

〈短報〉

Changes in Breaking Strength of Plaice Muscle Prepared by Different Killing Treatments

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It is known that the quality of raw fish meat consumed as sliced raw fish("who" in Korean) is mainly evaluated by its firmness. The firmness of fish meat depends on its species(Hatae *et al.*, 1986) and the total amount of collagen in fish muscles contribute in its firmness(Sato *et al.*, 1986). Recently, Ando *et al.*(1992) reported the difference in muscle firmness was related to both the density and the arrangement of collagen fibrils in the pericellular connective tissue. The relationship between temperature dependency and breaking strength as firmness index of plaice muscle stored at low temperature were studied and the value of breaking strength in samples stored at 0°C or 5°C showed maximum value after 10 hrs(Cho, 1992; Cho *et al.*, 1993).

To clarify the effect of killing treatment on the rheological changes of plaice muscle, the relationship between breaking strength and killing treatments were studied in this paper. Live plaice, *Paralichthys olivaceus*(38~42cm in body length and 800~900g in body weight) were killed by the following three different conditions: 1. spiking at the brain instantly. 2. dipping in sea water including anesthetic(1000ppm of ethyl aminobenzoate for 3 min.). 3. electrifying in sea water(110V, 30sec.). After all treatments above, the samples were bled and then stored at 5°C. Those stored samples were used in checking the breaking strength through storage. At selected time intervals, breaking strength of fish muscle was measured by the method as follows. A slice of 10mm in thickness was cut off from the middle part of the dorsal muscle of fish. A cylindrical plunger(8mm in diameter) was pierced into the slice at a speed of 1mm/sec,

and the maximum force recored by a rheometer (Instron model 1011, U.S.A.) was regared as the breaking strength. Data were expressed as the average of 8~10 individuals.

Fig. 1 shows the changes in the breaking strength of plaice muscle prepared by the different killing treatments during storage at 5°C. The level of breaking strength was 946.49 ± 23.65g in the muscle immediately after death. Values of breaking strength in samples killed by spiking at the brain instantly and dipping in sea water including anesthe-

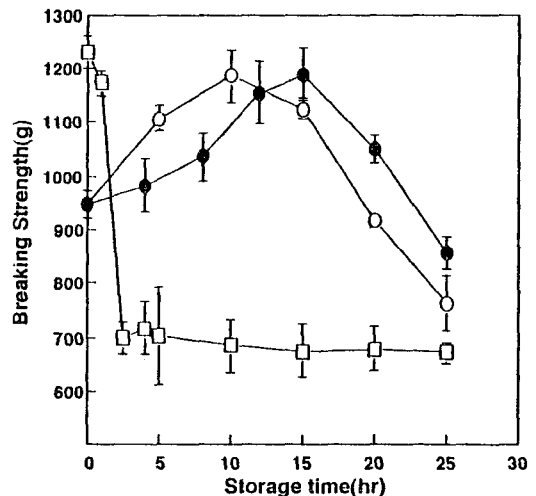


Fig. 1. Effect of killing treatments on the changes in breaking strength of plaice muscle during storage at 5°C.

- ; spiking at the brain instantly.
- ; dipping in sea water including anesthetic (1000ppm of ethyl aminobenzoate for 3 min.)
- ; electrifying in sea water(110V, 30sec.).

tic rose steadily over 10 hrs and 15 hrs after death, respectively. However, in case of fresh flesh from electrifying in sea water showed maximum value of breaking strength($1,231 \pm 25.17g$) just after death and then it decreased significantly($p < 0.05$) until 2.5 hrs passed.

From the results above, it could be suggested that treatment of dipping in sea water including anesthetic is more effective in delaying times reached around maximum breaking strength of fresh plaice flesh than spiking treatment at the early periods after death. The other hand, electrifying in sea water was effective in shortening those times.

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