Incidence of Larval Anisakiosis in Ocean Fish Sold Through Network of Supermarket Stores

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Abstract

Investigations conducted on a sample of 33 ocean fish of consumption, mackerel and herring uneviscerated and frosen, packed in plastic bags, different weights and purchased from supermarket chain stores, concerning the incidence and intensity of parasitism by larvae of Anisakis sp. to gut and visceral level, lesion picture caused and also some morphological measurements, reveals an incidence of anisakiasis of 60.0% to 72.2% in mackerel and respectively in herring. Regarding the infestation intensity of Anisakis larvae sp., infestations dominate weakly the mackerel (44.4%), followed by medium (33.3%) and massive (22.0%). In contrast to the herring are dominant the medium infestations (46.1%), followed by massive (30.7%) and low infestations (23.1%).Table of lesion caused by larval stages in gut and visceral level is characterized by intestinal congestion, hemorrhagic enteritis and hemoragico – necrotic and the presence of larval cystic foci on serous of gut, kidneys, liver and gonads. Morphological investigations carried out on a sample of 20 larvae, collected from herring and mackerel, regarding biometric aspects, cuticular and of color, body size variables highlights from 13.0 mm / 0.6 mm minimum to 27.0 / 0.6 mm maximum, with an average of 20.0 mm / 0.5 mm, comparable to those presented in the speciality literature.

Keywords: cyst, larva, lesions zoonosis.

1. Introduction

At present, in the world, anisakiosis shows a real danger to human communities consuming fish (ichthyophagous populations), such as Japan, Thailand, USA etc., and especially for populations in geographic areas considered nonichthyophagous (ex.Romania) once with the diversity of food resources and increasing interest in fish and seafood. In this context, in recent times, including in Romania there is a massive import of fish and seafood from anisakigenous areas, fresh or chilled life, a situation that favors survival of a live larvae closer to the consumer. Another risk is the adaptation by consumers in areas of fashion nonichthiofagous consumption of raw fish or cooked foods such as sushi range Japanese products.

Anisakiosis danger to humans is that if it accidentally eat meat and / or viscera of fish or seafood with live or dead larvae, risk being the victim of two serious pathological manifestations, an acute allergic syndrome (nausea, vomiting and violent colics) and / or chronic enteral syndrome (subocclusions or intestinal occlusion). From these considerations, it are requiring a series of measures that people are aware of the danger of this disease but also a thorough health inspection of all meat-based products, fish offal and seafood from areas considered anisakigenous.

2. Materials and methods

Investigations were conducted during January-February 2011, on a sample of 33 non-eviscerated marine fish and frozen (15 pieces mackerel species,

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Scomber scombus and 18 pieces herring - Clupea heringus), packed in plastic bags (3-5 pieces per bag) and a variable weight (200-400 g). We mention that the fish taken in the study came from the waters of Norway and Spain, imported and packed by specialized companies in Romania in the field. After thawing, macroscopic examination was performed by opening the general cavity, following intestinal parasites, changes of organs in general cavity and lesion table produced in gut level by larval stages of Anisakis sp. From parasitized specimens were collected parasites in Petri dishes with 10% formalin solution for some morphological measurements. To appreciate the intensity of larval parasitism, were evaluated numerically parasites located in the gut, setting:

- low infestation, under 5 parasites/ fish
- medium infestation, between 5 – 10 parasites/fish
- high infestation, above 10 parasites / fish.

There have been done some morphological measurements (length, width, color) on a sample of 20 larvae collected, using a millimeter graduated linear.

3. Results and discussion

Investigations conducted on a sample of 33 marine fish, non eviscerated and frozen, buy in the supermarket chain stores, the incidence and intensity of parasitism by larval Anisakis sp, lesion table caused and some morphological measurements, reveals the following aspects:

A. Parasitism incidence with Anisakis sp larva in consumption marine fish is presented in accompanying table.

The data presented in the table below highlights a high level of anisakiosis in marine fish by 60.0% to 72.2% in mackerel and herring, with an average of 66.6%. Like other helmintozis found in fish (freshwater and marine fauna) and nematodes responsible anisakiasis, in their biological cycle requires a definitive host (ichtiofage marine mammals) and 2-3 intermediate hosts (capepodes crustaceans and marine fish) in which the body develops stages larval L1 - L4. [1, 2, 3, 4]. Contamination of marine and ocean fish is more intense, the higher is the most developed invertebrate fauna (food source for fish). Thus the incidence of parasites in marine fish crustacean is correlated with the amount consumed and their pollution level especially with larvae Anisakis spp [5, 2].

Variety of intestinal infestation with larvae of Anisakis sp from marine fish consumption, depending on the species is shown in Figure 1.

Table 1. Anisakiosis incidence in comsumption marine fish

Species	Total tested samples	From which positive	%
Mackerel	15	9	60.0
Herring	18	13	72.2
Total	33	22	66.6

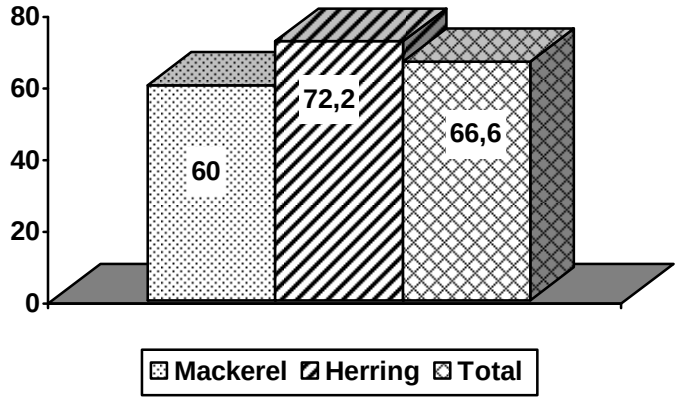

Figure 1. Variety of intestinal infestation with larvae of Anisakis sp.

B. Infestation intensity level with the larvae of Anisakis sp in consumption marine fish, on fish lot taken in the study, is presented in Table 2. The data presented in Table 2 highlights the different levels of intensity Anisaki sp larvae parasitism, depending on the species, as follows:

- in meckerel species (comber scombrus) dominates low infestations (44,4%), followed by those medium (33,3%) and high (22,2)
- in herring species (Clupea herengus), medium infestations (46,1%) are dominant, followed by those with high level (30,7%) and low (23,1%)

Table 2. Infestation intensity with Anisakis sp larva in marine fish, on species

Species	Number of positive samples	From which					
		Low infestation		Medium infestation		High infestation	
		Number of samples	%	Number of samples	%	Number of samples	%
Mackerel	9	4	44.4	3	33.3	2	22.2
Herring	13	3	23.1	6	46.1	4	30.7
Total	22	7	31.5	9	40.9	6	27.2

In the next graphic there are are presented percentage values in anisakiosis intensity of parasitism in larval marine fish sample taken in the study

Anisakiasis in marine fish is a disease with a nonspecific clinical picture, insignificant. Man, however, can become accidental hosts after consumption of raw or undercooked fish in heat-treated condition.[1, 2, 3, 4, 6]. Most sources of infestation for humans are given the traditional dishes of raw herring (Lomi-Lomi), salmon (ceviche, sushi, sashimi). Unfortunately, in humans the disease is extremely severe clinical picture expressed by an acute allergic syndrome (nausea, vomiting, abdominal cramps) and/or chronic enteral syndrome (subocclusions and intestinal occlusion) whose only treatment is surgical.[7, 8, 9].

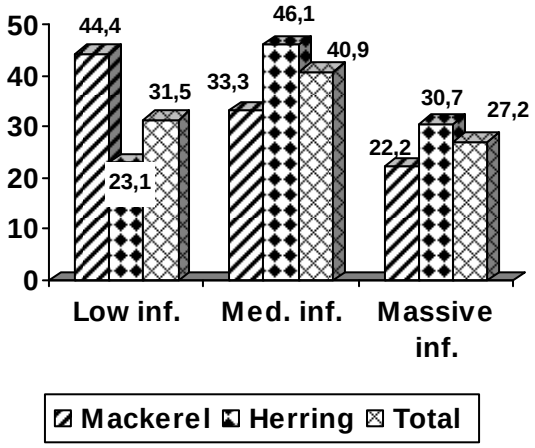

Figure 2. Percentage values in anisakiosis intensity of parasitism in larval marine fish

C. Regarding the pathological table, most lesions are confined to the gut, and other locations are possible. These consist of:

- intestinal mucosal congestion
- lesions of hemorrhagic enteritis and necrotic hemoragic in focus, especially in heavy infestations when larvae are encysted [1, 2]
- degenerative liver and renal lesions characterized by the presence of nodular foci and white rings on the surface and deep
- the presence of cystic larval forms, located on the serosal bowel, gonads, in the form of nodules 3-4 mm with a perifocous fibroconjunctival reaction.[3].

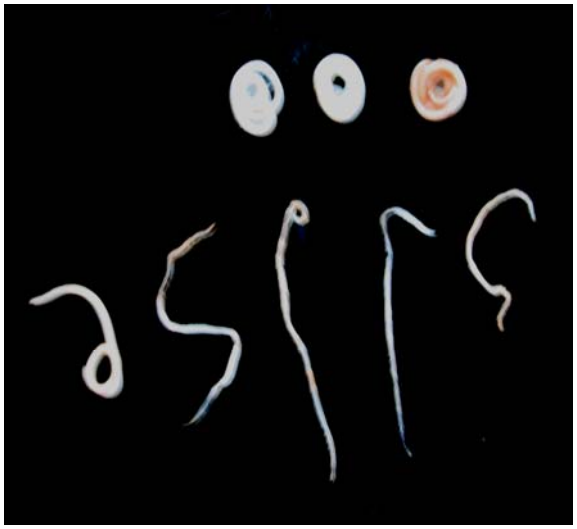

Figure 3. Anisakis sp. larva, encysted in gonads structure, in mackerel

D. Morphological investigations carried out on 20 larvae collected from the intestinal lumen, pyloric appendices from marine fish infected with larval anisakiasis by biometrics, are shown in Table 3.
Values obtained following biometric measurements on a sample of 20 larvae, collected from herring with anisakiosis, are between 13.0 mm / 0.6 mm (minimum value) and 27.0 mm / 0.6 mm (maximum value) with a mean of 20.0 mm / 0.5 mm. Doing a comparison of data obtained with those presented in the literature, they are like identical for Anisakis genre.[2, 3, 7, 8].

Table 3. Biometrics done on Anisakis larvae collected from marine fish sp.

Sample number	dimensions		cuticule	colour
	Length (mm)	Width (mm)		
1	15.0	0.4	Ring. rough	Dirty yellow
2	22.0	0.6	"	"
3	19.0	0.5	"	"
4	27.0	0.4	"	"
5	20.0	0.6	"	"
6	22.0	0.6	"	"
7	18.0	0.5	"	"
8	20.0	0.6	"	"
9	21.0	0.5	"	"
10	22.0	0.6	"	"
11	13.0	0.6	rings	yellow
12	24.0	0.5	rough	"
13	22.0	0.5	"	"
14	17.0	0.4	"	"
15	19.0	0.5	"	"
16	19.0	0.3	"	"
17	23.0	0.5	"	"
18	21.0	0.7	"	"
19	17.0	0.6	"	"
20	20.0	0.4	"	"
Average	20.0	0.5	"	"

4. Conclusions

Investigations conducted on a sample of 33 consumtion marine fish, mackerel and herring, non gutted and frozen, purchase of supermarket chain stores, the incidence and intensity of parasitism on larval anisakiasis, lesion table caused, and also some morphological measurements, reveals the following aspects:

1. Larval anisakiosis incidence is high, with differing values depending on the species, 60.0% to 72.2% in mackerel and herring, with an average of 66.6%.
2. Larval parasitism intensity shows different values depending on species. In mackerel, dominates low infestations, 44.4%, followed by average, 33.3%, and then heavy infestations, 22.2%. In herring medium infestations, 46.1%, are the dominant ,followed by massive infestations and respectively, poor of 30.7% and 23.1%.
3. The lesion table caused in gut and visceral level is characterized by intestinal congestion, bleeding and hemorrhagic necrotic enteritis, the presence of serous cystic larval foci localized on intestinal serous, kidneys and gonads.
4. Morphological investigations carried out by biometrics on a sample of 20 larvae collected from herring and mackerel, emphasize variables body size, from 13.0 mm / 0.6 mm to 27.0 mm / 0.6 mm, with an average of 20, 0 mm / 0.5 mm, comparable to those in the speciality literature.

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