

Profile of Toxic Metals in Intoxicated Items Collected From Different Areas of Khyber Pakhtunkhwa, Pakistan

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Abstract: The present study was aimed to quantitatively measure specific elements and to construct awareness among the public about the intoxicated items having high concentration of heavy metals. Twelve samples including Black Snuff, Yellow Snuff, Powder Snuff, Pan, Marijuana, five type of Cigarette i.e. Gold leaf, Capstan, Marlboro, Dollar and Diplomat, Caffeine and Salajeet were analyzed for the heavy metals through Atomic Absorption Spectrophotometry (AAS). Heavy metals like Zinc (Zn), Lead (Pb), Nickel (Ni), Iron (Fe), Copper (Cu) and Cadmium (Cd) were determined. The mean values for heavy metals in selected intoxicated items were Zn (15.00±0.09), Pb (13.09±0.03), Cu (8.45±0.06), Fe (140.0±0.06), Ni (11.40±0.010) and Cd (7.71±0.01), respectively. The highest concentration of Zn, Pb, Fe, Cu, Ni and Cd were recorded in Powder snuff, caffeine, black snuff, Gold leaf, Caffeine and Pan respectively.

Key words: Heavy Metals • Intoxicated Items • Atomic Absorption Spectroscopy

INTRODUCTION

The term heavy metal is a general term which applies to group of metals and metalloids with atomic density greater than water [1-3]. They are also known as trace elements because they occur in minute concentrations in biological systems. These metals may build up in biological systems and become significant health hazard. Heavy metals are the most important toxic pollutants which threaten the environment especially watery perimeters. These pollutants are created naturally or through the mines near natural water resources, entrance of industrial sewage, different petrochemical industries and the leakage of oil and gas [4]. Commercial and farming procedures have led to an increased concentration of heavy metals in soil, air, water and consequently, these materials are taken by vegetation or animals and find their ways into food chain [5]. They can directly or indirectly threaten human through the food chain. Cd, Pb and Al are the most important heavy metals among these. *Nicotiana tobacum* common name is Tobacco, whose leaves are

famous for the use of smoking, chewing or sniffing for different effects all over world [6]. Heavy metals are present in tobacco smoke and have long been associated with various diseases. Many heavy metals, including cadmium, lead and thallium are efficiently extracted from the soil by tobacco plants. Thus, levels of heavy metals in tobacco are higher when grown in soil having high ambient heavy metal concentrations. Other environmental factors may influence heavy metal uptake by tobacco plants including soil pH and heavy metal-containing sludge or fertilizers applied to crops [7]. Nineteen known carcinogenic and at least 30 different heavy metals are present in tobacco [8]. World Health Organization (WHO) [9] regularly reviewed that hazardous effects of heavy metals like lead (Pb), cadmium (Cd), mercury (Hg), arsenic (As), selenium (Se) and nickel (Ni) on human health. Lead and arsenic have carcinogenic and other negative effects on human health, the blood analysis of smokers and non-smokers show higher concentration of lead and arsenic in former [10-13]. DNA damage in lungs, acute renal failure, seizures, nerve damage skin pigmentation

and cancer problems, ulcerations of the mouth, low hemoglobin, leukemia, skin lesion, bladder cancer and lung cancer are caused due to arsenic exposure [14, 15]. Excessive doses of Cd results in cardiovascular diseases increase blood pressure, lungs and bones damage [16].

MATERIAL AND METHODS

Collection of Samples: For the present study twelve samples of intoxicated items of different variety were collected from, Khyber Pakhtunkhwa, Pakistan.

Digestion of Samples: Specific weight 2grams of each in-toxicated item was placed in furnace in crucible at 500°C to obtain ash. The samples were heated in crucible for several hours until white ashes were obtained. The ashes were cooled down at room temperature and then digested by adding 65% of nitric acid. These samples were placed on hotplate for removal of excess amount of acids and then diluted up to mark of 25ml. These samples were filtered through Whatman # 42 filter paper into 25 ml volumetric flask and were transfer in plastic bottles for elemental analysis.

RESULT AND DISCUSSION

The concentration of Zn, Fe, Ni, Cu, Pb and Cd in the selected intoxicated items is appended in Table 1. As obvious from these tables, high concentration of Zn was found in Nasal Snuff up to 15mg/kg followed by Yellow Snuff 13.5mg/kg, Salajeet 11.75mg/kg, Gold Leaf 4.175mg/kg, Black Snuff 3.65mg/kg, Paan 2.45mg/kg, Capstan 2.275mg/kg, Charas 1.025mg/kg, while the concentration of remaining are 0mg/kg. No doubt zinc in trace amount is very important for growth and proper function of the body but its high concentration have numerous adverse effects. Taking too much zinc into the body through food, water, dietary supplements or smoking etc. can also affect health. If large doses of zinc are taken by mouth even for a short time, stomach cramps, nausea and vomiting may occur. Ingesting high levels of zinc for several months may cause anemia, damage the pancreas and decrease levels of high-density lipoprotein (HDL) cholesterol. Pb Caffeine 13.39mg/kg, Black Snuff 11.72mg/kg, Salajeet 8.35mg/kg, Nasal Snuff 6.65mg/kg, Diplomat 4.85mg/kg, Capstan 4.06mg/kg and Gold Leaf 2mg/kg, while the remaining contain 0% lead. The effects of lead are the same whether it enters the body through breathing or swallowing. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults to lead at work has resulted

in decreased performance in some tests that measure functions of the nervous system. Lead exposure may also cause weakness in fingers, wrists, or ankles, lead can severely damage the brain and kidneys in adults or children and ultimately cause death. Figure 2 Graph showing % concentration of Zn and Pb in various intoxicated items).Cu was in high concentration in Malboro 8.475mg/kg followed by Gold Leaf 7.275 mg/kg, Dollar 6.95mg/kg, Capstan 6.38mg/kg, Diplomat 5.40 mg/kg, Yellow Snuff 5.25mg/kg, Black Snuff 4.45mg/kg, Nasal Snuff 4.35mg/kg, Caffeine 4.30 mg/kg, Charas 3.638mg/kg, Salajeet 3.09mg/kg and Paan 2.95mg/kg. Copper is essential for good health. However, exposure to higher doses can be damaging. Long term exposure to copper dust can irritate your nose, mouth and eyes and cause headaches, dizziness, nausea and diarrhea. If you drink water that contains higher than normal levels of copper, you may experience nausea, vomiting, stomach cramps, or diarrhea. Intentionally high intakes of copper can cause liver and kidney damage and even death. Only few samples contain Ni. The concentration of Ni was high in Caffeine 11.40mg/kg, Nasal Snuff 2.216mg/kg, Black Snuff 0.85mg/kg and Gold Leaf 0.225mg/kg. The most serious harmful health effects from exposure to nickel are chronic bronchitis, reduced lung function and cancer of the lung and nasal sinus Figure 3 Graph showing % concentration of Cu and Ni in various intoxicated items).Similarly the concentration of Fe also reaches to maximum in Nasal Snuff 141.12mg/kg followed by Black Snuff 140.125mg/kg, Diplomat 130.20mg/kg, Dollar 135.02mg/kg, Yellow Snuff 130.62mg/kg, Paan 112.03mg/kg, Salajeet 101.05mg/kg, Charas 87.4mg/kg, Gold Leaf 80.10mg/kg, Capstan 76.78mg/kg, Caffeine 75.03mg/kg and Malboro 12.0mg/kg. High level of Fe may affect kidneys, lungs and also the CNS. Inhalation in high amount can cause headache, nasal and eye irritation and even death. the concentration of Cd was recorded to be 7.71mg/kg in Paan followed by 7.66mg/kg in Black Snuff then Yellow Snuff 7.4mg/kg, Nasal Snuff 6.02mg/kg, Caffeine 5.15mg/kg Capstan 4.74mg/kg, Gold Leaf 4.58mg/kg, Charas 4.51mg/kg, Diplomat 2.73mg/kg and Salajeet 2.62mg/kg. Breathing air with very high levels of cadmium can severely damage the lungs and may cause death. The U.S. Department of Health and Human Services (DHHS) has determined that cadmium and cadmium compounds are known human carcinogens. The International Agency for Research on Cancer (IARC) has determined that cadmium is carcinogenic to humans. The EPA has determined that cadmium is a probable human carcinogen. Figure 1 Graph showing % concentration of Fe and Cd in various intoxicated items).

Table 1: Concentration of heavy metals in various intoxicated items

No	Name	Zn	Pb	Cu	Fe	Ni	Cd
1	Black Snuff	3.65±0.06	11.75±0.374	4.45±0.070	140.125±0.200	0.825±0.121	7.66±0.193
2	Yellow Snuff	13.5±0.007	0	5.15±0.100	130.62±0.115	0	7.4±0.108
3	Paan	2.45±0.098	0	2.95±0.077	112.03±0.162	0	7.71±0.114
4	Charas	1.025±0.002	0	3.638±0.048	87.4±0.124	0	4.51±0.341
5	Nasal Snuff	15±0.087	6.65±0.640	4.35±0.038	141.12±0.171	2.216±0.130	6.02±0.168
6	Capstan	2.275±0.091	4.06±0.794	6.38±0.083	76.78±1.080	0	4.74±0.222
7	Gold Leaf	4.175±0.004	2±0.544	7.275±0.113	80.10±0.62	0.225±0.088	4.58±0.153
8	Malboro	0	0	8.475±0.067	12.0±0.83	0	0
9	Dollar	0	0	6.95±0.030	135.02±0.371	0	0
10	Diplomat	0	4.85±0.659	5.40±0.040	130.70±0.115	0	2.73±0.374
11	Caffeine	0	13.39±0.003	4.30±0.010	75.03±0.171	11.40±0.0160	5.15±0.009
12	Salajeet	11.75±0.091	08.35±0.008	3.09±0.008	101.05±0.006	0	2.62±0.142

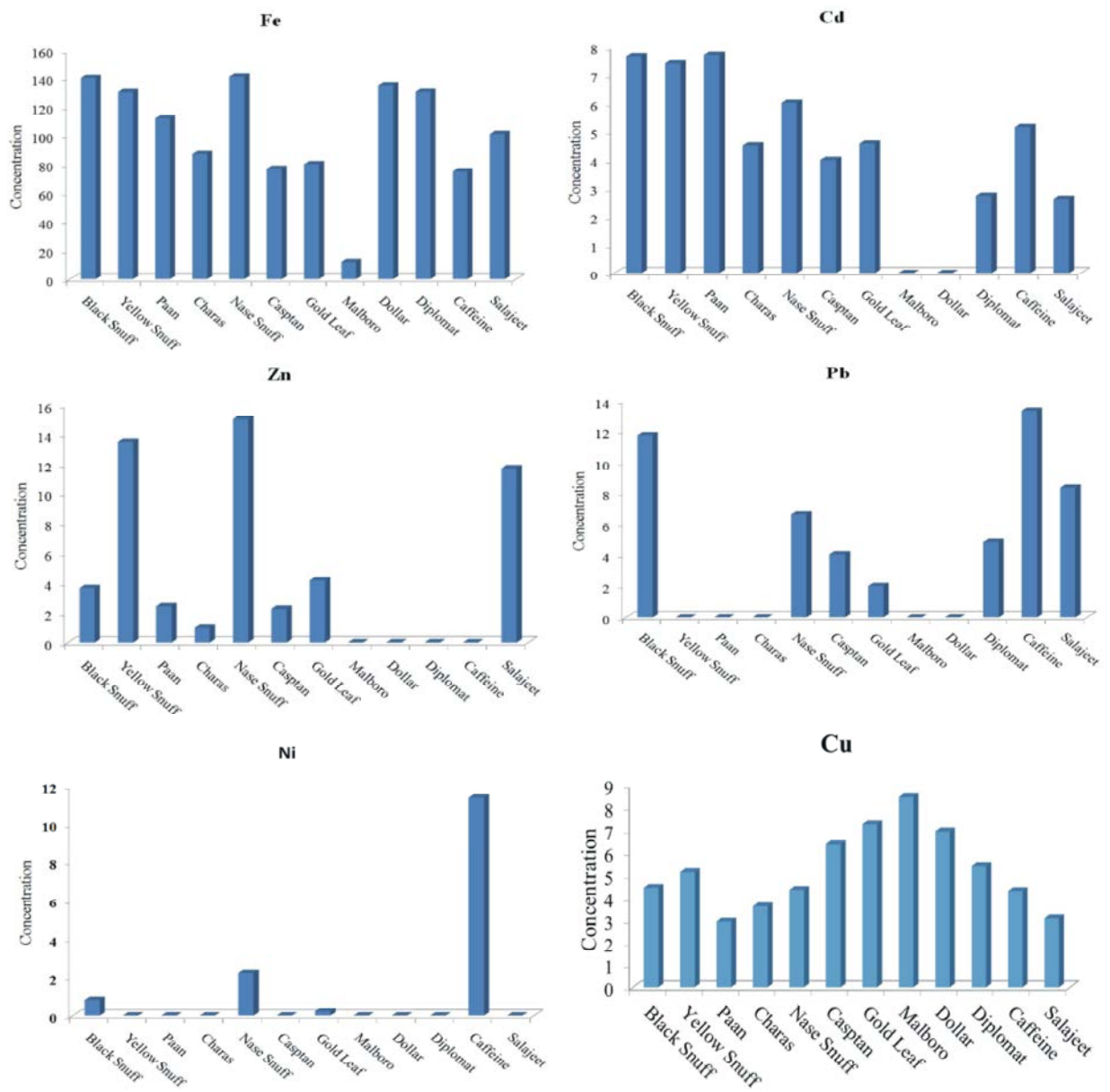


Fig. 1, 2, 3:

CONCLUSION

The present study was aimed to identify the toxic elements in the given samples. The concentrations were different in all selected samples. The utilization of the above and many other intoxicated item cause serious infection and even are death causing because of the presence of various toxic metal.

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