

Shelf Life Study of Poultry Meat with Added Seaweed Extract

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Abstract: - Preservatives that used must be sourced from natural ingredients, in order to minimize the effects of hazardous chemicals when using synthetic materials. One of natural preservatives from marine is the extract of *Gracilaria* sp and *Ulva* sp. The fresh poultry meat that is obtained from a local poultry shop is taken for the study. Observations made on the organoleptic, measurement of pH, antibacterial assay and Total Plate Count (TPC). Based on the value of pH and TPC, the extract of *Gracilaria* sp showed significant result. It enabled to extend the storage life of the poultry meat. The texture also did not change was visualized along with other parameters. The antibacterial activity of extracts of *Gracilaria* sp. against *S. aureus* and *P. aeruginosa* was performed. The use of extracts of *Gracilaria corticata* gave the best results based on the parameters of pH, antibacterial activity and TPC and TVB-N analysis.

Key Words: — *Seaweeds, G.corticata, U.lactuca, TVB-N analysis, poultry meat.*

I. INTRODUCTION

Poultry meat is commonly favored by consumers due to its abundant nutrients (e.g. proteins and fats) and good taste. However, goat meat easily deteriorates after slaughter due to enzyme activities and microbial metabolism (Haung et al., 2013). Some researchers reported meat preservative methods, such as irradiation, coating, and modified atmosphere packaging to improve the cold storage quality of meat (Economou, et al., 2009).

The production of fermented meat products goes back thousands of years because it was quickly discovered that shelf-stable meat products could be produced by adding salt to meat and subsequently dried or fermented (Hugas et al., 2002).

Seaweeds are macroalgae living in sea or brackish water. Scientists often call them benthic marine algae which means attached algae that live in the sea.

They are often referred to as seaweeds or marine macro algae (Devi et.al. 2008). Seaweeds are rich resources of natural nutrients some of which cannot be obtained from terrestrial plants.

Bioactive compounds of seaweeds such as sulphated polysaccharides, peptides, minerals, phlorotannins, carotenoids and sulfolipids have proven health benefits against various diseases. Traditionally, seaweeds are used as folk medicine for treating diseases like goiter, wounds, burns, rashes, inflammation, diabetes and also gaining attention of pharmaceutical industries due to their anti-cancer, antibacterial, and antioxidant properties. (Chandini et al., 2008.)

Seaweeds polysaccharides have wide applications in foods as well as in pharmaceutical industry due to their biochemical properties such as stabilizer, emulsifier and gelling property. (Barrow et al., 2005). Seaweeds are the natural marine algae which have several properties to act as natural preservatives to extend the shelf life of perishable foods without affecting their quality and causing side effects. (Krishnamoorthy et al., 2017).

II. MATERIALS AND METHODS

A. Antibacterial Activity

Extract Preparation:

A total of 500 g of *Gracilaria corticata* and *Ulva lactuca* washed with clean water and then rinsed using PBS and then cut into pieces and added to 96% ethanol (1:4) further blended for 30 min. Extracts have been obtained is evaporated using a rotary evaporator with a temperature of 40°C. Further drying process is by freeze drying.

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B. Total Plate Count Evaluation

This value is determined using the extracts. The poultry meat sample is soaked in the extract solution and the values are noted for 0, 3, 6, 9, 12, 15 day. (AOAC 1995)

Total Volatile Base Nitrogen:

(TVB-N), an important index representing the content of ammonia, trimethylamine, and dimethylamine within measured samples, has been extensively used in meat and meat product quality determination. Total Volatile Base (TVB) which is mainly composed of ammonia and primary, secondary and tertiary amines, resulted from degradation of proteins and non-protein nitrogenous compound which is caused by microbial activity (Ruiz-Capillas and Moral et al., 2005). In poultry meat trimethylamine is only present in significant quantities and total volatile nitrogen consist almost entirely as ammonia. As ammonia production due to deamination of protein increases during spoilage, its determination represents a simple method of following the course of determination of the quality lean meat.

III. RESULTS AND DISCUSSION

A. Antibacterial Activity

The antibacterial analysis using *Gracilaria corticata* and meat sample revealed inhibition of microorganism against *S. Aureus* and *S. enteritidis* the maximum inhibition zones of *Gracilaria sp.* Extract were 13.7 mm for *S. aureus* and 8.4 and for *S. enteritidis* respectively.

Table.1. Antibacterial Activity of Poultry Meat

S.No	Bacterial Strain	Inhibition Zone (Mm)
1.	<i>S. aureus</i>	13.7
2.	<i>S. enteritidis</i>	8.4

In this it is inferred that total bacteria on poultry meat increased along with the length of storage, but the number of bacteria on sample with seaweed extract showed less activity. It shows that the use of seaweeds extract inhibit the activity of bacteria poultry meat. This count includes all pathogens and non-pathogens and is used to determine the hygienic status of food.

B. Total Plate Count of Poultry Meat

The maximum limit for total bacterial count for meat products is 5.69 log CFU g⁻¹ (Pelczar et al., 1977). When TPC for sample with *G.corticata* was measured it was found to be 5.89 log CFU /g and for *U.lactuca* it was found to be 5.44 log CFU /g. Comparing these results *U.lactuca* had better results as the bacterial growth was less.

Table.2. Total Plate Count Analysis of Poultry Meat

S.No	Sample	TPC(CFU/Gm) Log 10					
		0	3	6	9	12	15
1.	<i>G.corticata</i>	5.9	5.35	5.04	4.34	4.01	4.333
2.	<i>U.lactuca</i>	5.44	5.48	5.43	5.004	5.29	5.36

C. Total Volatile Base of Poultry Meat

Total Volatile Base (TVB) which is mainly done to analysis of fresh meat. The TVB value of poultry meat during storage increased with the length of storage time. This is because of the antibacterial compounds in extracts of *Gracilaria sp* is capable of inhibiting bacterial decomposition of protein components into a volatile compound.

TVB-N on Day 0 is about 14 mgN/100 g, and it increases rapidly with the increase of storage time. Next it increased to 16 mgN/100 g. ON the second day the TVB-N value was 17 mgN/100 g. At the day 3, it reaches about 19 mgN/100 g, and then on fourth day it further increased to 21 mgN/100 g which exceeds the acceptable freshness limit (20 mg/100 g) and thereby considered as non-fresh.

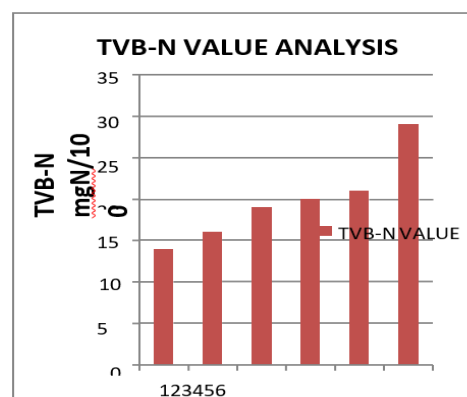


Fig.1. TVB-N Analysis of Poultry Meat

IV. CONCLUSION

Extract *Gracilaria* sp. have potential as an antibacterial. Based on the content of TVB and TPC the use of extracts of *Gracilaria* sp. 2% were able to extend the shelf life of poultry meat during low-temperature storage till 4 days.

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