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Prevalence of Anisakid Larvae in Maricultured Sea Fish Sold in Guangzhou, China

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Abstract: The prevalence of anisakid larvae in maricultured sea fish sold in Guangzhou, China were investigated in November 2006. A total of 208 individuals representing 48 fish species were obtained from a wholesale market. They were examined for the presence of anisakid larvae by examination of the viscera and whole body cavity. Eight species of fish (16.7, 8/48), namely Pseudosciaena crocea, *Muraenesox cinereus*, *Evynnis cardinalis*, *Plectorhynchus diagrammus*, *Scomberomorus koreanus*, *Plectorhynchus nigrus*, *Nemipterus virgatus* and *Siganus fuscescens*, were found to be infected with anisakid larvae, with an overall infection rate of 7.7% (16/208). The results of present investigation demonstrated the risk of human infection with anisakid larvae in Guangzhou, China, which have implications for implementing control strategies against anisakid infection in human in China.

Key words: Maricultured sea fish, anisakids, market, prevalence, Guangzhou, China

INTRODUCTION

Anisakids are a group of parasitic nematodes infecting a range of marine mammals, a number of fish species and some kinds of birds with a worldwide distribution (Hartwich, 1974; Adams *et al*., 1997; Abollo *et al.,* 2001; Chai *et al.,* 2005; Zhu *et al.,* 2007). Marine fish of many species can act as intermediate, paratenic hosts or definitive hosts for aniakid nematodes (Hartwich, 1974). Infection of sea fish with anisakids cause significant economic losses to the fishery industry due to the apparent increase in prevalence and intensity and subsequent condemnation of infected fish (Rohlwing *et al*., 1998; Abollo *et al*., 2001). More importantly, larval anisakids of some genera such as *Anisakis*, *Contracaecum* and *Pseudoterranova*, can infect humans causing significant clinical diseases (i.e., anisakiasis) in a number of countries (Adams *et al*., 1997; McCarthy and Moore, 2000; Couture *et al*., 2003; Chai *et al*., 2005; Zhou *et al*., 2008). Actually, there is a marked increase in the prevalence of human infection with anisakid larvae worldwide in the last two decades (Chai *et al*., 2005).

Infection of sea fish with anisakid larvae has been documented as a severe problem for fishery industry in China (Tang *et al.,* 2001; Ruan and Zhang, 2007; Zhang *et al*., 2007), which poses public health concerns. But unfortunately, results of almost all of these surveys were published in the Chinese language. Also, to our knowledge, there had been no reports of anisakid infection in maricultured sea fish in China in the English literature. In order to provide relevant base-line data for the better control of anisakid infection in maricultured sea fish and for assessing the risk of human infection with anisakids, the objective of the present investigation was to estimate the prevalence of anisakid infection in maricultured sea fish sold in market in Guangzhou, China by post mortem examination.

MATERIALS AND METHODS

A total of 208 maricultured sea fish representing 48 species were bought from a wholesale fish market in Guangzhou, China. These fish were from marine aquaculture fisheries in Guangdong Province, China. The whole body cavity and viscera of each fish were carefully and thoroughly examined for the presence of anisakid

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larvae. Nematode specimens were counted, fixed and stored in 70% (v v^{-1}) ethanol. They were identified to generic level based on the host and tissue from which they were derived, the geographical origin of the host/parasite and the morphology of the parasite (Hartwich, 1974; Olson *et al*., 1983; Nascetti *et al*., 1993; Orecchia *et al*., 1994; Mattiucci *et al*., 1997).

RESULTS AND DISCUSSION

Of the 208 fish individuals representing 48 fish sepcies examined, 8 species of fish (16.7%, 8/48), namely *Pseudosciaena crocea*, *Muraenesox cinereus*, *Evynnis cardinalis*, *Plectorhynchus diagrammus*, *Scomberomorus koreanus*, *Plectorhynchus nigrus*, *Nemipterus virgatus* and *Siganus fuscescens*, were found to be infected with anisakid larvae, with an overall infection rate of 7.7% (16/208) (Table 1). The anisakid larvae found represented Anisakis and Hysterothylacium. No anisakid larvae were found in other 40 fish species (not shown). In the investigation, the highest prevalence of anisakids larvae occurred in *E. cardinalis* (50%) and the lowest prevalence of anisakids larvae occurred in *S. fuscescens* (3.8%). Almost all of the parasites were found encapsulated in tight flat coils in the viscera, on the liver or free in the body cavity.

Infection with anisakid larvae has been recorded in approximately 200 fish species world-wide (Abollo *et al*., 2001). In China, more than 150 fish species have been found to be infected with anisakid larvae, with several fish species having a prevalence of 100% (Tang *et al*., 2001; Ruan and Zhang, 2007; Zhang *et al*., 2007). The present survey of anisakid infection in maricultured sea fish sold in a wholesale market in Guangzhou revealed that 16.7% fish species and 7.7% of examined fish individuals were infected, some of which are commonly eaten fish, such as *P. crocea* and *M. cinereus*, thus posing a high risk for human infection, in particular in Guangzhou, where people have the habit of eating raw or undercooked fish and have the pursuit of eating exotic and delicate foods such as sushi (in which raw fish is the main component) and cisheng (sliced raw fish). The infection rate of anisakids in maricultured sea fish in the present investigation was lower than that in sea fish caught from the Yellow Sea (Zhang *et al*., 2007), because the maricultured sea fish have less opportunity to be infected by anisakids. Nevertheless, in China, the severe prevalence of anisakid infection in sea fish has received little attention in the last years, possibly because human infection with anisakids has not been officially documented in scientific literature, although it has been reported in the media.

The high prevalence of anisakids in maricultured sea fish sold in market indicates the potential of human infection and represents a risk for public health in Guangzhou and elsewhere in China. It is imperative that appropriate control strategies and measures be implemented to prevent and control the potential infection of people with anisakids in Guangzhou and elsewhere in China.

Table 1: Prevalence of anisakid larvae in maricultured sea fish sold in Guangzhou, China

Fish species	No. of examined fish	No. of positive fish (%)	Intensity of infection
Pseudosciaena crocea	10	4 (40)	1-4
Muraenesox cinereus	10	2 (20)	4-15
Evynnis cardinalis	10	5 (50)	3-80
Plectorhynchus diagrammus	2	1 (50)	2
Scomberomorus koreanus	7	1 (14.3)	2
Plectorhynchus nigrus	8	1 (12.5)	1
Nemipterus virgatus	10	1 (10)	1
Siganus fuscescens	26	1 (3.8)	1

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