

# THE EFFECTIVENESS OF THE USE OF *ALLIUM CEPA* (ONION) EXTRACTS AS A PRESERVATIVE AGENT TO *DECAPTERUS MACARELLUS* (GALUNGGONG)

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## ABSTRACT

*This study focused on the effectiveness of onion (*Allium cepa*) extract as preservative to galunggong (*Decapterus macarellus*). The study covers the effects of such a preservative to texture, odor, appearance, taste and over-all acceptability. The onion extract was applied on the fish and was placed in a 4 degree Celsius freezer, for 2 and 4 days. During the second and fourth day, the samples were presented to 30 panelists for evaluation using the Likert scale. The translation of scores using a T-test was done after the completion of the test for purpose of statistical analysis. At 0.05 level of significance, the p-values indicates that there is no significant difference between the fresh fish and with 2-day treatment in terms of appearance, odor, texture and the over-all acceptability except for taste. Moreover, the p-values indicates that there is significant difference between the fresh fish and with 4-day treatment in terms of texture, taste and the over-all acceptability except for the odor and appearance. Results indicated that no chemical and microbial analyses were done in the study.*

**Keywords:** Onion, Galunggong, Antioxidant, Antimicrobial Properties, T-test

## INTRODUCTION

Meat preservation is necessary for transporting meat for long distances without spoiling of texture, colour and nutritional value. The art of preserving meat is an aide to the development and rapid growth of super markets (Nychas, Skandamis, Tassou and Koutsoumanis, 2008). Preservation is a response to consumers demand high quality, preservative-free, safe but minimally processed foods with extended shelf life (Santas, Almajano, Carbo, 2010).

*Decapterus macarellus* also known as Galunggong or Round Scad, is commonly seen in the markets in the Philippines. Because of the high demand for such a species, it is now among the marine products that the Philippines is importing. These round scad is usually consumed by people who are living in urban and rural areas. These is, therefore, a need to ensure that galunggong becomes available in the market for long period of time.

*Allium cepa* (onion) has been used as an ingredient in various dishes for thousands of years by many cultures around the world. World onion production is steadily increasing so it is now the second most important horticultural crop after tomatoes (Bankole, 2004). There are many varieties

of onion and these are eaten raw, cooked, fried, dried or roasted. They are commonly used to flavour dips, salads, soups, spreads, stir-fry and other dishes (NIHORT, 1986 and Jilani, 2004). *Allium cepa* have long been considered an important vegetable (Hansen, 2001, p. 77).

*Allium cepa* is usually used as ingredient in cooking. It is a widely distributed vegetable, that is a good source of natural compounds with beneficial health effects. Onion is high in food value, moderate in protein content, and rich in calcium and riboflavin (Jilani, 2004). Onions have received considerable attention for their healthful, functional benefits. Phytochemicals in onions include the organosulfur compounds such as cepaenes and thiosulfinates (Dorsch and Wagner, 1991; Goldman 1996), the large class of flavonoids including quercetin and kaempferol (Dorant, 1994), and pigments such as anthocyanins found in red onions (Fitzpatrick, 1993). Onions are a rich source of dietary flavonoids with average values ranging from 270-1917 mg of flavonoids per Kg of fresh weight, depending on the variety of onion. They are mainly represented by the flavonols quercetin and kaempferol, commonly present as glycosylated forms. The antioxidant and antimicrobial properties of the flavonoids of the raw onion make it a good candidate for use in food preservation (Santas, Almajano, Carbo 2010). In this regard, onion seems to be potential as preservative.

A preservative is defined as a natural or synthetic chemical agent that prevents decomposition by microbial growth or any undesirable chemical change in finished products. They are added to various products to retard their spoilage, discoloration or contamination by microorganisms. Preservatives are the substances, which are used to prevent food spoilage from microorganism. It helps to prevent spoiling of foods that are created by microbial growth or chemical alterations, preservatives that either natural or artificial, are added to food products. (Singh, Sharma, & Garg, 2010).

*Allium cepa*, a natural preservatives has the chemical constituents that can be extracted from natural sources that offer intrinsic ability to protect products against microbial growth. Other natural oils include essential oil constituents, flavonoids, phenolic compounds, etc. (Singh, Sharma, & Garg, 2010, p. 602).

The study aimed to evaluate the combined effect of light salting, low temperature, and the use of onion extract in preserving fish. Moreover, it wanted to determine the shelf study of fish with onion extract using acceptability test. Furthermore, it wanted to validate the existing studies that were conducted that onions have the potential compounds that can preserve fish.

## **MATERIALS AND METHODS**

The galunggong (*Decapterus macarellus*) was bought fresh from the market. The internal organs were removed. In addition, the galunggong were cut into half for a better exposure to the extract. On the other hand, the red onions (300 grams) were bought from a local market. They were finely chopped and blandered with 300 mL water.

### Preparation of the fish together with the onion, light salting, and low temperature

The fish were lightly salted to enhance their lipid oxidation. Furthermore, the onion extract was placed in a bowl so that the fish can be dipped on the extract. The extract was used as an antioxidant for the salt. It was placed in a 4 degrees celcius freezer for 2 and 4 days.

## RESULTS AND DISCUSSION

A total of 30 panelist were presented two variations of fish that were coded as Sample A, and Sample B. Sample A is fresh fish bought in the market while Sample B consist of fish with onion extract with Day 2 and Day 4-treatment.

The study covers the effects of onion (*Allium cepa*) extract in preserving Fish (*Decapterus macarellus*) in terms of texture, odor, appearance, taste and over-all acceptability. No chemical and microbial analyses were done in the study.

Table1: Fresh Fish Average Mean Evaluation

	Fresh	
	Mean	Interpretation
Appearance	3.83	Like
Smell	4.03	Like
Taste	4.1	Like
Texture	3.87	Like
Acceptability	4.07	Like

Table2: 2-days Treatment Average Mean

	2 DAYS	
	Mean	Interpretation
Appearance	3.90	Like
Smell	3.93	Like
Taste	4.03	Like
Texture	4.17	Like
Acceptability	3.94	Like

Table 3: 4-days Treatment Average Mean

	4 DAYS	
	Mean	Interpretation
Appearance	4.37	Very Much Like
Smell	4.07	Like
Taste	4.07	Like
Texture	4.43	Very Much Like
Acceptability	4.40	Very Much Like

Table 4: T-test result between fresh 2-days Treatment

	Computed Value		Decision	Conclusion
	Computed-t	P- Value		
Texture	1.82	0.07	Accept Ho	NOT Significant
Smell	0.18	0.86	Accept Ho	NOT Significant
Appearance	0.14	0.88	Accept Ho	NOT Significant
Taste	2.48	0.019	Reject Ho	SIGNIFICANT
Acceptability	1.83	0.07	Accept Ho	NOT Significant

\*significant at 0.05 level of significance

Table 4 shows the result of T-test in the significant differences between fresh fish and fish with onion for 2 days in terms of texture, smell, appearance, taste and the over-all acceptability. At 0.05 level of significance, the p-values of 0.07, 0.86, 0.88 and 0.07 are all more than 0.05, then the null hypothesis are all accepted. Then, there is no significant difference between the fresh fish and with 2-day treatment in terms of appearance, odor, texture and the over-all acceptability.

However, the p-value of 0.019 is less than the level of significance, then the null hypothesis is rejected. Therefore, there is significant difference between the fresh fish and with 2-day treatment in terms of taste only.

Table 5: T-test result between fresh 4-days Treatment

	Computed Value		Decision	Conclusion
	Computed-t	P- Value		
Texture	3.27	0.002	Reject Ho	SIGNIFICANT
Smell	0.18	0.86	Accept Ho	NOT Significant
Appearance	0.14	0.88	Accept Ho	NOT Significant
Taste	2.83	0.006	Reject Ho	SIGNIFICANT
Acceptability	2.38	0.021	Reject Ho	SIGNIFICANT

\*significant at 0.05 level of significance

Table 5 shows the result of T-test in the significant differences between fresh fish and fish with onion for 4 days in terms of texture, smell, appearance, taste, and the over-all acceptability. At 0.05 level of significance, the p-values of 0.002, 0.006 and 0.021 are all less than 0.05, then the null hypothesis are all rejected. Then, there is significant difference between the fresh fish and with 4-day treatment in terms of texture, taste and the over-all acceptability.

However, the p-value of 0.86 and 0.88 are both more than the level of significance, then the null hypothesis is accepted. Therefore, there is no significant difference between the fresh fish and with 4-day treatment in terms of odor and appearance.

## CONCLUSION

Salt accelerated the lipid oxidation and the onion extract as an antioxidant solved the problem of the short shelf life of the fish. Meanwhile, the use of low temperature slows down the speed of enzyme reaction and also prevents the growth of most pathogens and food spoilage bacteria in preservation. Three methods were used in this study for controlling microorganisms, including antimicrobial compound (onion extract), low temperature (4 °C), and salt (light salting). The longest shelf life recorded is 4 days. Our results demonstrated that light salting together with the onion extract as a natural antimicrobial and antioxidant agent can be used to extend the shelf life of the Galunggong fish (*Decapterus macarellus*) and gives it a good characteristics in terms of cooking. We hope to replace synthesized compounds with natural ones in human food by conducting more research on their preservative effects (Zolfaghari, Shabanpour, & Fallahzadeh, 2010).

## RECOMMENDATION

The researchers recommend that a study be made to test the effectivity of onion extract to meat products such as pork, beef, and chicken. This study should be made in order to identify the effectiveness of onion as a natural preservative in all kinds of food available to mankind.

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