

Histological Aspects Regarding the Muscular Tissue Harvested from some Marine Fish Preserved by Refrigeration

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Abstract. The study of the modifying which affect the muscular tissue of the fish during the cold preservation, take the liberty to obtaining of new particular data, which can be benefic in order to elucidation of some aspects regarding the freshness and the depositing conditions of the consumption of fish. On account of knowledge of the modifying induced by cold preservation of the fish muscular tissue before to put into circulation, there were made researches about some fish species (horse mackerel, sea gudgeon, garfish, iht sole), which were fished in Black Sea, bordering on Mangalia city. The muscular tissue samples were drawn at the time of capture and after 24, 48, 72 hours, during this time the fish were stored in pounded ice. The samples, drawn from dorsal region, were fixed in 10% formalin, included in paraffine, sectioned at 6 microns and colored by usual histological methods. In the moment the samples were drawn, the muscular fibers has normal microscopical aspects, and there are parallel and accurate disposed. The striations were obvious and the nuclei were flattened, placed under the sarcolemma. The interfibrillary conjunctive tissue was unchanged. At 24 hours from fishing and stored in pounded ice, some striations disappared and has started a visible transversal fragmentation. The cytoplasm has lightened its colour and some fibers become waved. In iht sole the change are more pronounced. At 48 hours, the aspects regarding the disorganisation are more visible, translated as increases the interfibrillary spaces. The striations were more and more rare. The fibers fragmentation are numerous. On transversal section it was observed the disappearance of nuclei. In sea gudgeon, the striations are still present and in garfish and iht sole spring up the cytoplasmatic vacuolizations. At 72 hours, the changings of muscular tissue are more pronounced, the fibers waves and the fragmentations are prevalent. The interfibrillary conjunctive tissue is dilacerated and the interfibrillary spaces are widen. In garfish the cytoplasmatic vacuolisation are more visible. Making an analysis of this aspects we can state that there are some differences regarding the manner in which are affected from frozen preservation of muscular fibers of various fish species harvested from Black Sea. The muscular tissue from horse mackerel and sea gudgeon is more resistant on preservation, while in garfish and iht sole the muscular fibers are more degradable.

Keywords: histological structure, muscular tissue, marine fish, refrigeration.

INTRODUCTION

In the studied specialized literature, most data refer to biochemical changes in fish muscle tissue, which occur during storage and preservation by cold. (Comnea, 2010) (6)

The study of changes affecting the fish muscle tissue during cold preservation take leave to obtain new particular data, which will complement existing ones and can be

beneficial to elucidate some aspects regarding the freshness of fish and storage conditions of this which are placed on the market for processing or consumption. (1,2,3,4,5,7,8,9,10)

MATERIALS AND METHODS

On account of knowledge of the modifications induced by cold preservation of the fish muscular tissue before being introduced into circulation, there were made researches about some fish species (horse mackerel, sea gudgeon, garfish, iht sole), which were fished in Black Sea, bordering on Mangalia city. The muscular tissue samples were harvested at the time of capture and after 24, 48, 72 hours, during this time the fish were stored in pounded ice.

The samples, harvested from dorsal region, were fixed in 10% formalin, included in paraffine, sectioned at 6 microns and colored by usual histological methods.

RESULTS AND DISCUSSIONS

In the harvest moment, the muscular fibers have normal microscopical aspects, and they are parallel and accurate disposed. The striations were obvious and the nuclei were flattened, placed under the sarcolemma. The interfibrillary conjunctive tissue was unchanged (Fig.1).

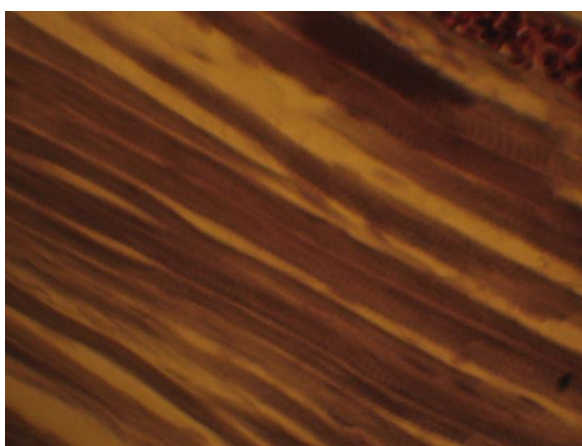


Fig.1 Horse mackerel – in the moment of fishing, longitudinal section, HH,ob.20

At 24 hours from fishing and stored in pounded ice, some striations has disappeared and the transversal fragmentation started to become visible. The cytoplasm has lightened its colour and some fibers become waved. In iht sole the change are more pronounced (Fig. 2, 3,4)

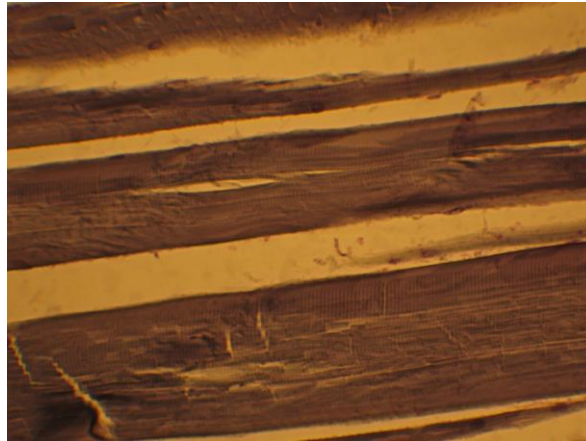


Fig 2 . Horse mackerel, after 24 hours , longitudinal section, HH, ob.20

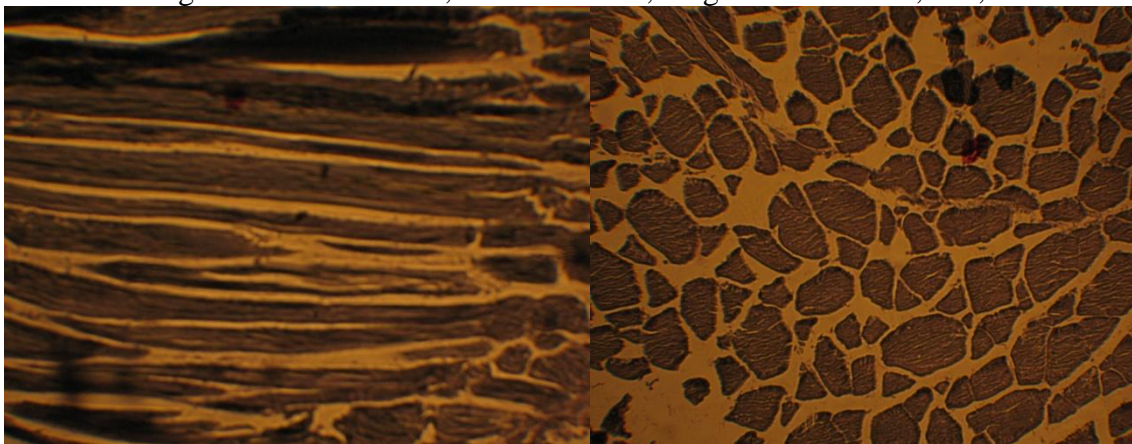


Fig.3 Garfish, 24 hours, longitudinal and transversal view, HH, ob.20

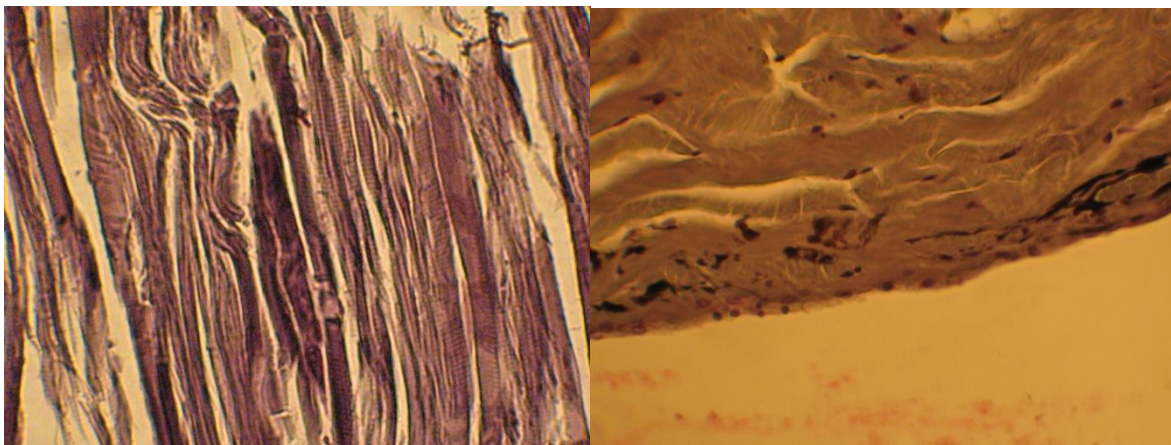


Fig. 4.Sea gudgeon, after 24 hours, longitudinal and transversal view , HH, ob.10

After 48 hours, the aspects regarding the disorganisation are more visible, translated as increases the interfibrillary spaces. The striations were more and more rare. The fibers fragmentation are numerous. On transversal section it was observed the disappearance of nuclei. In sea gudgeon, the striations are still present and in garfish and iht sole spring up the cytoplasmatic vacuolizations (Ffig. 5, 6,7)

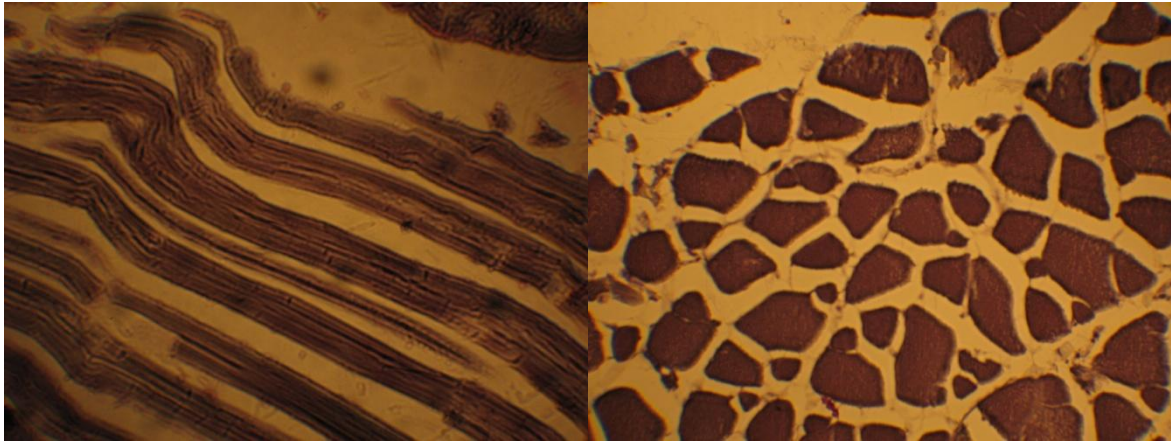


Fig.5. Horse mackerel, after 48 hours. Longitudinal and transversal view, HE ,ob.20

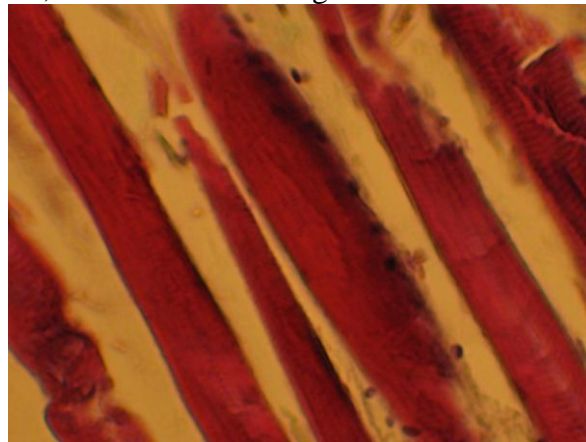


Fig.6. Sea gudgeon, after 48 hours, HE,ob.20

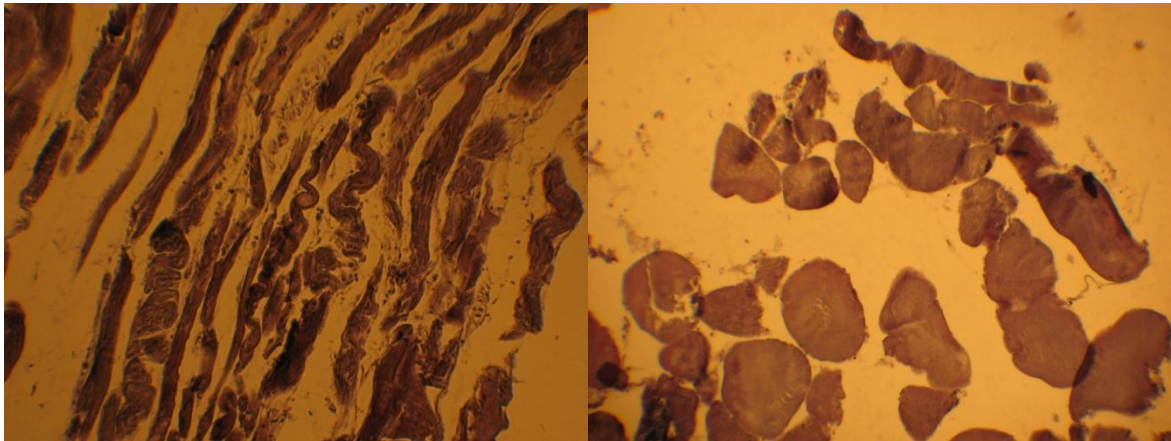


Fig.7. Iht sole, after 48 hours, HH, ob.10

After 72 hours, the changes of muscular tissue are more pronounced, the fibers waves and the fragmentations are prevalent. The interfibrillary connective tissue is dilacerated and the interfibrillary spaces are widen. In garfish the cytoplasmatic vacuolisation are more visible (Fig. 8.9).



Fig.8. Garfish, after 72 hours, HE, ob.20

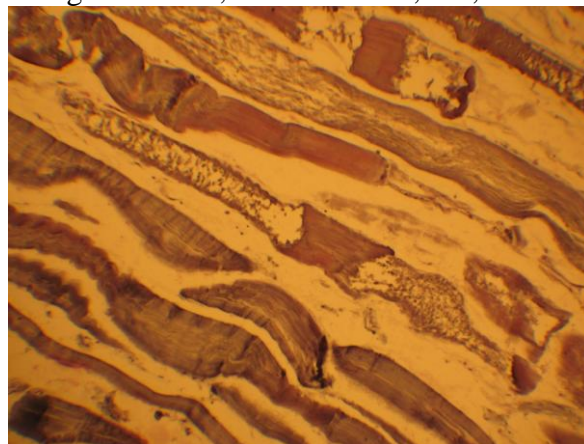


Fig.9. Iht sole , after 72 hours, HH, Ob 20

CONCLUSIONS

- Making an analysis of this aspects we can state that there are some differences regarding the manner in which are affected from frozen preservation of muscular fibers of various fish species harvested from Black Sea.
- The muscular tissue from horse mackerel and sea gudgeon is more resistant to preservation.
- In garfish and iht sole the muscular fibers are more degradable.

REFERENCES

1. Altringham, J., D., Wardle C., S., Smith, C., I. (1993) - Myotomal muscle function at different locations in the body of swimming fish, *J. Exp. Biol.* 182, 191- 206
2. Aughery Elizabeth, Frye, L. (2001) - Comparative veterinary histology with clinical correlates, Iowa State university Press, Ames, Iowa, 65-70
3. Block, B. A. (1994) Thermogenesis in muscles, *Annuar Rev. Physiol.*40, 283- 302
4. Bone Q. (1966) On the functions of two types of myotomal muscle fibre in elasmobranch fish, *Fish.J. Mar.Biol.Assoc. U.K.*,321-349
5. Carey, F.G., Teal, J.M.. (1966) Heat conservation in tuna fish muscle, *Proc.Nat. Acad. Sci. U.S.A.*, 56, 1461-1469

6. Comnea, Florina Luminița – Modificari biochimice la nivelul musculaturii de pește pe parcursul depozitării, Lucrare de dizertație, Master, FMV București, 2010
7. Frewadman, M.A. (1979) – Role partitioning of swimming musculature of striped bass., *Marone saxatilis* Walbaum and blue fish, *Pommatomus saltratrix* L., *J.Fish.Biol.*15, 417-423
8. Kapoor, B.,G., Khanna Bhavna, (2004) – *Ichthyology handbook*, Springer –Verlag, Narosa Publishing House, India, 123-149
9. Moyle, P.G., Cech, J.J., jr., (2004) - *Fishes, an introduction to ichthyology*, Fifth ed., Prentice Hall, Upper Saddle River, NJ 07458, 23-37
10. Munteanu, Gabriela, Bogatu D., (2003) – *Tratat de ihtiopatologie*, Ed. Excelsior art, Timișoara,591-593