showed that the rejection limit of appearance fresh *Lutjanus* sp at controlled, *Atung*, ice and combined ice and *Atung* : the shelf-life were at 6th hours with value is 6.6, at the 24th hours with value is 7.2, at the 30th hours with value is 6.7 and more than 30 hours or 36th with value is 6.2 respectively. The prime quality sensory at 18th hours with value is 8.2. It's the showed higher appearances' values and longer shelf-life of freshness. These values to be due the influence of the activities of deteriorating and number of bacteria. Because *Atung* powder which contained bioactive compound can inhibit the activity of bacteria. This compound bioactive is acetalic acid. It can be prohibited the deterioration of the enzyme in fishes [11, 16]. Seeds of certain plants can be used as food preservative to prohibit biological; deterioration caused by microbes such as *Atung* seed [17, 18]. Also supported by [26, 27], they showed that some of plant contain bioactive compound.
3.2.2. Sensory profile of odour of Lutjanus sp. Sensory profile of odour is presented in Figure 2

![Figure 2](image)

Figure 2. Sensory profile of odour of fresh Lutjanus sp. kept in preservative during shelf-life.

Figure 2 showed that the rejection limit of odour fresh Lutjanus sp at controlled, Atung, ice and combined ice and Atung in order as follows: the shelf-life were at 6th hours with value is 6.8, at the 24th hours with value is 7.3, at the 30th hours with value is 6.7 and more than 30 hours or 36th hours with value is 7.0. The prime quality sensory based on sequent of treatment above as follows: at the 18th hours with value is 8.2, at the 18th hours with value is (7.9), at the 18th hours with value is (7.9), and at the 24th hours with value is (8.1). Treatment with Atung and combined Atung and ice showed highest odour values. Because Atung had also prohibited the activities of deteriorating and number of bacteria [11,16], and therefore retained the freshness of the fish. Generally, post-mortem changes in fish consist of several cases: changes of sensorial, autolysis by enzyme, bacterial action, rancidity process and physical changes would accumulate in the change of odour produced [18, 19, 20, 21]. Therefore Atung might have held back the changes because of Atung function as a antimicrobe. The destructive action of microbes can be prevented by Atung, because Atung has bioactive components. This component bioactive namely is acelaic acid.

3.2.3. Sensory quality of consistency of Lutjanus sp. Sensory quality of consistency is presented in figure 3. Figure 3 showed that the rejection limit of consistency fresh Lutjanus sp. at controlled, Atung, ice and combined ice and Atung: the shelf-life were at 6th hours with value is 6.5, at the 24th hours with value is 7.1, at the 30th hours with value is 6.4 and 36th with value is 6.0 respectively. The prime quality sensorys at the 18th hours with value is 7.9, at the 18th hours with value is 8.0, and at the 24th hours with value are 8.1 respectively. Treatment with Atung powder showed rather low consistency or texture value compared with those of appearance and odour. This could be explained by the possibility of Atung contained enzymes which could tenderize the meat of fish. Inside parts of certain plants contained meat tenderizer enzyme [22, 23, 24]. Treatment with Atung powder showed longer shelf-life freshness because Atung contained bactericidal of bioactive compound. This compound active is acelaic acid. Another hand Atung function to inhibit bacterial pathogen and spoilage or deterioration process of food fresh product. Adding to [26, 27, 28] that Atung seeds had cells and tissues where certain bioactive compounds of secondary metabolites were stored and deposit. They showed that some of plant contain bioactive compound.
Figure 3. Sensory profile of consistency of fresh *Lutjanus* sp. kept in preservative during shelf-life.

4. Conclusion
The sensory profile of post harvested *Lutjanus* sp. and *Cephalopholis* sp. treated with atung and ice were different. Treatment with atung for *Lutjanus* sp. better than *Cephalopholis* sp. The prime sensory quality was at 18th with value 8.2, while ice at 12th. The best sensory profile and longer shelf-life freshness of *Lutjanus* sp. was 30 hours and 7.7 scale, of post harvested treated with a combination atung and ice. The prime sensory quality was at 24th with value 7.8 (appearance), 8.2 (odor) and 8.2 (consistency). Atung should be one of the best choices for fishermen on small islands community because of Atung fruits can be used as an alternative preservative material to substitute ice by the fishermen, because the fish condition treated with atung is still in prime sensory at 22 hours post-harvested. Atung fruits were more practical, efficient and cheaper, and critical to be uses by small scale traditional fishermen.

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