



All About Lobster Health

Mushy Tail

Mushy tails are usually more common in 'warm water' spiny lobster tails. However, the problem may also happen infrequently with clawed lobsters such as the American or Canadian lobsters, although mushiness in cooked crustaceans has been reported since the 1960's. The explanation for this phenomenon is still unclear.

What we know from other species:

Mushy tail or mushy meat is a well documented condition in salmon. A parasite called *Kudoa* has a drastic effect on the consistency of the flesh of the host after death, causing liquefaction or jellification of the flesh. When the fish is alive, there are usually no apparent signs, but within 24 hours following death or on cooking, liquefaction occurs. In farmed Atlantic salmon, this condition is more spectacular when infected salmon are frozen while they still appear healthy; after thawing, the flesh is virtually completely liquefied. Apparently, the parasite is responsible for the release of significant amounts of proteolytic enzymes (protein degrading enzymes) which causes the muscle to liquify.

In tuna, a certain proteolytic enzyme called calpain, is responsible for the condition known as burnt meat. At high pH, calpain can rapidly degrade certain muscle proteins. Perhaps tuna in poor nutritional status with low energy reserves could maintain an elevated tissue pH resulting in a favourable environment for the calpain to degrade muscle protein.

Possible Explanations:

Molt Cycle

Before molting, lobsters will remove and store the calcium from their shell in little structures called gastroliths located inside the stomach resulting in a softening of the existing shell. After molting, the calcium is redistributed to the new shell, helping in to harden the new shell. It has been hypothesized that some of the calcium is also stored within the tail muscle and if a lobster is harvested at that specific time, this tail could be mushy.

Dead Lobster

Tails from dead lobsters may become mushy after cooking. However, the tails of dead lobsters exhibiting typical foul odour often fail to show a mushy texture after cooking. Therefore, mushy tail is possibly due to changes occurring before death.

Enzyme Activity

One theory that could explain mushy tail in lobster is the action of proteolytic enzymes released by the hepatopancreas (tamale) of the lobster. This release could be activated by stress, rough handling or perhaps diseases in which the hepatopancreas would be injured. If the injury or damage to the hepatopancreas is severe enough, the enzyme will quickly move through the entire tail muscle.

Another theory would be that the origin of these proteolytic enzymes is not from the lobster itself, but rather from an outside source. Parasites similar to *Kudoa* that cause the jellification of salmon flesh, also infect certain types of crustaceans although none have been reported to cause muscle liquefaction in lobster. Perhaps the mushy tail condition observed in some lobsters could be attributable to proteolytic enzymes from bacteria or parasites.

Another suggestion is that mushy tail is caused by natural enzyme (collagenase-like) activity that can breakdown the collagen or connective tissue which holds the muscle tissue together. This enzyme would also be produced in the hepatopancreas of the lobster; injury or damage of the hepatopancreas would result in release of this enzyme.



No matter what the cause of mushy tail in lobster is, we believe that the occurrence of this problem is likely dependant on the physiological and biological condition of the lobster before death or processing, and could reflect different handling conditions throughout all segments of the industry prior to cooking.

- ❖ **Mushy tail is not specific to a certain species of lobster, location, size, or time of the year.**
- ❖ **Mushy tail is usually seen with weak to very weak lobsters, and sometimes in apparently healthy lobsters.**
- ❖ **The scientific explanation for mushy tail is still unclear.**



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