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Longtail Tuna (*Thunnus tonggol*) Consumption Frequency in Terengganu, Malaysia

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Abstract

In Terengganu, Longtail tuna or *Thunnus tonggol* is one of the most popular marine fishes landed by fishermen and has a high demand among customers. This species often served with a unique local delicacy called *Nasi Dagang* and *Ikan Singgang*, one of the favourite meals during breakfast by local communities. Since people have always consumed this species, therefore this study aims to identify the consumption rate of this species among Terengganu people. Specifically, this survey data obtained from 124 respondents, ages ranged from 15 to 60 years old from five districts in Terengganu, including Besut, Kuala Nerus, Kuala Terengganu, Hulu Terengganu, and Kemaman. Generally, the estimated amount of this species consumption is 239.7 g per person and 1.83 times per week. From the formula calculated, the amount of this species consumed by one person is 437.4 g/person/week. This value can use to calculate the permissible tolerable weekly intake (PTWI) to estimate the intake of pollutants, such as heavy metals in the human body.

Keywords

Thunnus tonggol, Consumption, South China Sea, PTWI

1. Introduction

In the year 2020, the Food and Agriculture Organization predicted that the global supply of seafood would be deprived of by about 23 million tons to main-

tain at least the current consumption level (18.4 kg) of the per-capita of seafood [1]. In line with the global norm, Malaysia is also faced with insufficiency supply due to the high demand for fisheries stock and declining in capture fisheries production in this country [2] [3]. Today, annual per-capita of seafood consumption of Malaysians ranked number fifth throughout the world and second highest among Asian nations after Japan [4]. Terengganu is one of the fish landing centers in Malaysia that supply fisheries stock to other areas in Malaysia. However, the annual fisheries landing in Terengganu have decreased for the past five years, and Longtail tuna (*Thunnus tonggol*) is one of the species that had been affected by the declining pattern in landing statistics by Department of Fisheries Malaysia [5]. The number of this species landed from 2015 has been decreased by 17.2% to 375.5 ton metric in 2018 (**Figure 1**).

Thunnus tonggol, known as *Ikan Tongkol* by local (**Figure 2**) is a commercially important pelagic species that found abundantly in tropical to temperate neritic habitat throughout the Indo-Pacific [6] [7]. It can reach a maximum

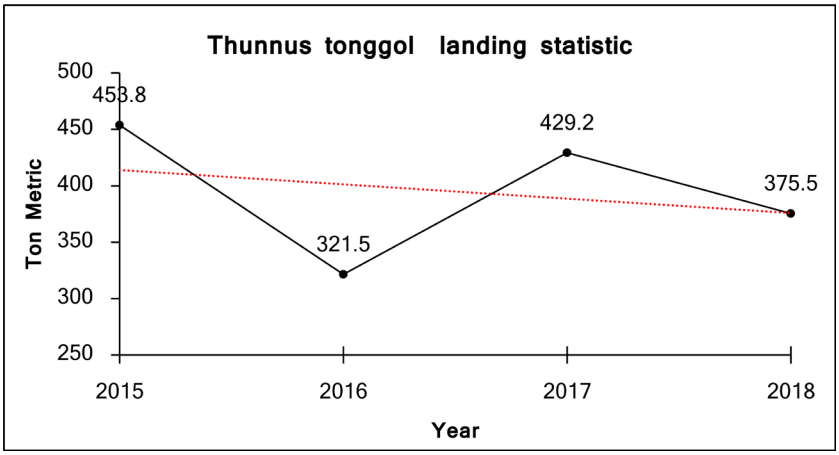

Figure 1. The annual *Thunnus tonggol* landing statistic in Terengganu from the year 2015 to 2018 decreased by 17.2% of ton metric (DOF, 2019).

Figure 2. Longtail tuna or *Thunnus tonggol* is a relatively smallest size among tuna species group. They are known as pelagic species that avoid very turbid waters and areas with reduced salinity such as estuaries.

length of 1.5 meters and up to 32 kilograms in weight [8] [9]. The lower side and belly are of silvery-white colour, with colourless elongate oval spots arranged in horizontally oriented rows [10] [11]. In Terengganu, this species is one of the most popular commercial marine fishes that commonly serve breakfast and lunch meals. *Nasi Dagang* and *Ikan Singgang* are two famous menus in Terengganu that use this species as a main ingredient in the dish.

2. Materials and Methods

A survey has conducted from April to September 2019. A total of five districts in Terengganu (Figure 3) have been selected as the survey area, including Besut, Kuala Nerus, Kuala Terengganu, Hulu Terengganu, and Kemaman which involve 124 respondents, and age ranged from 15 to 60 years old. For a survey design, all available information on the consumption of *Thunnus tonggol* among Terengganu people has considered. Generally, the survey questionnaire was composed of two sections: 1) Personal information including the age and residential districts, 2) questions on consumption behaviours including the amount intake and the frequency of this species.

3. Results and Discussion

The survey was administered randomly to the residents aged between 15 and 60

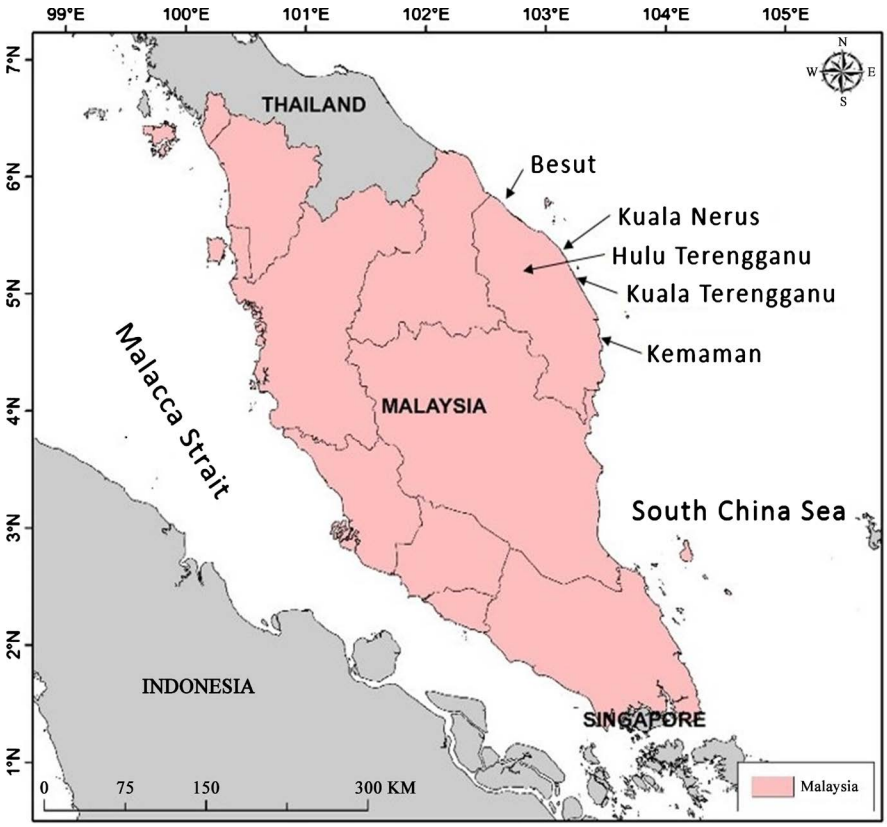

Figure 3. Terengganu is one of state in Peninsular Malaysia and a part of the South China Sea and one of the significant fish landing centers in Malaysia.

years old. Through the survey, 42.9% of respondents were aged from 15 to 24 years old, while the least respondents came from aged 35 to 44 years old. Among these, 78.6% of respondents were female, and 21.4% of respondents were male.

Table 1 describes the variables and the definition of the question in the questionnaire set. Based on the survey question, one important question referring to *Thunnus tonggol* consumption frequency is "How often did you consume *Thunnus tonggol*?" Given that the level of consumption frequency encoded as

Table 1. Variables and the definition of the question used in the questionnaire set.

Variables	Description	Percentage
Gender	Male	21.4%
	Female	78.6%
Age 4 ranges of age	15 - 24 years old	42.9%
	25 - 34 years old	17.1%
	35 - 44 years old	10.0%
	45 - 60 years old	30.0%
Area 5 different districts in Terengganu state	Besut	22.2%
	Kuala Nerus	16.2%
	Kuala Terengganu	22.2%
	Hulu Terengganu	20.5%
	Dungun/Kemaman	18.8%
Frequency 7 indicators variables	Twice a week	16.2%
	Once a week	26.6%
	Twice a month	19.7%
	Once a month	21.4%
	Once in 6 months	10.3%
	Others	4.3%
Amount of fish meal intake (Estimation in gram based on slice of fish flesh)	141 g	11.4%
	196 g	37.7%
	272 g	9.6%
	392 g	10.5%
	402 g	30.7%
Customer preferences on fish parts e.g.: Head, muscle, tail.	Head	32.8%
	Muscle	47.4%
	Tail	19.8%
Cooking methods The methods applied to cook the fish	Grilled	2.6%
	Boiled	51.3%
	Fried	31.3%
	Steamed	14.8%

an ordered response, it has divided into six categories. For example, 26.6% of respondents answered that they consumed once a week, and 10.3% of them were likely to eat this species once in six months (Figure 4).

The survey also asked about the fish part that respondents opt (Figure 5). The poll showed that only 19.0% of respondents chose fish tail part, and 32.8% chose fish heads. Majority of the respondents (47.4%) were likely to take muscle parts in their dish. Meanwhile, in terms of cooking methods, 51.3% of respondents prefer boiling methods, while 31.3% prefer frying, 14.8%, and 2.6% preferable steaming and grilling techniques, respectively (Figure 6).

Table 2 presents the calculated average data on the amount and frequency of *Thunnus tonggol* intake by Terengganu people. The average dietary of this species was 239.7 g per person in one day, while the average frequency was 1.8 times per week. Hence, the estimation of average this species consumption was 437.5 g/person/week.

In Malaysia, fish has always been a superior choice of protein source for most

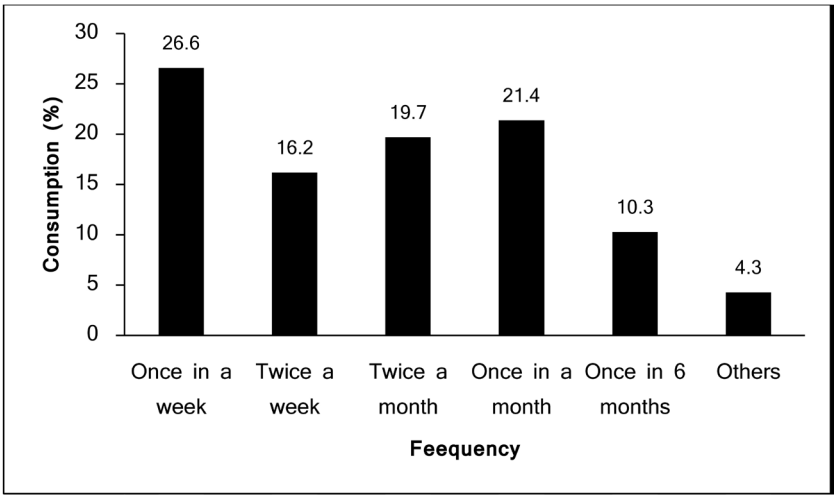

Figure 4. Frequency of *Thunnus tonggol* consumption by Terengganu people.

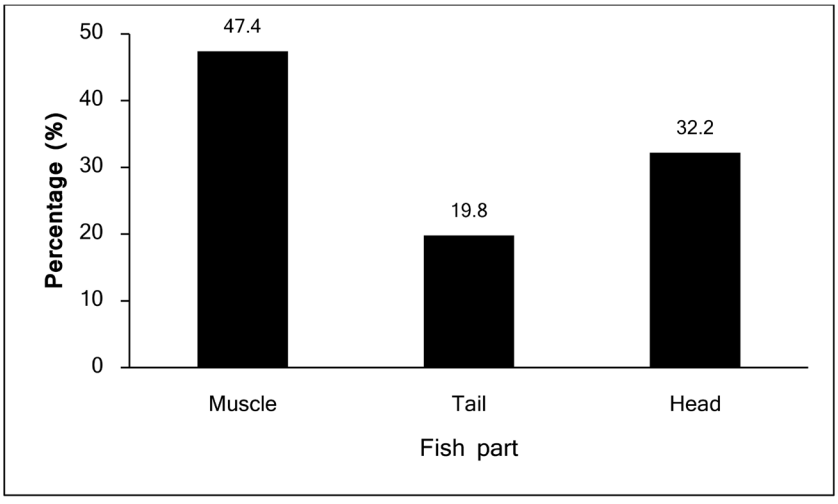

Figure 5. Respondent's fish part opt for *Thunnus tonggol*.

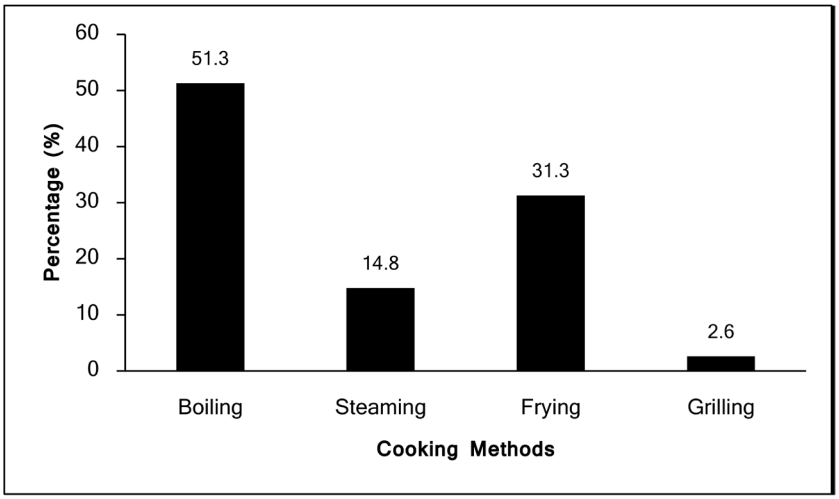

Figure 6. Respondents favourite cooking methods for *Thunnus tonggol.*

Table 2. The average consumption on *Thunnus tonggol* among Terengganu people.

Average amount (g)	Average frequency (times/week)	Average consumption (g)/ person/week
239.7	1.8	437.4

of the population compared to other sources such as chicken and beef [12]. Particularly, a totality of 26.6% Terengganu people used to take this species as their meal at least once in a week. The finding indicates that this species has a higher demand in this region. Apart from that, this species also considered as the most economical and can be bought at an affordable price [13]. Furthermore, by eating fish, it is believed that can help to prevent heart disease [14] [15] and reduce the level of cholesterol [16] due to the fish characteristic that can accommodate an essential fatty acid, docosahexaenoic acid and eicosapentaenoic acid in their tissue [17]. From the consumption rate calculated, the average amount of this species consumption per person in one week is 437.4 g. This finding was slightly higher than the study conducted past 10 years by Irwandi and Faridah [18], which is 0.06 kg/person/day or 420 g/person/week.

A comparative survey among different cooking methods apply to this species was also asked the respondents. Data from survey findings show 51.3% of the respondents choose to boil the fish as their preferred cooking method. This method corresponds with the famous menus in Terengganu, which the fish is cooked with curry gravy and serves with glutinous rice, namely Nasi Dagang and Ikan Singgang, fish soup with added turmeric, chilli, garlic, and onion. Concerning the preference fish parts, 47.4% of respondents favour muscle part, which is the major edible part of the fish. The fish muscle shares sufficient balanced amino acids, savoury flavour, and high digestibility [19]. Hence, it becomes the most popular and suitable source of protein to the healthy adult and children or even for the patient that suffers from inflammation and in the process of wound healing that satisfies the need for amino acid requirements [20].

4. Conclusion

The consumption rate of *Thunnus tonggol* in Terengganu has increased due to the high population growth rate and a major source of animal protein due to the stability and lower cost compared to meat. Nonetheless, the annual landing statistics for this species has decreased in the past five years. This study, in practical terms, indicated respondent's preference and consumption rate of this species in Terengganu, Malaysia. This finding can be used as a reference in calculating human permissible tolerable daily and weekly intake (PWTDI and PTWI) to estimate the intake of pollutants by consuming fish, especially by *Thunnus tonggol* for Terengganu and adjacent regions.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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