Status of fish Consumption *per capita* of Tehran citizens

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Abstract

Status of fish consumption was analyzed by completing the 295 questionnaires in all 22 metropolitan regions of Tehran from different households in 2008. After reviewing the descriptive and statistics analysis along with the non-parametric statistics, the fish consumption *per capita* was extracted through formulas. The average and mode of purchasing of each household occurs 11 times per year with 5.1 Kg in each time. Considering the higher fish consumption growth rate in Iran, the sequence of interest in all kinds of protein is as follows: poultry, mutton, beef, Trout, wild fishes and Chinese carps. The highest interest of households to buy fish more than other protein resources is due to the nutrient value of it. An average of 33.2% purchasing is dedicated to the farmed fish. 59% of purchasers are interested to buy packed up fish products and pay attention to the label of nutrient values on the product package. Fish consumption *per capita* is 13.3 Kg, which is divided to 6.4 kg for farmed fishes, 5.8 Kg for wild fishes and 1.1 Kg for canned fish. The higher consumption *per capita* of Tehran citizens in comparison with other people from other cities, who are living in Tehran, is because of their tendency and freshness of farmed fishes.

In contrast, the consumption of canned and wild fishes among people of littoral regions who live in Tehran is higher than others.

Keywords: Fish consumption per capita, Fisheries, Tehran, Iran

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Introduction

The world consumption of fish and its by products has increased during the last years due to high rates of proteins and calories (11% to 24%) with 96% of easiness in digestion, unsaturated fatty acids such as omega-3 and moreover because of increase in the growth of world population and the living standard levels and making a good vision in the people who are interested in the consumption of fish (Moogouei, 2010). So that, there is a 3.1% production growth rate against1.7% of the consumption growth rate (Delgado et al., 2005). For the time being, there is 7.35 Kg fish *per capita* (Iranian Fisheries Statistics, 2008). Considering the 16.5 fish *per capita* in the world, there is a big difference between Iran and other countries. Fewer researches have been done in Iran, in comparison with other countries in the world, which shows that the consumption statistic of farmed Chinese carps is 1 Kg (Salehi, 2005). So, it demands more researches and investigation and giving beneficial strategies to grow the consumption rate of fishes in the household basket.

Table 1 shows the status of fish *per capita* and their calorie and protein, which presents the consumption growth rate in Iran from 40 years ago up to 2005, that states the 6.8% growth rate which starts from 0.5 Kg and approaches 6.9 Kg. but, in contrast, this rate for the world consumption is 1.2% which starts from 10.1 Kg and approaches 16.4 Kg (FAOSTAT, 2005). Although the growth rate in Iran is higher, but there is still a gap to to fill for reaching the world standard level. Hence, there should be a special attention to improve our consumption culture in our local market (Adeli, 2008).

Table 1: Comparison of status of fish *per capita* and gained calorie and protein (FAOSTAT, 2005)

Location	Fish Supply quantity (Kg/capita/yr)	Fish supply (Kcal/capita/day)	Protein supply quantity (g/capita/day)
World	16.4	29	4.6
Low-income food Deficit countries	13.7	22	3.7
Least developed countries	9.2	17	2.7
Landlocked developing countries	3.3	6	1
European union	22.3	48	6.7
Asia	17.8	31	4.9
Maldives(First world's country)	180.1	376	57
Iran	6.9	13	1.9

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As this table shows, to supply the demands and improve the market's share and for investigating the current patterns and replacing the better patterns, producers should knew the consumer's behavior and interests, till they are able to draw their attention to create better strategies for production policies. In this field, innovators and expert people can review and recognize the consumer's behavioral patterns and their demands and acceding, and case their modeling by helping the gathered data (Hamidizade, 2000). In Iran, pointing the target has been defined without considering the demands and consumer's behavior, specially the consumers of farmed fish, and the progress and improvement in production has been done only based on production potentials in Iran. Hence, identifying the behavior and trend of consumers will cause a prosperous planning and strategies for production and supplying the products in the market and meeting the consumer's demands (Adeli, 2008).

Materials and methods

Designing the questionnaires based on interviews with producers, planners, distributors and processors, and helping the local/international resources, lead us to prepare a prototype questionnaire with the reliability of 95%, and the number of samples by helping the Cochran Formula, was calculated as 268 households. Students and other graduates in this major, introduced by the Agricultures and Natural Resources Engineering Disciplinary Organization, helped us to fill the questionnaires by interviewing 295 households in all 22 localities of Tehran.

After that by using the $SPSS_{11.5}$ software, all data of descriptive statistics and deductive analyzing the non-parametric statistics, were analyzed (Sharifi et al., 1998). The method of estimating the future consumption of fish in a country is based on an estimation of supply and demand. But FAO has proposed two methods for evaluating the past and present fish consumption in a country. The first method is used as formula one (Failler, 2007).

(Formula 1)

$$\frac{\text{Total fish production in the country} - \text{Fish export} + \text{Fish import} + \Delta\ \text{Stocks} - \text{Non food uses}}{\text{Population of the country}}$$

The second method is based on sampling a category of fish consumptions. The fish consumptions in a region are classified according to their level income, their age, their culture and etc (Failler, 2007). This research has used the second method too, and in Tehran statistical society the following method is applied:

$L^* M = FH/ G = FC$ *(Formula 2)*

L: Average weight of a fish in every purchasing

M: Times of purchasing per year

G: Member of household

FC: Fish *per capita*

Then, by considering the weight of each can (180 gr), the weight of household's canned fish *per capita* (CFC) is calculated as below:

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*N * 0.18 (Kg) = CW / G = CFC (Formula 3)*

N: Number of annual used cans

CW: Total weight of cans

Farmed Fish *Per Capita* (FFC) is calculated as below:

FH(P))/100=FF/G=FFC (Formula 4)*

P: Percent of farmed fish consuming

FF: Weight of farmed fish consuming

Results

The detailed result of interviewees are as follows: Male: 183, Female: 112, Fish Consumers: 268 (= 90.8%), Non-consumers: 27 (=9.2%), Birth in Tehran: 205 (=69.7%), Birth in littoral region provinces: 16 (=5.4%), Birth in other 22 provinces: 73 (= 24.8%), Average size of household: 4.3, Tehran's fish consumers: 3.3, Total fish consumers of interviewees: 268, responsible people for purchasing: 112 and diploma and under graduated purchasers: 56.2%. The 72.5% remaining interviewees who are not responsible of purchasing, are diploma and under graduated. The education level of those 27 people who do not use fish (55.8%), is diploma and under graduated, max weight of purchasing for each time: 13.9% of 1 Kg, min weight of purchasing for each time: o.5 Kg, max frequency of purchasing for each time: 13.9% of 1 Kg, average purchasing of Tehran's households for each time: 5.1 Kg.

About 53.9% of Tehran's households purchase fish less than 10 times per year, and 30.7% between 10 to 20 times, 9.7% between 20 to 30 times, 3% between 30 to 40 times, and 2.7% purchase fish more than 40 times per year. To sum up, the mean purchasing of Tehran's households are 11 times per year. 5.4% (16 households) do not use canned fish and others use. The maximum frequency is 18.6% (20 cans) per year, of which the average use is 26.1 cans among Tehran's households. The priorities of animal protein based on interests using the Friedman test are chicken, mutton, beef, which their mean rankings are 1.87, 1.92 and 3.37 in order, and Trout, wild fish and warm water fish are the next priorities. Chicken, by getting 77.6% interest, has the highest priority among Tehran's households.

The highest interest of purchasing fish with 43.7 percent is because of their nutrition facts. The other priorities are interest (2.26%), considering fish for child growth (2.81%), having fish in Tehran's national ceremonies (4.29%), having fish in Tehran's parties and weddings (4.49%), and others (5.18%). In this statistical society, only 18 households (6.1%) purchase only farmed fish and 76 households (25.8%) do not buy farmed fish, although the mean purchasing of Tehran's households, which is 33.2%, is farmed fish.

There were no changes in the routing usage of 40.3% of users, who had visited farming plants or had watched any related programs in the television. Chart 1shows the category of users based on fish type.

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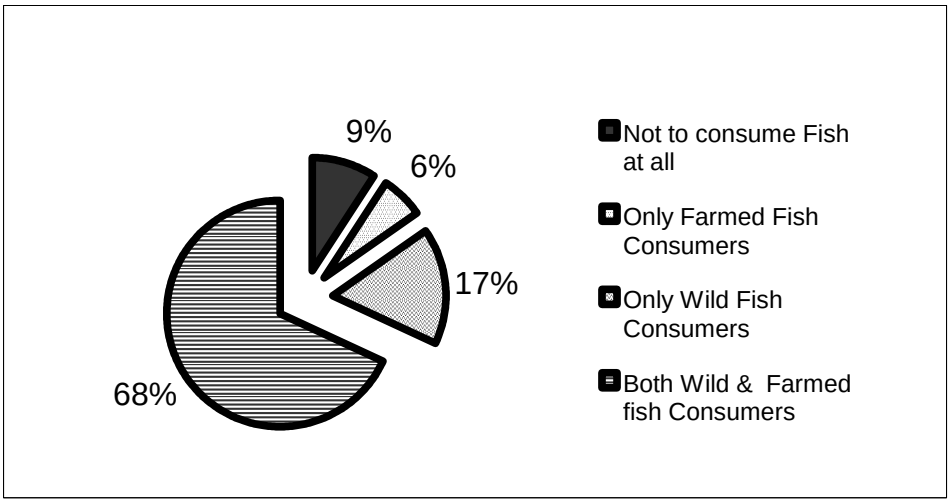


Figure 1: The category of users based on fish type in Tehran

58.9% of purchasers are interested in methods and type of packing and consider the following items in order: define nutrition facts on the packing cover, steak slicing against fillet slicing, canned fish, ready-to-cook fishes, printing the date and place of production, fresh fish, printing the cooking recipe, printing the farming method, smoked fish, salted fish and frozen fish. Among farmed fishes, Trout with 60% demand has the highest applicants in Tehran, so that the other species such as Grass carp, Silver carp, Common carp and Big head carp are the next priorities. The highest frequency of household's fish consumption (Excluding canned fish), with 12%, belongs to households with 10 Kg use per year, which their mean usage is 45.75 Kg fish per year. The highest frequency of 5.4% belongs to 5 Kg fish per capita. As an average, Tehran fish *per capita* is 12.2 Kg with the standard deviation of 17.3.

The highest frequency of canned fish with 18.6% is 3.6 Kg and the mean use is 4.7 Kg with the sandard deviation of 4.78. Canned fish *per capita* are 900 gr with 11.8 % frequency for each one in this statistical society, and the average use of canned fish *per capita* is 1.1 Kg with the standard deviation of 1.15. The highest frequency of wild fish *per capita* is 5.6 % (for 1.67,2 and 5 Kg), and the average is 6.4 Kg with the standard deviation of 10.9.The highest frequency of consuming farmed fish is 2.4% (for 1 and 2 Kg). The average is 5.8 Kg with the standard deviation of 12.04. The median is 940 gr. So, out of 13.3 Kg fish per capita, 5.8 Kg belongs to farmed fish. In chart 2, the total users' sharing of capita of wild fish, farmed fish and canned fish are illustrated, one for each different social level in Tehran.

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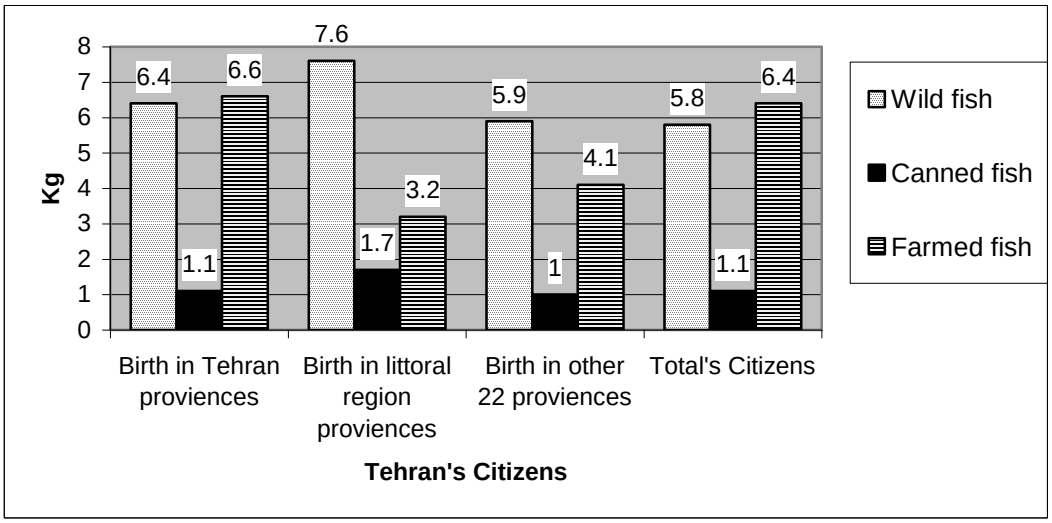


Figure 2: Fish consumption *per capita* (Kg)

Dotted column: wild fish per capita, Black column: Canned fish per capita, Striped column: Farmed fish per capita

Discussion

By considering and reviewing the results and data of Table 2, it is clear that nutrition awareness of animal protein usage has been improved in Iran and their appetite has been changed during the past years. Although, fish *per capita* in Iran is lower than the international standard, but the growth rate of fish consuming has been improved during these past years based on the living conditions in Iran. The ranking is as follows: chicken, mutton, beef and fish, but the annual protein consumption in America in the year of 1999 has been as follows: chicken, beef, mutton, pig and fish (Verbeke and Brunso, 2006). Dallimore (2005) believes that lining style influences the consumer's decision and selection, and he showed that in France, by decreasing 7% of fish consuming, there is an 18% increase in consuming beef and Pork. The economic and social situation and differences in the household's income and their occupations and level of education can cause the differences between consumption areas (Salehi, 2006). Based on Meigolinezhad's opinion (2000), culture, rites and rituals influence the fish consumption, and especially in Tehran, the social-cultural item has the highest role in consumption. This research shows that the people of Tehran have the highest fish consumption *per capita* in comparison with other people in Iran, and even consume more than other provinces and northern people who are living in Tehran. This is because of the increase in the farming fish in Tehran and more availability with lower prices of this product, in comparison with wild fishes. The research of Adeli and Shabanpour in 2007 also showed that the trend of consumption of households considering the increase of price of wild fishes is towards farmed fishes. Meanwhile, there is a firm relation between fish consumption and coastal line areas (York, 2004).

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Table 2: Comparison of status of fish *per capita* and growth *per capita* kind of animal's protein in the Iran & World (FAOSTAT, 2005)

		Per Capita 1965			Per Capita 2005			Growth rate		
		Chicken	Fish	Red meat	Chicken	Fish	Red meat	Chicken	Fish	Red meat
World	Value	3.3	10.1	21.7	12.5	16.4	27.3	3.4	1.2	0.6
	Share	9.4	28.8	61.8	22.2	29.2	48.6	65.4	23.1	11.5
Iran	Value	1.9	0.5	11	17.9	6.9	12.5	5.8	6.8	0.3
	Share	14.2	3.7	82.1	48	18.5	33.5	45	52.7	2.3

The department of research and development of the International and Public Relation Bureau of Iranian Fisheries Co. (1996) proclaimed that the fish *per capita* of Tehran (excluding canned fish) is 3.7 Kg and believes that marketing and publicity have improved the consumption. Promotion the awareness and vast advertisement of fish consumption during past years and growth rate of aquaculture, emphasize the 11.2% aquatics consumption growth rate in Tehran. Hajimohamadi, in the year of 2002, showed that *per capita* is 4.7 Kg and the share of fish for supplying protein is 3% of total foodstuffs, although now a days this share has been improved to 13 Kcal (FAOSTAT, 2005).

A research in some European countries shows that the highest fish consumption belongs to Spain with 2.61 times per week and the lowest fish consumption is in Netherlands with 0.95 times per week, shows a big difference with Tehran with 11 times per year. This research shows that 2.5% of people never eat fish, 34.4% of people never eat wild fish, and 33.6% of people have never eaten farmed fish (Verbeke and Brunso, 2006). In contrast, in Tehran, 25.8% never eat farmed fish and 6.1% only consume farmed fish and 17.3% of people use 50% farmed fish. The previous researches of Adeli (2005), also shows that the most important factor for purchasing is their packing with printed nutrition facts, and then there are other important factors such as protein and nutrition facts and then physician's advice. As the research of Rostami (2001) shows, the reason of low consumption of fish is the lack of awareness of fish nutrition facts and healthy aspects of eating fish and it is the most important factor of purchasers' concerns. Hence, by improving the level of consumers' awareness toward nutrition fact of all types of aquatics, improving the production plants shall be done based on market demands to gain a firm settlement. Dallimore also showed that 70% of ready-meat consumers buy and use it because of its healthy aspects.

In 1998 the Bureau of Fishery Industry and Marketing of Fars province Shilat Organization,, showed that the significant level of carp fish consumption is lower than other fishes consumption. Adeli's researches of the current year and the year 2005, shows that the rate of consuming Chinese carps is in the lowest ranking among other animal proteins and consuming of the Trout, is in the highest level, because of its fresh and live sales and improvement in its farming (38%

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growth rate) during the last ten years. Botrel (2007) showed that in France, high quality and freshness of Trout are the most important factors of its selling and this quality is because of its live selling. Meigolinezhad (2000) believes that, there is lack of availability and accessibility of fish in all markets, and its selling cost is not trustable and we can not consider fish as a healthy product. In spite of people's eagerness in fresh and cleaned fish, the highest share of the market is frozen fishery products, and the system of quality control inspection is so week (Babaii, 1995). Hence, standardizing the controlling tools, accurate supervision, creating trust among people through Iranian Veterinary Organization or by delegating to Private Organizations including governmental supervision, we can cause more fish consuming and produce more occupations. Babaii (2002) has defined the reasons of low fish consumption, because of bad odor and taste, not getting used to and improper and unhygienic supplying. In Shiraz, the strategies of improving consumption have been mentioned as: decreasing the price, supplying hygienic and fresh fish, increasing the sales centers, recipe in structure and supervision on sales and distribution at the end. Usually, consumption improvement is gained by better quality, easy access, variety and decreasing the cost (Verbeke and Brunso, 2006). Now a day, industries are cautiously moving toward easier products (Foster, 2005). Adeli and Shabanpour (2007) showed that 62.3% of the statistical society is interested in packed and pared fishes. Printing the necessary data and nutrition facts are the preliminary demands of consumers. Dallimore (2005) showed that 84% of consumers control the data label pasted on the packing, so that, consumption the organic and eco-labeled products have been grown 25% during these years. So, we can see that, priorities of Tehran's consuming behavior have no special difference with other people, and the main matters are lower fish per capita, lower awareness and lower trust of supplied fishes beside growth of consuming rate in comparison with other countries in the world during the past decades. So, by supporting the special research in the field of marketing and using modern methods of advertisement besides improving the quality of fish farming and proper distribution. It is revealed that in the future by using these kinds of researches and permanent analyses of consumers' behaviors, we can approach the new market of aquatics, gain more fish *per capita* with accurate planning and qualifying the health level of the society and establishing new occupations .

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وضعیت مصرف سرانه ماهی شهروندان تهرانی

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چکیده

با تکمیل اطلاعات پرسشنامه ای از ۲۹۵ خانوار مناطق ۲۲ گانه شهر تهران در سال ۱۳۸۷ میزان مصرف ماهی آنان بررسی شد. پس از بررسی آمارهای توصیفی و تحلیل استنباطی آماره های ناپارامتریک، میزان مصرف سرانه از فرمول های مربوطه بدست آمد. میانگین خرید هر خانوار در هر نوبت ۵/۱ کیلوگرم و ۱۱ بار در سال می‌باشد. علاقه مندی به ترتیب به گوشت مرغ، گوسفند، گاو، قزل آلا، ماهیان وحشی و سپس کپورماهیان پرورشی است. بالاترین انگیزه خرید بدلیل ارزش غذایی آبزیان است. بطور متوسط ۳۳/۲ درصد خرید را ماهیان پرورشی تشکیل می‌دهند. ۵۹ درصد خریداران علاقه‌مند به بسته‌بندی ماهی‌اند و درج ارزش غذایی ماهی را بالاترین اولویت می دانند. مصرف سرانه ماهی ۱۳,۳ کیلوگرم است که ۶,۴ کیلوگرم آنرا ماهی پرورشی، ۵,۸ کیلوگرم آنرا ماهی وحشی و ۱,۱ کیلوگرم آنرا کنسرو ماهی تشکیل می دهد. مصرف سرانه ماهی تهرانی ها بیشتر از سایر شهرستانی‌های مقیم است، زیرا گرایش آنها به ماهیان پرورشی و تازگی آن است. در مقابل، مصرف کنسرو و ماهیان وحشی شهروندان استانهای ساحلی مقیم تهران بیشتر از سایرین است.

واژگان کلیدی: مصرف، سرانه ماهی، شیلات، تهران، ایران

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