Short Paper

Influence of the Ethanol Treatment on pHs of Boiled Meat Extracts of Fish, Shellfish, and Domestic Animals

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Major taste sensations upon eating fish meat are elicited by some nonprotein nitrogenous compounds. Generally, boiled meat extracts prepared from fish and shellfish to test the taste quality contain high-molecular-weight compounds (HMWC) such as glycogen and soluble protein together with nonprotein nitrogenous compounds. In order to evaluate the quality, those HMWC are often removed with ethanol (60–80%). However, we reported that the ethanol treatment of the boiled muscle extracts from yellowtail resulted in a significant pH decline.¹⁾ The present study was undertaken to confirm that the decline of pH effected by the ethanol treatment generally occurs in muscle extracts from other species of fish, shellfish, and domestic animals.

Live specimens of prawn *Penaeus japonicus*, corbicula *Corbicula japonica*, oyster *Crassostrea gigas*, and short-necked clam *Tapes philippinarum* were purchased from a local market. Sea urchin (gonad) *Stomgylocentrolus pulcherrinus*, boiled snow crab (leg) *Chionoecetes opilio*, blue crab (leg) *Portunus trituberculatus*, scallop (adductor muscle) *Patinopecten yessoensis*, carp (dorsal muscle) *Cyprinus carpio* and cod (dorsal muscle) *Gadus macrocephalus*, sliced beef and pork, and chicken meats were also purchased from local markets. Live specimens described above were shucked and washed with ice-cold 1.5% sodium chloride to prevent the contamination of crushed shells. The method for preparing boiled meat extracts (original extract) from all specimens was the same as described previously.¹⁾ The procedure to prepare ethanol-treated extracts was also the same as described in our previous report.¹⁾

Table 1 shows pHs of the original and ethanol-treated extracts from fish, shellfish, and domestic animal meats. The original extracts from beef, pork and chicken showed relatively low pH values (ca. 5.8–6.0); these values agreed well with the data presented so far on such animals.²⁾ The highest was snow crab among all specimens tested. Higher pH values were also reported by Tokunaga *et al.*³⁾ for the horse hair crab ranging from 7.6 to 8.1. Hayashi *et al.*,⁴⁾ reported a considerably lower value of 6.6 for boiled snow crab after the ethanol treatment of leg meat extracts. Such great difference in pH as described above is, most probably, due to the ethanol treatment. The reported value for sea urchin gonad (ca. 6.2)⁵⁾ is con-

Table 1. pHs of original and ethanol-treated extracts from some specimens of fish, shellfish, and domestic animal meats

Specimen	Original extract	Ethanol-treated extract
Sea urchin	6.21	5.25
Blue crab	6.76	5.48
Snow crab	7.93	6.89
Prawn	6.86	6.09
Corbicula	6.91	5.58
Oyster	6.22	4.85
Short-necked clam	6.53	5.21
Scallop	6.36	5.53
Carp	6.69	6.20
Cod	6.72	5.77
Chicken	5.98	5.04
Pork	5.79	4.87
Beef	5.89	4.93

sistent with the value that we found for the original extract. Ethanol treatment of this extract also resulted in lowering pH. The lower pH values in the ethanol-treated extracts from all specimens strongly suggests that the treatment produces the decline of pH in aquatic as well as domestic animal meats. Probably, the pH decline would also occur when raw fish and shellfish muscles are directly extracted with ethanol. Our preliminary investigation on a mechanism of the decline using yellowtail white muscle indicated that the decline did not result from the removal of HMWC but from that of certain low-molecular-weight substances (LMWS). Levels of LMWS such as free amino acids which have a high buffering activity, however, were not reduced by the ethanol treatment. A considerable extent of pH decline is thought to give some influences on overall taste quality of the meat extracts.

Further investigations on the substances which allow to result in the pH decline and the influences on taste quality are now in progress.

References

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