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Determination Of Heavy Metal Concentration In Edible Fish From Arnala Beach, Naigaon Creek, Rangaon Beach & Vasai Creek.

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Abstract: *Heavy metal concentration of Ni, Pb, Zn, P and S were detected in fish samples of Indian prawn (species-**Fenneropenaeus indicus**) from Arnala beach, Naigaon creek and Vasai creek and Bombay duck (species-**Harpadon nehereus**) from Rangaon beach. Heavy metals in fish samples were analyzed by Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES). Irrespective of fish species, range for muscle samples are S>P>Zn>Pb>Ni. Level of S and P reported to be highest in fish samples from Arnala beach and Vasai creek respectively. Zn and Pb concentrations were reported to be higher than the Ni.*

Key words: - *Fenneropenaeus indicus, Harpadon nehereus, Inductively Coupled Plasma Atomic Emission Spectroscopy.*

Introduction:-

Heavy metal pollution in water bodies gives threat to consumer of fishery sources (Terra *et. al*.; 2008). Heavy metals constitute a core group of aquatic pollutants with its bio-accumulative and non-biodegradable properties in food (Kazim *et. al*.; 2008). Studies on bioaccumulation of pollutants in fish are important in determining different content of trace heavy metal in fish species from bio-magnifications of food chains, metabolic capability and feeding habits (Asuquo *et. al*.; 2004). Human may be contaminated by organic and inorganic pollutants associated to aquatic systems by consumption of contaminated fish and other aquatic foods from this environment (Aderinola *et. al*.; 2009). The accumulation of heavy metal is a tool for identifying the impact of metal in aquatic ecosystem and therefore shows an adverse effect in organism (Borgmann and Norwood, 1995). Metals are introduced into water bodies, through oil spillage, sewage effluents (Marr and Creaser, 1983), auto emission, and industrial activities such as mining, canning (Finerty et. al.; 1990), electroplating, rock weathering etc. (Guerrin et. al.; 1990).

Arnala beach, Rangaon beach, Naigaon creek and Vasai creek are the famous and crowded fish landing ports. A large number of fish consumers prefer fish buying from these ports. The objective of this study is to analyze heavy metals concentrations in common edible fish species Indian prawn (species-**Fenneropenaeus indicus**) from Arnala beach, Naigaon creek and Vasai creek and Bombay duck (species-**Harpadon nehereus**) from Rangaon beach.

Materials and methods:-

Sample collection: - Fish samples from Arnala beach, Rangaon beach, Naigaon creek and Vasai creek were caught using gill nets and analysis were carried out according to APHA (APHA, 2005). The fishes were washed using distilled water and placed in separated polyethylene bags with ice. The samples were preserved in frozen condition until ready for analysis.

Figure 1: Indian prawn from Arnala beach, Naigaon creek and Vasai creek.

Figure 2: Bombay duck from Rangaon beach.

Sample preparation: - The soft flesh separated from each species was weighed for 0.50gms in a weighing balance (sensitive). 0.50gms of flesh of each species was treated with 8ml of Nitric acid and Perchloric acid each. The flesh was made to dissolve completely and then the total volume was made to 50ml by adding 34ml of distilled water.

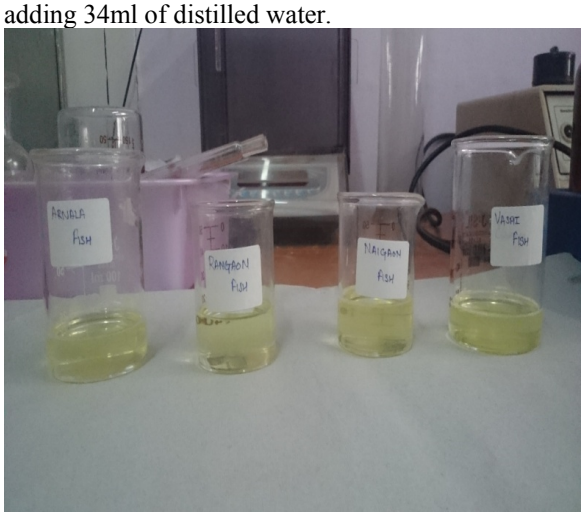

Figure 3: Dissolving process.

Then the samples were filtered through whatman filter paper No.1 to get a clear solution which was further used as sample. The prepared samples were tested in Inductively Coupled Plasma – Atomic Emission Spectroscopy (ICP-AES) for qualitative and quantitative analysis (Abdulali et. al.; 2005).

Results and Discussion: -

The analysis has shown that Ni, Pb, Zn, S and P these heavy metals were all present in all the four fish samples analyzed. This is an indication that Arnala beach, Rangaon beach, Naigaon creek and Vasai creek are highly contaminated with heavy metals.

Figure 4: Filtered samples. Furthermore, from the table level of S and P are comparatively much high and the level of Pb and Zn are comparatively high than Ni.

Sample sites	**Heavy metals**				
	S (mg/L)	P (mg/L)	Zn (mg/L)	Pb (mg/L)	Ni (mg/L)
Arnala beach	43.722	7.341	0.254	0.103	0.069
Naigaon creek	39.264	7.193	0.254	0.12	0.071
Vasai creek	39.155	7.866	0.245	0.123	0.068
Rangaon beach	29.909	5.73	0.201	0.096	0.071

The concentration of heavy metals in fish is higher as a result of accumulation of these metals in the fish and when consumed it may lead to food poisoning or other health related challenges such as: decreased fertility, spontaneous absorption (Vallae and Umar, 1979), low birth weight, cancer, mental retardation, brain damage, tumour, decreased haemoglobin level, neurological and gastrointestinal disorder death (Ipinmoroti and Oshodi, 1993).

The Institute for Health Metrics and Evaluation (IHME) has estimated in 2013 that lead exposure accounted for 8, 53,000 deaths due to long-term effects on health, with the highest burdon in low and middle income countries (IHME, 2015). Lead is a cumulative toxicant that affects multiple body systems and is particularly harmful to young children (WHO, 2016).

Pollution has been defined as the introduction to the environment substances which are liable to cause hazard to human health (Holdgate, 1979). It is well known that Zn and S are essential nutrients for enzymatic biochemical activities (Buss and Robertson, 1976).

Conclusion: -

The pollution level of Arnala beach, Rangaon beach, Naigaon creek and Vasai creek was determined. From the analysis of the result obtained and the potential dangers associated with consumption of these heavy metal can lead to major health problems. Unfortunately, many house hold depend on it for consumption and other domestic purpose, hence they are the affected by heavy metal pollution.

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