Editorial

The PH of the seafood meat: a problem that deserves to be clarified

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In recent years, the General Inspection Coordination (CGI) of the Department of Animal Products Inspection (DIPOA) of the Ministry of Agriculture, Livestock, and Supply (MAPA) in Brazil has intensified the fight against seafood economic fraud. Thousands of tons of imported seafood are being seized and the violation notice is immediately drawn up because they are in disagreement with Article 443, Item 2 of the Regulation of the Industrial and Sanitary Inspection of Products of Animal Origin-RIISPOA (The physical and chemical determinations for characterization of fresh fish are: pH of external meat <6.8 and the internal <6.5 in fish). Some seafood containers are being seized or returned and unfortunately, others are being incinerated, because they are, according to CGI/DIPOA/MAPA, unfit for consumption. Faced with this unfortunate situation, the pH parameter is causing of controversial in the academic, business and inspection sectors. It is already recognized internationally that pH variation in seafood meat can only indicate that there some changes (biochemical or microbiological) arise, however, did not be treated as a single parameter to judge seafood quality or even consider it as unfit for consumption. It is already known that seafood is a perishable raw material, its shelf life, and integrity during storage under refrigeration conditions (cooling or freezing) and transport (under the same conditions) is influenced by enzymatic and microbiological changes. Thus, appropriate techniques to maintain its quality and freshness are necessary. The speed with which each of these changes develops depends on how the basic principles of conservation, hygiene, maintenance of the cold chain, as well as the species captured and the methods of capture were applied.

In addition, the hydrogen ionic potential (pH) has the function of indicating the acidity or alkalinity or neutrality of seafood muscle in an aqueous medium. The determination of pH represents an important factor in the quality evaluation of various foods, such as seafood, which is considered a food of low acidity (pH higher than 4.5). The concentration of the hydrogen ions is almost always changed when the hydrolytic, oxidative or fermentative decomposition of muscle is processed the higher pH and bacterial activity. However, it is not conclusive as the only parameter to evaluate the degree of freshness of the seafood, and also chemical, microbiological, microscopic and/or sensorial analyses should be performed in order to have greater reliability in the results. Depending on how the process has been from capturing, storing on board, landing, processing, freezing and storing, the pH could be changed, even without the seafood having lost its initial quality since, in the post-mortem of seafood, numerous chemical and biochemical reactions are triggered.

What does the legislation say? Codex Alimentarius (or the Food Code) is the global point of reference for consumers, food processors and producers, national food control agencies and the international food trade. All countries are signatories to the Codex Alimentarius and are based on their legislation, both in inspection and in the construction of specific legislation in their country. In the Codex Alimentarius (for frozen fish fillets), In Brazilian Legislation (Ordinance No. 185, dated 05/13/1997-Whole and Eviscerated Fresh Fish), In European Union Legislation (Chapter II - Official controls on fishery products); In US Law (USFDA- Procedures for safe and sanitary processing, and importation of seafood and derivatives); In Canadian Law (CFIA-General standard for fresh and frozen fish). There is no pH analysis as the freshness index, or if this parameter frames the seafood as unfit for consumption. Only in the Argentinean Legislation (Argentine Food Code), the fish is classified as unfit for consumption when pH>7.5 and the ammoniacal nitrogen content exceeds 125mg $100g^{-1}$ dry matter and abnormal sensorial characteristics.

Based on the divergences in pH values, and in a recent study developed by MAPA (published in Official Circular No. 02/2016/CGI-DIPOA/SDA/GM/MAPA) it was verified for the Merluccidae family species, the pH may present slightly higher values in relation to the current Brazilian legislation (RIISPOA) without sensorial rejection, and thus determined that for frozen fish (Merluccidae family), the pH 7.0 should be adopted as the maximum limit for condemnation, which proves the divergence in pH values between species. This situation suggests that the Brazilian legislation deserves to be modified. Doubts still persist in the academic, scientific and inspection classes regarding the increase in the pH value of fish meat and the possible use of the phosphate food additive (as a humectant). The use of this additive before freezing should be seen as a viable technological alternative in order to ensure better sensory quality and extensive shelf-life. Moreover, there is no data in the scientific literature on the correlation between the use of phosphate (or mixtures of polyphosphates) and the pH of treated fish, so it cannot consider that the pH of fish meat, above neutrality, indicate that it was exclusively treated with polyphosphates. At the same time, a very high pH may indicate a deteriorating process, where a small increase in pH in the order of 0.1-0.4units could be related to the production of an alkali, and in muscle tissue this should be by the production of ammonia or a biogenic amine, as evidenced by the increase in TVB-N content (provided it is at the limit of freshness, i.e., 30mg $100g^{-1}$).

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Conflict o interest

The author declares no conflict of interest.

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