



The Effect of Bay Oil on the Sensorial Properties of Rainbow Trout (*Oncorhynchus mykiss*) Fillets under Refrigerator Conditions

Nermin KARATON KUZGUN

Munzur University, Faculty of Fisheries, Tunceli, Turkey

nerminkaraton@hotmail.com,

ORCID NO: 0000-0002-9430-1802

Abstract In this study, it was examined the sensorial properties to *Oncorhynchus mykiss* fillets of bay essential oils during storage $2\pm 1^{\circ}\text{C}$. So as to create all samples was applied 1% Bay oil to fillets of rainbow trout. During the storage at $2\pm 1^{\circ}\text{C}$ of fillets in the study were made every three days sensory analyzes (Appearance, Texture, Colour, and Odor). As a result of the sensorial analysis ended the storage period on the 6th day of fresh fish fillets, on the 9th day of the fillets treated with 0.1% bay oil, on the 12th day of the fillets treated with 0.5% bay oil and on the 15th day of the fillets treated with 1% bay oil. As a result, it has been observed that the application of bay essential oil has a positive effect on the sensorial properties of rainbow trout under refrigerator conditions.

Keywords Bay, Essential oil, *Oncorhynchus mykiss*, Sensorial properties, Refrigerator conditions

Introduction

Depending on the development of nutritional awareness, consumption of fish and seafood is increasing day by day. In our world, unless protective measures are taken, fish mostly consumed as fresh will deteriorate in a short time after hunting. To prevent or delay spoilage, processes such as cold storage vacuum packaging, and treatment with antioxidants are required [1-3]. Depending on the development of nutritional awareness, consumption of fish and seafood is increasing day by day. In our world, unless protective measures are taken, fish mostly consumed as fresh will deteriorate in a short time after hunting. To prevent or delay spoilage, processes such as cold storage vacuum packaging, and treatment with antioxidants are required [4]. The use of additives in perishable food before cold storage could minimize microorganism growth during storage. However, since there are limits for additive use, their presence in food products should be limited. Furthermore, it is known that most consumers refrain from consuming food that contains chemical additives, albeit in safe levels [5-7]. Today, the employment of herbal additives has been increasing due economic, nutritional and safety reasons [8].

Bay is an evergreen shrub, hairless and perennial plant in Laurence family the Mediterranean region [9]. The essential oils of Bay leaves have unique qualities like absence of phytotoxic effects, ability to suppress headaches, migraine, bacterial, fungal infections, high blood sugar and gastric ulcers, and they exhibit antioxidant properties and anti-inflammatory [10,11].

The present study aimed to report the effect of bay essential oil on the sensory properties of *Oncorhynchus mykiss* fillets at $2\pm 2^{\circ}\text{C}$ during storage.



Experimental

Trout samples were procured from a fish farm located in Keban Dam Lake and immediately transported to Firat University Bioengineering Laboratory on ice. Fish were washed and filleted. Then, the samples were randomly divided into four groups: the control group A without essential oil application, group B where the samples were treated with 0.1% essential oil, group C where the samples were treated with 0.55% essential oil and group D where the samples were treated with 1% essential oil. All analyzes were conducted in triplicate on days 0., 3., 6., 9., 12., and 15..

Organoleptic assessment

In the Organoleptic assessment of samples made from *Oncorhynchus mykiss*, panelists (n=15) formed from in the age range 25-60. Organoleptic assessment was made in accordance with the method of Lawless and Heymann [12]. The samples were baked in a baking at 12 minutes at 180 °C. Panelists evaluated organoleptic assessment of the samples on a hedonic scale (9-point) (like extremely: 9, like very much: 8, like moderately: 7, like slightly: 6, neither like nor dislike: 5, dislike slightly: 4, dislike moderately: 3, dislike very much: 2, dislike extremely (1)).

Result and Discussion

The present study investigated the effects of bay essential oil (1% and 3%) on the sensory qualities of rainbow trout in 4 ± 2 °C storage.

Appearance

The appearance properties determined during the storage of the experimental trout fillets are presented in Figure 1. It was determined that the appearance score of the samples without essential oil was 7.66 ± 0.62 on the first day of storage and 3.10 ± 0.83 on the last day of storage (6th day). The appearance score of the samples with 0.1% bay essential oil treatment was 8.25 ± 0.59 on day 0th, and the score dropped to 2.83 ± 0.89 at the end of the storage. In samples treated with 0.5% bay essential oil, the appearance score was 8.91 ± 0.27 on day 0, and the score dropped to 4.27 ± 1.16 at the end of storage. The appearance score of the samples with 1% bay essential oil treatment was 8.00 ± 0.00 on day 0th, and the score dropped to 3.25 ± 0.83 at the end of the storage. In a study conducted by Karaton Kuzgun, [13], a decrease was observed in the appearance score of fillets covered with chitosan coating film that included thyme, clove, rosemary essential oils. This finding was consistent with the present study results.

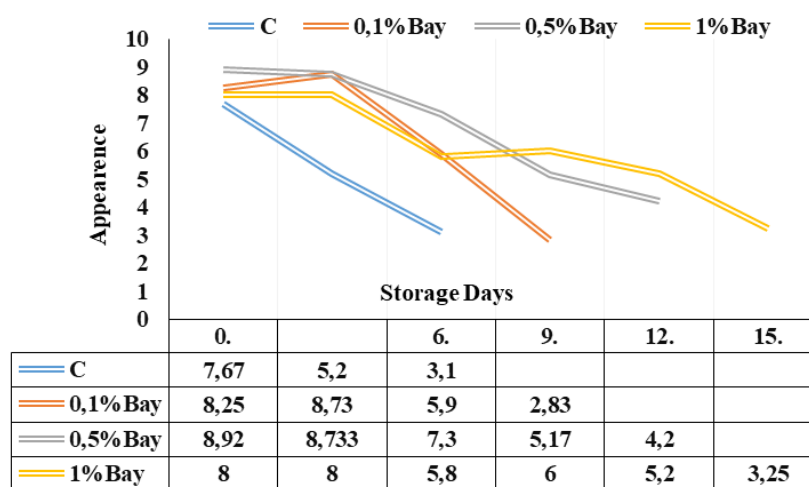


Figure 1: The changes in the appearance of bay essential oil treated trout fillets

Odor

The odor scores determined during the storage of *Oncorhynchus mykiss* fillet samples treated with bay essential oil are presented in Figure 2.



The odor scores of the fillet employed in the study were determined between 8.75 ± 0.43 - 2.67 ± 0.74 . The control group odor score was determined as 7.33 ± 0.47 at the beginning of the storage, and at the end of the storage (6th day), the score reached 2.80 ± 0.75 . In the 0.1% bay essential oil group, it was determined that the odor score was 7.33 ± 0.47 on day 0th of storage, and it was 2.66 ± 0.75 on the 9th day, the last day of storage. In samples treated with 0.5% bay oil, the odor score was determined as 8.25 ± 0.43 on day 0, and this value dropped to 2.80 ± 1.16 at the end of storage (12th day). 1% group odor score was determined as 8.75 ± 0.43 at the beginning of the storage, and at the end of the storage (15th day), the score reached 3.00 ± 0.70 . In previous studies, odor scores reported for fillets treated with cinnamon essential oil [13] and other herbal essential oils, such as black cumin [14] were similar to the present study findings.

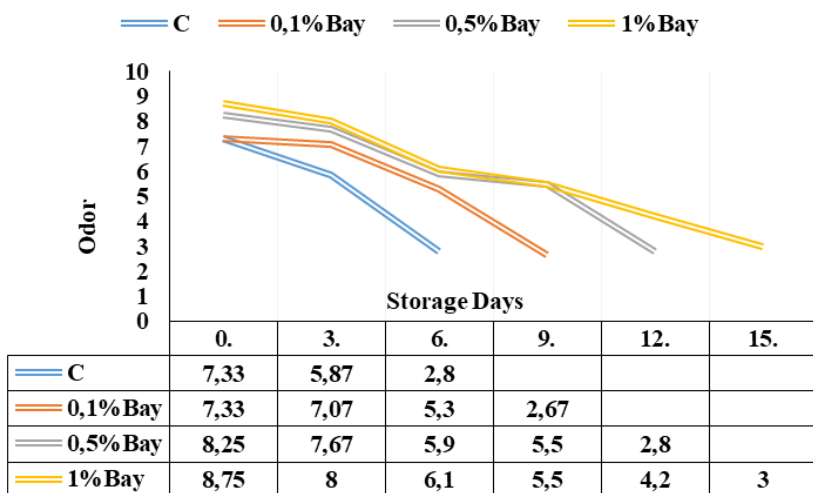


Figure 2: The changes in the odor of bay essential oil treated trout fillets

Texture

The texture scores determined during the storage of the experimental trout fillet samples are presented in Figure 3. The texture score of the control group fillets was 7.58 ± 0.86 on day 0th, the texture score exhibited a steady decrease during storage to 2.60 ± 0.66 on day 6th. In the samples treated with 0.1% bay essential oil, the lowest texture score was determined on day 9th of storage (3.33 ± 1.24). The decrease was consistent throughout the storage period. The highest score in the 0.1% bay essential oil groups was determined as 8.00 ± 0.81 on day 0th of storage

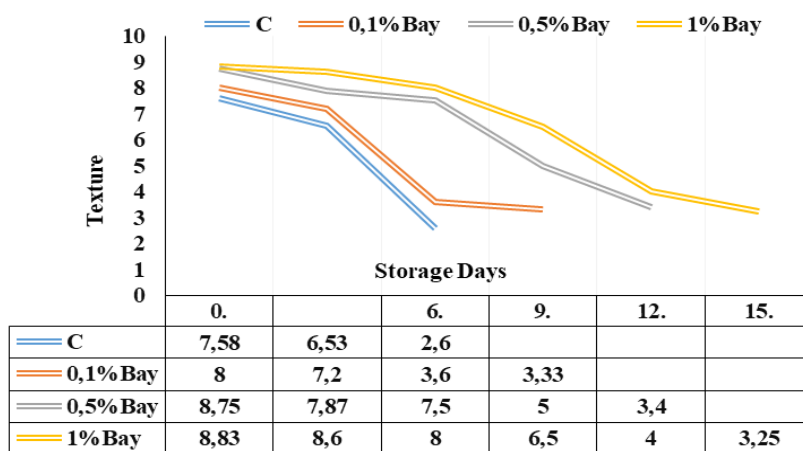


Figure 3: The changes in the texture of bay essential oil treated trout fillets

. In samples treated with 0.5% bay essential oil, the texture score was 8.75 ± 0.43 at day 0th and decreased to 3.40 ± 1.74 at the end of storage (on day 12th). The texture score of In samples treated with 1% bay essential oil was $8.83 \pm$



0.37 on day 0th, the texture score exhibited a steady decrease during storage to 3.25 ± 0.82 on day 6th. Ojagh et al. [14] reported that chitosan coating enriched with cinnamon essential oil led to a higher texture score in trout when compared to the control group. This finding was consistent with the present study findings. Oajgh et al. [14] reported in another study that cinnamon oil enriched and chitosan coated trout samples exhibited lower texture scores when compared to the control group. This finding was consistent with the present study findings.

Color

The color scores determined during the storage of the experimental trout fillets are presented in Figure 4. The color score of the samples without essential oil treatment was 7.75 ± 0.83 on the first day of storage and 2.90 ± 0.83 on the last day of storage (6th day). On day 0th, the color score for the samples treated with 0.1% essential bay oil was 8.41 ± 0.64 , and the color score decreased to 3.66 ± 1.37 on the last day of storage (9th day). The color score for the samples treated with 0.5% essential oil was 8.50 ± 0.50 on day 0th, and the score decreased to 3.40 ± 1.01 at the end of storage (12th day). The color score for the samples treated with 1% essential bay oil was 8.58 ± 0.49 on the first day of storage and 3.25 ± 0.83 on the last day of storage (15th day). Karaton Kuzgun [13] observed a decrease in the appearance scores of fillet samples covered with chitosan coating film that included thyme, clove, rosemary essential oils. This finding was consistent with the present study findings.

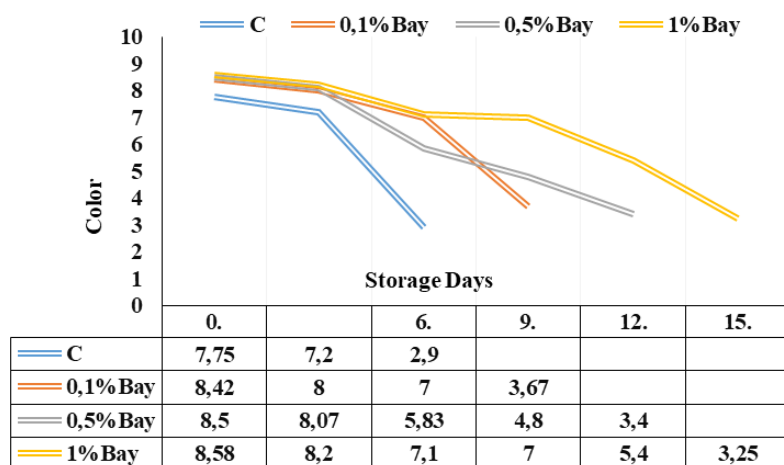


Figure 4: The changes in the total appreciation of bay essential oil treated trout fillets

Conclusion

In conclusion, it could be suggested that a natural antimicrobial and antioxidant, bay essential oil improved the sensory properties of *Oncorhynchus. mykiss* fillets and could be utilized to preserve other food products. The study findings underlined the necessity of further studies on consumption of food products and seafood prepared with natural preservatives. It has been come to the conclusion that the group treatment with 1% bay essential oils of as the best sensory ratio.

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