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# Effect of Immersion in Refrigerated Brine Solution on Physicochemical Properties of Olive Flounder (*Paralichthys olivaceus*) Muscle

## 4. Changes of physicochemical properties in Olive flounder during storage at 5℃

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## Introduction

Olive flounder and Black rockfish comprises around 90% of the total fish culture in Korea. Most of the olive flounder is consumed as raw fish meat "saengseonhoe", as like a sashimi in Japan. Also, texture is particularly a important factor which determine the quality of raw fish meat in Korea. Many works have attempted to improve of texture such as arai, electrical stimulation and compulsory exercise of fishes.

The contraction of strained muscle involves the interaction of two types of filaments, thick filaments consisting mainly of myosin and thin filaments consisting primarily of actin. Upon stimulus by a nerve impulse, $Ca^{2+}$ is released from the sarcoplasmic reticulum and diffuses into the myofibrils, initiating a relative sliding of the myosin and actin filaments past on another, which results in contraction.

We put a theory to practical use that developes new method to improve the texture of fish meat by immersion in refrigerated brine solution, but the actual physicochemical changes which lead to improve the texture remain unknown. In the present paper we report physicochemical changes in Korean olive flounder muscle by refrigerated brine solution.

## Materials and Methods

### 1. Materials

Equipment to adjust the temperature of brine solution manufactured AR. co., Ltd.

Living specimens (400~440g in body weight) was purchased from a local supplier (Dogoon Fisheries Co.). After recovery in 15℃ sea water for about 6 hours. Fishes were immersed in refrigerated brine solution for 2.5, 5 min, respectively. Control was killed by spiking at the brain of fish.

### 2. Methods

Rigor index of fish was measured as a parameter of rigor tension essentially according to Bito et al. (1983). Toughness was measured using rheometer (Fudoh Kogyo Co.) according to Ando et al. (1991a). ATP and it's related compounds were determined by the method of Iwamoto et al. (1987). Lactate was determined by the method of Backer and Summerson (1941). Myofibrils were prepared according to Perry

and Grey's method (1956) with some modifications. All procedures were carried out at 0~4℃. SDS-gel electrophoresis was performed by the method of Laemmli (1970). ATPase activities were assayed by the method of Kim et al. (1998). Liberated $\gamma$-inorganic phosphate was measured by the method of Fiske and Subbarow (1925).

## Results and Discussion

1. Acceleration of full Rigor-mortis was faster in the samples of the ones immersed in refrigerated brine solution than in samples that were killed instantly, as the immersion time was longer, the rigor-mortis was faster. Though onset of rigor-mortis and full rigor-mortis were rapid in the samples of immersed in refrigerated brine solution, the rigor index of full rigor-mortis was lower.

2. The total concentration of ATP and it's related compounds remained about 10.5 umole/g and were similar in all cases but the ATP contents were lower in the samples of the ones immersed in solution, as the immersion time was also longer, ATP contents were lower.

3. The contents of lactate for each samples immersed for 2.5 and 5 minute were 9.60±0.34 umole/g, 8.61±0.47 umole/g. On the other hand, in the samples that were killed instantly, the contents were only 3.38±0.27umole/g. From these results, as the immersion time was longer, lactate contents were more increased.

4. The breaking strength in muscle of Placie was 1.43±0.12kg in samples that were killed instantly. The breaking strength in samples immersed in refrigerated brine solution increased slowly and showed the maximum value over 5 minute(1.76±0.13).

5. SDS-PAGE pattern olive flounder killed instantly by spiking at the head was not significantly distinguishable from that of the samples immersed refrigerated brine sloution.

6. The myofibrillar ATPase activities of the samples immersed in refrigerated brine solution for 2.5 and 5minute were higher than in the samples that were killed instantly.

## References


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