THE PIKE PERCH RAW FRESHNESS

Purgea Ramona*

**University of Oradea, Faculty of Environmental Protection, 26 Gen Magheru St. , 410048 Oradea; Romania, e-mail: rpurge@yahoo.com*

Abstract

The state of freshness of the raw material fish may be achieved beside the sensorial analyses (smell, colour, consistency, etc.) also based on the physical-chemical ones: the biological particularities of the fish, the structure and chemical composition of the tissues, the technology of capturing and life suppression impart certain characteristics to the biochemical processes in the fish flesh (Eftimie V.M., 2001). The biological particularities of fish, its tissues structure and chemical composition, the life capture and suppression, the processing and conservation methods all imprint certain characteristics to the biological processes in the fish meat, especially to the alterative ones..

The biological particularities of fish, its tissues structure and chemical composition, the life capture and suppression, the processing and conservation methods all imprint certain characteristics to the biological processes in the fish meat, especially to the alterative ones. The biological particularities of fish, its tissues structure and chemical composition, the life capture and suppression, the processing and conservation methods all imprint certain characteristics to the biological processes in the fish meat, especially to the alterative ones.

Key words: pike perch, metabolism, musculature activity.

INTRODUCTION

After the death of the fish, the biochemical processes from the fish flesh are carried out with an increased dynamics that leads to the faster installation of the specific modifications. The fish flesh is rich in protein and non-protein nitrogen and poor in carbon hydrates.

The biological particularities of fish, its tissues structure and chemical composition, the life capture and suppression, the processing and conservation methods all imprint certain characteristics to the biological processes in the fish meat, especially to the alterative ones.

Given the specificity of the aquatic environment, the fish is living in a permanent motion status. The general metabolism and especially the somatic musculature activity are more intense than in the case of the terrestrial animals. Subsequently to the fish death, the biochemical processes in the meat unfold in an increased dynamicity which leads to a much more rapid occurrence of the specific alterations (U.S.Food and Drug Administration. 1997. Foodborne Pathogenic Microorganisms and Natural Toxins).

Unlike the other meats, the fish meat is decompounds itself more rapidly, the amount of slightly added ammonia having a growth dynamics much more alert in comparison with the butcher's animals.

On the other hand, the fat meat fishes have a high level of lipids content mainly constituted from triglycerides with a high content of fatty acids with long chains of unsaturated carbon atoms. Phospholipids are unsaturated lipids too; all these factors have important consequences on the alteration process, in the case of their aerobic depositing.

The water content in the organisms, at some species reaching the level of 4-5% or even more, in comparison with butcher's animals, constitutes another stimulating element for the alteration processes.

Generally, the optimal activity of the enzymes is developed at the same temperatures with the normal temperature of the living fish, this condition being a valid one even after fish life suppression. The biological processes in the fish meat are optimally developed at lower temperatures than in the case of butcher's animals temperatures, fact which influences the meat freshness duration.

As already known, the fish meat is rich in proteic and non-proteic azote (for example, aminoacids, trimethyl amine – TMAO, creatinine), and poor in carbohydrates, from which it results a *post-mortem* high pH (>6.0). Thus, the fish meat offers better conditions for the development of microbial flora of putrefaction.

Subsequent to capturing, the biochemical processes in the fish meat are taking places at higher pH values than in the case of terrestrial animals. Even the muscular rigidity occurs at a pH value of 6.0 indices. Thus, the fish meat offers better circumstances for the occurrence of microbial flora of putrefaction (Ward, D.R. and C.R. Hackney (eds). 1991. Microbiology of Marine Food Products. Van. Nostrand Reinhold, New York).

Given the specificity of the capturing technique, the fish death is caused by asphyxia as a consequence of fish pulling out of the aquatic environment. Suppressing the respiratory processes before the death status occurrence causes the aerobic early suppression of glycolisis, meaning the accumulation of lactic acid in the musculature and the depletion of the glucose and glycogen stocks in the organism as faster as longer the agonizing period lasts.

As a consequence of this status the muscular rigidity soon occurs (sometimes instantaneous) and it lasts shorter. The strong exothermic glycolitical activities, the high pH of meat even during the rigidity status, the relative low temperature at which the cathepsins of the fish musculature, all these can act at an optimal level (10-15°C) and increase the vulnerability regarding the bacterial aggression.

Suppressing the fish live is carried out without bleeding so the entire blood amount remains within its corps, thus exacerbating the risks of premature alteration.

The brachial cutaneous mucus fulfils an important anti-bacterial role during the fish lifetime, its secretion and then its passage to the aquatic environment having a permanent nature. Through this mechanism a permanent cleaning of the fish (skin) surface, including of those bacteria which contaminate it, it is enacted. Subsequent to the fish death, the cutaneous and brachial mucus remains an adherent to the substratum being a proper environment for the bacteria expansion. The cutaneous mucus is composed from a muco-polysaccaride type, free aminoacids, trimethyl amine oxide, piperidine derivates and other related derivates.

This status marks the particularity of altering process' initiation and development which propagates itself from inside with a higher intensity and it starts with the anaerobic putrefaction.

By the intermediate of the action of the anaerobic bacteria of putrefaction, the decarboxyliation of this acid occurs and the formation of histamine, one of the best well known biogenic toxic amine. Part of the severe intoxications due to the altered fish consumption, mentioned in the specialised literature, may be attributed to this particularity.

The inappropriate fish packaging and transportation, from the catching spot to the consumption location, hastens the alteration processes.

When the hygienic and technological conditions in which the fish is kept, the diverse conditions starting with the fishing and ending with its consumption as such or with its processing, are appropriate ones, microflora is, in general, less significantly represented against the butcher's animals' case.

MATERIALS AND METHODS

20 samples of pike perch fresh fish were drawn, from the two units, A and B, seeking the verification of 20 batches (10 batches from unit A and 10 batches from unit B). The draw of samples was performed after classifying the fish raw material in quality classes (size, corporal weight, state of freshness, etc.) from the batches of indigenous fish, which were verified from sanitary-veterinary point of view at the reception in the two fish processing units.

The whole fresh raw material fish must correspond from physical-biochemical point of view to the conditions of quality foreseen in STAS 5386-86 (Zaika,L.L. et al., 2000).

According to STAS 5386-86, the conditions of admissibility for the pike perch fresh fish are:

- easily hydrolysable nitrogen, mg NH_3/100 g = 30
- ammoniac in free-state (Nessler reaction) = absent
- H_2S = absent
- pH = maximum 6,2.

RESULTS AND DISCUSSIONS

From the 20 analyzed batches (10 in unit A and 10 in unit B), in 8 of them (3 batches from unit A and 5 batches from unit B) one highlighted exceedings of the maximum admitted limits of the physical-chemical parameters, according to the stipulations of STAS 5386/86.

From the 20 draws performed in the 2 units, a number of 8 of them responded positively as a result of the physical-chemical examination to the following parameters: the easily hydrolysable nitrogen, the ammoniac in free-state, the sulphurated hydrogen and the pH.

Predominant were exceedings of the maximum limits for the easily hydrolysable nitrogen, which were recorded in 8 of the 20 analyzed samples (6, 74%) in the two units, followed by values above the allowed limits of the pH in 8 of the analyzed samples (5, 05%) and positive results of the Nessler reaction in 10 samples (5, 61%) and of the reaction for highlighting H_2S in 5 samples (2,8%).

The inadequate results of the physical-chemical parameters of freshness obtained as a result of performing the laboratory examinations corroborate with the results of the organoleptic examination of the batches of fresh raw material fish.

CONCLUSIONS

As a result of the physical-chemical determinations performed for the samples of fresh raw material fish one recorded exceedings of the maximum allowed limits for the easily hydrolysable nitrogen, pH, positive results of the Nessler reaction and of the reaction for highlighting H_2S (sulphurated hydrogen).

REFERENCES

1. Eftimie V.M., iunie 2001,Particularitatile morfo-structurale, consideratii biochimice, microbiologice si parazitologice ale pestelui materie prima, destinat procesarii. Referat 2 in cadrul tezei de doctorat, Facultatea de Medicina Veterinara Bucuresti.
2. Zaika,L.L., J.G.Phillips,J.S.Fanellli and O.J.Scullen. 2000. Revised model for aerobic growth of Shigella flexneri to extend the validity of prediction at temperatures between 10 and 19ºC.Intl. J. Food Microbiol. 41; 9-19.
3. Ward, D.R. and C.R. Hackney (eds). 1991. Microbiology of Marine Food Products. Van. Nostrand Reinhold, New York.
4. U.S.Food and Drug Administration. 1997. Foodborne Pathogenic Microorganisms and Natural Toxins.
5. Ward, D.R. and C.R. Hackney (eds). 1991. Microbiology of Marine Food Products. Van. Nostrand Reinhold, New York.