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ANALYSIS OF TOXICOLOGICAL CONTENT AVAILABLE IN TUNA FISH SPECIES AT SOUTHERN COASTAL REGION OF INDIA

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Abstract: **Human health are directly affected by Metal pollution due to waterways which can have effects over food chain. The polluted water will have the accumulation of trace metals which causes the impact on living organisms of sea that is consumed as food. This study is required for the analysis of those metals which are toxic namely Pb and Cd and the essential metals of dietary for four different brands processed from cans of tuna species are Zn and Mn in 120 in India and the observation of pollution in tuna products is critical for humans due to safety of food mercury (Hg), lead (Pb) and cadmium (Cd). The pollutants like Hg, Pb and Cd has been observed for 60 specimens of tuna in a total. The contents of metal present in the samples are expressed in terms of mggÿ1 wet weight, for mercury the values differed from 0.20 to 0.66 with a median value of 0.29, from 0.09 to 0.32 with a median value of cadmium is 0.18 and from 0.18 to 0.40 with a median value of lead is 0.28. This study signifies with the results of tuna from the southern coastal region of India have the permissible levels of concentrations which is below these toxic metals. For the contribution of the body burden can therefore be considered negligible.**

Keywords: **Tuna fish, spices, toxicological content.**

1. INTRODUCTION

Naturally, metals with other elements which are existed in food or in which can invade the food that results in activities of human such as processes of industrial and agricultural. Those metals which have specific issues that cause harmful effects in relation with the human health are mercury, lead, cadmium, tin and arsenic. The heavy metals are often referred as Mercury and lead. These metals have toxicity in part because of the actuality in which they can be deposited in biological tissues this method of deposition is bioaccumulation[1]. The method for deposition of metals is bioaccumulation that happens for all surviving creatures that leads to the exposure of metals contained in food and surrounding, which can comprises of animals that are used as food namely fish and cattle.

Those metals that can primarily enter the environment namely mercury, cadmium, arsenic and lead that cause effects on emissions on industrial or through the products disposal which contains these metals, and also comprising batteries of mercury-cadmium or cadmium-nickel, ceramics that containing lead and glass, thermometers containing mercury, etc[2]. The uses in past namely the utilization of mercury as a dressing of seed and as an antibacterial, the utilization of lead through water pipes and as an agent for antiknock in petrol and arsenic is used as a rodenticide have been widely phased out due to the toxicity and endurance of the metals[3].

There are two main aspects for toxicity of these metals, they are: (a) the truth that have unknown functions of metabolic, but during the presence of disrupt normal cellular processes in the body, toxicity that leads to in a number of organs; (b) in specific the potential for the heavy metals mercury and lead, for the accumulation in biological tissues this is a known

as bioaccumulation. Once the metal taken up into the body, there occurs bioaccumulation and stored in specific organs like the liver or the kidney this can be expelled slowly while it is equated with its uptake. The bioaccumulation process of metals happens in all animals, comprising animals used as food such as fish and cattle. Hence it is required to control the toxic metal levels in foodstuffs to protect human health[4].

Tuna was identified as a predator and is capable of heavy metals concentration in large amount. For example, concentrations of mercury ranges in between 50 to 120 µg g-1 have been described across the internal organs for Japanese tuna [5]. The study comprises of Copper and nickel because many important functions can be executed in the biological systems, since detrimental effects are caused due to chromium[6]. Although, copper in the forms of ions which are toxic for fish are Cu2+, Cu2OH2 2+, and CuOH+. The nature of toxicity in specific metals and which have the main concentration made for the whole burdens of human due to the utilization of these metals in food are also recorded[7]. Therefore, the metal levels present these foodstuffs are below review often.

The fresh waters from pond are polluted through a vast diversity of toxins that turned into an issue for previous decades that are minimized (Vutukuru, 2005, Dirilgen, 2001, Voegborlo et al. 1999, Canli et al, 2002)[8]. These extensive systems for aquatics of nature may also be polluted by those metals which are weighted are releases from activities of domestic, industrial and other man-made (Velez and Montoro; 1998; Conacher et al., 1993). The pollution due to heavy metal cause effects on devastating for the balance of ecological with environment of recipient and aquatic ecosystems diversity due to the increase of toxin in the food chain and the effects that are adverse can be managed with aquatic systems death (Farkas et al., 2002, Yousuf and El- Shahwi, 1999)[9]. The accumulations of aggregation that is significant of metals that are weighted are present within the tissues of fish and it specifies the weighted metal source to the living creatures in prime dietary. Those components that are polluted that present in those fish species consumed as food are determined for the effects of contaminations that has studies of them in food has been prompted (Emami Khansari et al., 2005)[10]. The consideration of heavy metals is the dominant in aquatic environment pollution due to their toxicity and accumulation of aquatic organisms.

The accumulation of contaminations is prone to long living organisms like Tuna fish. Many countries comprising Iran eats canned tuna fish regularly (universally about 10 × 1010 tonne per year). This study determines those metals that are poisonous and the levels of necessitate (Pb, Zn, Mn and Cd) in various types of four canned tuna fish commercially (tuna with long tail, Kawakawa, Kilka and tuna with yellow fin) typically eaten country like Iran in which GFAAS is used for determining. The assistance to produce the information required for execution of surveillance intended at assuring the food supply safety and decreasing toxic metals for human exposure.

2. MATERIALS AND METHODS

Tuna fingerlings are random for total of 70 (average weight: 6-7 grams) that can be utilized for the recent study has been accumulated from the farm of local fish placed in India where50 liters capacity for pools of plastic can be adapted about a week while it is present in laboratory. The fish is maintained using ground water in the tanks where fish have their habitat have the pH level ranges between 7.2±0.1, oxygen which is dissolved ranges in 8.0±0.3 mg/L and the range of bicarbonates is 95.0±5.0mg/L. LC_{50} for Renewal bioassay has been determined and was probit analysis method for Finney has been evaluated (1971).

The biochemical components by the standardization of procedures namely Glucose, Glycogen, Total proteins and free amino acids has been estimated in 5 tissues of the healthy fish body parts like Muscle, Gill, Liver, Heart and Kidney (Control) and those concentration of poisonous and sub- poisonous due to the presence of Cadmium chloride (Merck) from the fish has been exposed. The toxic concentration dose of One-tenth has been taken in equals with sub-lethal dose and for the biochemical analysis; the exposure of fish has been tend to the dose before sacrifice of sub-toxic of 7 days in time period.

3. RESULTS AND DISCUSSIONS

The total samples square measure taken for canned tuna were analyzed is fifty; wherever the leads were detected in forty one and Cd were detected in thirty three samples. Tuna caught by industrial vessels from the coasts of southern square measure canned. Cans of Tuna were procured from groceries, markets, supermarkets, hypermarkets, and main food distribution networks, together with the foremost well-liked markets in areas with high population densities.

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Statistics tools:

SPSS, (Statistical Package for the Social Sciences) is generic, quite comprehensive analysis software, comprising descriptive statistics, parametric and non-parametric analysis functionality. In this study, correlation analysis is used for metal elements which are strongly correlated in tuna fish.

The toxicity of these metals has two main aspects: (a) the fact that they have no known metabolic function, but when present in the body they disrupt normal cellular processes, leading to toxicity in a number of organs; (b) the potential, particularly of the so-called heavy metals mercury and lead, to accumulate in biological tissues, a process known as bioaccumulation. This occurs because the metal, once taken up into the body, is stored in particular organs

Table 1: level of biochemical components Varied for the different levels in terms of **% of maximization** ( ) or **% of minimization** ( ) in ***tuna fish*** revealed for **sub-toxic** and **toxic** doses of **mercury level** as compared to **control** fish

Tissue	Glucose (%)		Glycogen (%)		Total Proteins (%)		Lipids (%)	
	Sub-Lethal	Lethal	Sub-Lethal	Lethal	Sub-Lethal	Lethal	Sub-Lethal	Lethal
Muscle	18.8	56.4	8.64	19.02	1.53	5.47	23.8	43.65
Gill	56.75	145.9	4.98	23.48	11.92	14.6	20.93	31.39
Liver	17.36	31.25	16.12	26.79	22.13	36.13	18.42	35.08
Heart	21.64	38.14	9.35	41.83	18.18	34.65	29.03	45.16
Kidney	34.21	50.0	17.64	41.83	9.16	43.12	18.46	32.3

Sl. No	Fish samples	Mean			Std. Deviation					F Value	Significance
		PB	ZN	MN	CD	PB	ZN	MN	CD		
1	**Yellow tuna**	0.010	0.008	0.021	0.13	0.401	0.150	0.301	0.316	.146	.864
2	**Long tail tuna**	0.012	0.08	0.010	0.71	0.31	0.100	0.201	0.81	.159	.853
3	**True tuna**	0.81	0.052	0.31	0.11	0.402	0.43	0.101	0.61	.159	.853
4	**Albacore tuna**	0.610	0.0208	0.191	0.973	0.71	0.390	0.321	0.636	.159	.853
5	**Skipjack tuna**	0.219	0.672	0.915	0.41	0.386	0.867	0.896	0.53	.851	.428

Sl. No	Fish samples	Mean			Std. Deviation					F Value	Significance
		PB	ZN	MN	CD	PB	ZN	MN	CD		
6	**Southern blue fin tuna**	0.871	0.183	0.831	0.45	0.613	0.698	0.523	0.621	.213	.808
7	**Frigate tuna**	0.93	0.975	0.78	0.521	0.671	0.876	0.178	0.672	1.270	.281
8	**Mackerel tuna**	0.011	0.198	0.921	0.233	0.441	0.150	0.411	0.986	.482	.618
9	**kilka**	0.230	0.218	0.961	0.821	0.431	0.270	0.891	0.566	.198	.821
10	**kawakawa**	0.210	0.008	0.021	0.13	0.401	0.150	0.301	0.316	.077	.926

Significance @ 0.05 level

Ten canned tuna fish specimens has been examined for Pb, zn,mn, and cd. A spiked sample demonstrates the accuracy of the methods used for good recoveries. Among the analyzed total samples Pb, zn, mn,cd has been deduced for every specimens since Pb and Cd has been deduced in 41 and 33 specimens correspondingly. Pb, Cd, Hg, Ni, Cu, and Cr concentrations are shown in Table 1 as standard deviation means and variation of coefficient.

The correlation study of metal to metal (Table 2) represents particularly three elements that are correlated heavily for tuna fish. The coefficient of correlation that has to be considered are (r>0.05) was found between Pb and Zn, Zn and mn, and mn and cd.

4. CONCLUSION

With respect to the heavy metal content of marine organisms taken from other southern coastal areas, very little comparison data appear to be available. Though estimates of the amount of toxic metals consumed in the diet are difficult to obtain. As a consequence of its known toxicity as well as that of Pb and Cd and of the serious contamination of foods that occurs from time to time during commercial handling and processing, most countries monitor the levels of toxic elements in foods.

Some toxic element levels are analyzed for the samples of tuna canned fish that are determined above legal limits. The reduction of levels has to be cautious while the practicing and the processing of raw materials have to be managed. The canned fish samples have to be examined frequently in departmental stores of Iran in regarding those components that are polluted and poisonous. The survey enhances the data and information of baseline for the accumulation of metals namely mercury, cadmium and lead in canned tuna fish that are typically retailed in India. These samples furnish the information that is beneficial for the safety based on common consumption of fishes by humans.

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