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Review Article

Levels of Heavy Metal in Vegetable, Fruits and Cereals Crops in Ethiopia: A Review

Dagne Bekele Bahiru, Lamesgen Yegrem

Ethiopian Institute of Agricultural Research, Debre Zeit Agricultural Research Center, Debre Zeit, Ethiopia

Email address:
ddagnebbk19@gmail.com (D. B. Bahiru), lamesyegrem@gmail.com (L. Yegrem)

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Abstract: Heavy metal pollution of the environment through anthropogenic and natural processes are expanded in a serious problem. Heavy metals are elements in the predict table they have high atomic weight, atomic number and atomic densities higher than 4 g/cm^3, among those metals lead, cadmium, zinc, mercury, arsenic, silver, chromium, copper, iron, platinum and others. Toxic heavy metal contamination of food crops is a big concern global world mainly in developing country like Ethiopia. Ultimately, heavy metal toxicity and disease in human and animals are because of conception of heavy metal contaminated soil, food and air. The huge amount environmental contamination by toxic heavy metals are dangerous because of their uptake by plants and subsequent accumulation in food crops consumed by animals and humans is deleterious to heath. There are many known source of toxic heavy metals including the nature, which releases in to the food, air and water, and human activities like fertilizer application in agricultural farm, the use of herbicides and pesticide and wastewater irrigation. Other sources of heavy metals in environment are smoking, automobile emission, industries, swage and waste disposal. Most studies showed that vegetables and other food crops consumed in Ethiopia are contaminated by heavy metals this is associated with adverse health issues such as cancer, which is currently serious in Ethiopia. It is therefore a big concern based on those issues the communities to avoid the conception of heavy metal contaminated food items. There is also need monitoring of the levels of heavy metals in food crops and precaution of heavy metal controlling methods.

Keywords: Heavy Metals, Heavy Metal Source, Food Crop, Contamination

1. Introduction

Agricultural activities are complicated phenomenon and exerts both favorable and unfavorable consequences on natural environment [1]. Heavy metal environmental pollution is matter of big concern and has accepted as a global world, problem, because of its effect on human and animal health. Among those metals Pb, Cd, Zn, Hg, As, Ag, Cr, Cu, Fe, Pt and others [2]. Heavy metals toxicity have received special attention globally and become an environmental problem of worldwide concern due to neurotoxin, carcinogenic and several other impacts arising from their consumption even at lower contents [3].

In general, heavy metals and other metals are present in chemical compound as positive ions or in the form of cations in the solution. Heavy metals are elements with metallic properties and atomic number higher than 20 [4]. Heavy metals are among the environmental pollutants due to their high toxicity, Heavy metals (HM) among the most serious environmental pollutants due to their high toxicity, abundance and ease of accumulation by various animal, humans, and plant organs [5]. HMs are elements in the predict table they have high atomic weight, atomic number and atomic densities higher than 4 g/cm^3, among HMs (Pb, Cd, Zn, Hg, As, Ag, Cr, Cu, Fe, Pt, Mn, Ni, Co and others). Some are micronutrients necessary for plant growth for example Zn, Cu, Mn, Ni and Co, while others have unknown biological function such as Cd, Pb and Hg [6, 7].

Food crops are dominantly eating routine taken by humans in all over the global world, being wellsprings of major supplements, antioxidants agent and metabolites. However, both essential and non-essential components are available in vegetables over an extensive variety of concentrations as are

said to be greater absorber of metals from the soil [8].

Many plant species are intake pollutants from the soil such as HMs: Pb, Cd, Cr, As and radionuclide from soil. Different plant species accommodate heavy metal in different concentration. Vegetables being carrier of metals, when take up by human being, Vegetables being get enter to human body [9]. Therefore, the present review was conducted to know the present heavy metal contamination status in different food crops grown in different part of Ethiopia and its sources.

2. Sources of Heavy Metals

HMs are one of the constituent of the earth's crust and present as environmental contaminants; they are not biodegradable and thermally degradable and enter the human body through food, air and water and bioaccumulate aver a period of time [10]. Heavy metals enter to the environment through natural and anthropogenic source. Anthropogenic source of heavy metals contamination include agricultural activities, such as pesticide and herbicide application, wastewater irrigation municipal waste used as fertilizer [11] even mineral fertilizer containing traces of heavy metals [12]. Additional anthropogenic source of HMs include waste disposal on agricultural farmlands [13], mining, traffic emission, cigarette smoking, building materials and others [14]. Heavy metals emanating from anthropogenic source are dangerous because of their instability and solubility in human body, which leads to high bioavailability [15].

2.1. Fertilizers

Historically, uncontrolled agricultural activities are the major human influence on the agricultural soils. In order grow and complete the lifecycle, plants must require not only macronutrients but also essential micronutrients. Some agricultural soil are deficient in heavy metals such as Co, Cu, Fe, Mn, Mo, Ni and Zn that are essential for plant growth. Large amount of fertilizers are regularly added to agricultural soil in order to provide adequate N, P and K necessary for crop growth and yield increment. Therefore, the application of certain fertilizers inadvertently adds potentially toxic heavy metals to the soil. Fertilizer production contains trace amount of heavy metals (e.g., Cd, Pb, Hg, As, Ni, Cu, Mn, V) as impurities, after continuous chemical fertilizer application may fertilizer application may significantly increase heavy metal content in the agricultural soil and then transferred to food chain [16-18].

2.2. Pesticides

Many common pesticides are in extensively in the agriculture and horticulture in the past accumulate substantial concentrations of heavy metals. For example, in Great Britain about 10% of chemicals have approved for use as insecticides and fungicides, which contain heavy metals such as mercury, copper, manganese, lead, and zinc [19]. There are many derelict sites where soil concentrations of heavy metals greater exceed background concentrations [16, 20].

2.3. Wastewater

The application of industrial, municipal wastewater and other wastes to agricultural farmland is common practices in many part of the world especially in developing countries [21]. In general, worldwide estimated that 20 million hectares of arable lands are irrigated with different wastewater [22]. Farmers are not bothered about environmental pollution, because the primary interest of farmers are maximizing their yields and profits. Although the heavy metal concentration in most wastewater is low, but in the long term irrigation of agricultural farmland with such can eventually result in heavy metal accumulation in the soil and then transferred to food crops [16].

2.4. Bio-solids and Manures

Different animal wastes fore examples poultry, cattle and pig manures product in livestock farms are commonly applied as fertilizer to crops and pastures as either a solids or slurries [23]. Although most manure are seen as valuable fertilizers, in the pig and poultry industry, the Cu and Zn added to diets as growth promoters and As contained in poultry health products may also have the potential to cause contamination of the soil by heavy metals. The manures produced from different animals on such diets contain high concentrations of As, Cu, Zn, etc [18, 23]. In addition, if repeatedly applied to restricted areas of land, can cause considerable buildup of these metals in the soil in the long run and also diffuse in to crop.

2.5. Industrial Wastes

Different industrial waste materials then containing heavy metals arise in various industries such as chemical, textile, tanning leather, petrochemical, metallurgy and metal processing. HMs in the soil also can be origin from accidental oil spills or the use of petroleum and pharmaceutical products and utilization waste from these industries. These toxic metals may be, fully or partially transferred to the food chain [24].

2.6. Air Borne Source

Air-borne source of toxic heavy metals includes stack or dust emissions of gas or vapor streams in air. Some toxic heavy metals arsenic, cadmium and lead volatilize during high temperature processing. These above-mentioned toxic heavy metals will convert to oxides and condense as fine particulates unless a reducing atmosphere, maintained. Stack emissions can be distributed over a wide area by natural air currents until dry/or wet precipitation mechanisms remove them from gas stream [16].

3. Source of Heavy Metals in Agricultural Soils and Crops

Toxic heavy metals can inter to the agricultural soils and crops in different ways. They may be natural process or through anthropogenic activities.

Table 1. *3 Sources of some selected heavy metals in Agricultural soils and crops [25].*

heavy metals	Sources of some selected heavy metals in Agricultural soils and crops
Arsenic	Use of arsenic in herbicides, cattle and sheep dips and insecticides. Also as a desiccant for cotton crop to facilitate the mechanical harvesting of the crop.
Cadmium	Addition of phosphatic fertilizers (Containing 2-200 mg Cd/kg), domestic and sewage sludge, wear of automobile tyres, lubricants and mining and metallurgical activities. Emissions from mining and smelting operations, atmospheric fallout from the combustion of fossil fuels.
Chromium	Wastewater and sludge from dyeing and tanning industries are the major sources of chromium pollution.
Lead	Exhaust gases of petrol engines, which account for nearly 80% of the total Pb in the air. Pesticides, fertilizer impurities, emissions from mining and smelting operations, atmospheric fallout from the combustion of fossil fuels. Soils located near Pb mines may contain high as 0.5% Pb content.
Mercury	Hg based fungicides. Sewerge sludge and atmospheric fall out resulting from combustion of fossil fuels and industrial processes.
Nickel	Fertilizer, Manures, Metal refining, smelting, burning of coal and industrial sewage sludge. Emissions from mining and smelting operations, atmospheric fallout from the combustion of fossil fuels.
Zinc	Fertilizer, Manures, Pesticide. Mining, metal refining, smelting, electroplating and Sewerage sludge.
Copper	Manures, Fertilizer, Pesticide, Sewerage sludge and atmospheric fall out resulting from combustion of fossil fuels and industrial processes.

4. Heavy Metal Contamination in Vegetable, Fruit and Cereals in Ethiopia

Food crops consist of essential components of the diet, by contributing carbohydrate, minerals, proteins and other nutrients, which consumed by human being. Vegetables are human diet they contains carbohydrate, minerals, proteins, vitamins and other trace elements. In the recent year 2008 their conception is increased, particularly in the urban community. However, they contains both essentials and toxic elements in the higher concentration [26].

In developed countries unlike developing countries where stringent regulations have implemented in order to restrict the discharge of untreated different wastewater into the river, including Ethiopia, and generally they are not adequate [27], where Kombolcha is a case in point. Therefore, the rivers of Kombolcha flowing through larger communities become heavily polluted when they are widely used for domestic, commercial, and industrial purposes [28].

Table 2. *Heavy metal contaminations levels of different crops grown in Ethiopia.*

Name of crop	Name of Heavy metals	Study area	Value of heavy metals in crops (mg/kg)	Authors
Ethiopian white rice	Cr, Cd and Pb	Fogera town	4.82, 0.54 and 3.30 respectively	[29]
Ethiopian red rice			2.32, 0.45 and 0.80 respectively	
Tomato	Cr, Cd and Pb	Eastern Industrial Zone in Dukem	2.97, 2.20 and 4.60 respectively	[30]
Cabbage			2.90, 3.20 and 5.47 respectively	
Lettuce			3.77, 3.68 and 5.50 respectively	
Cabbage	Cr, Pb and Ni	Kera, peacock and Akaki	0.89, 0.21 and 0.80 res. 1.71, 0.29 and 0.91 res. 0.68, 0.37 and 1.37 res.	[31]
Carrot	Cr, Pb and Ni	Mekanisa, Peacock Akaki	0.82, 0.91 and 2.44 res. 0.28, 0.54 and 0.98 res. 0.82, 2.55 and 1.66 res.	
Kale	Cr, Pb and Ni	Kera Akaki	0.99, 0.53 and 4.64 res. 1.10, 0.37 and 1.31 res.	
Potato	Cr, Pb and Ni	Kera Akaki	0.70, 1.80 and 1.40 1.35, 2.02 and 2.00	
Lettuce	Cr, Pb and Ni	Kera Bulbula	9.47, 1.59 and 1.86 1.21, 0.39 and 0.71	
Beet	Cd, Cr, Cu, Mn and Ni	Akaki review	0.25, 10.28, 32.25, 161.00 and 7.57 µg/g	
Potato			0.28, 7.81, 35.13, 148.05 and 5.99 µg/g	
Tomato			0.115, 4.91, 13.21, 69.17 and 2.21	
Pepper			0.18, 5.55, 17.21, 56.29 and 5.38	
Head cabbage			0.10, 4.11, 14.20, 45.40 and 1.95	
Greenbeen			0.20, 6.12, 12.52, 86.25 and 2.10	
Lettuce			0.35, 24.11, 24.25, 145.60 and 2.95	
Raw maize	Cr, Mn, Co, Cu and Pb	Shendi Finote selam Debre tabor	0.17, 2.60, 0.48, 1.32 and 1.21 0.23, 1.23, 0.43, 0.08 and 1.50 1.55, 3.74, 0.46, 0.04 and 1.25	[32]
Roasted maize		Shendi Finote selam Debre tabor	0.19, 2.80, 0.70, 1.95 and 1.20 0.34, 1.28, 0.58, 0.05 and 2.071 1.71, 4.37, 0.66, 0.05 and 2.11	
Bread from maize		Shendi Finote selam Debre tabor	0.19, 2.70, 0.44, 2.87 and 2.60 0.27, 0.65, 0.48, 0.05 and 2.02 1.55, 2.42, 0.69, 0.05 and 2.04	

Name of crop	Name of Heavy metals	Study area	Value of heavy metals in crops (mg/kg)	Authors
Lettuce	Pb, Cd and Cr	Feleg Daero, Tigray	0.16, 0.89 and 3.19 res.	[32]
		Qualay kacha	0.47, 1.17 and 3.56 res.	
		Wehnibet	0.44, 1.15 and 3.76 res.	
Onion		Mariam dihan	0.29, 1.07 and 3.48 res.	
		Feleg Daero	ND, ND and ND	
		Qualay kacha	1.39, 0.43 and 1.81 res.	
		Wehnibet	0.55, 0.45 and 2.35 res.	
		Mariam dihan	0.30, 0.36 and 1.78 res.	
Cabbage	Pb, Cr and Cd	Melka Hida farm	0.30, 0.85 and 0.23	[34]
		Wonji Gefersa faM	0.31, 0.29 and 0.20	
Lettuce		Melka Hida farm	0.65, 2.40 and 0.40	
		Wonji Gefersa faM	0.40, 1.33 and 0.32	
Spinach		Melka Hida farm	0.33, 2.1 and 0.30	
		Wonji Gefersa fam	0.31, 1.06 and 0.22	
Wheat	Cu, Mn, Co, Ni, Cr, Pb and Cd	Local market of Ambo	1.72, 7.67, 0.35, 0.27, 0.45, 0.05 and ND	[35]
Barely			0.15, 1.67, 0.14, ND, 0.29, 0.03 and ND	
Sorghum			1.29, 2.34, 0.45, 0.43, 0.95, 0.08 and ND	
Maize			0.13, 0.42, 0.24, 0.07, 0.52, ND and ND	
Lactuca sativa var. crispa	Cd, Co, Cr, Cu, Ni, Pb, and Zn	Sora Amba around Addis Ababa nSora Amba, around Addis Ababa	0.54, 0.42, 5.28, 23.9, 3.49, 10.50 and 57.70	[36]
Brassica carinata A.Br.			0.34, 0.32, 4.47, 12.00, 3.13, 7.16 and 80.20	
Beta vulgaris var. cicla			0.39, 0.54, 2.85, 17.00, 5.94, 8.63 and 84.80	
Lactuca sativa var. crispa	Cd, Co, Cr, Cu, Ni, Pb, and Zn	Lekunada, Addis Ababa	0.73, 0.70, 6.29, 34.30, 5.44, 10.70 and 87.10	
Brassica carinata A.Br.			0.45, 0.51, 3.11, 16.00, 2.87, 6.52 and 76.80	
Beta vulgaris var. cicla			0.62, 0.91, 3.81, 38.90, 4.92, 12.60 and 105.00	
Lactuca sativa var. crispa	Cd, Co, Cr, Cu, Ni, Pb, and Zn	Peacock-Urael, Addis Ababa	0.56, 0.48, 2.38,, 13.70, 3.28, 8.88 and 63.40	
Brassica carinata A.Br.			0.53, 0.65, 1.56, 14.50, 2.78, 6.12 and 89.60	
Beta Vulgaris var. cicla			0.76, 0.76, 2.36, 24.30, 5.24, 9.79 and 87.00	
Lactuca sativa var. crispa	Cd, Co, Cr, Cu, Ni, Pb, and Zn	Peacock-Bole, Addis Ababa	0.40, 0.53, 3.08, 23.20, 5.21, 12.90 and 56.90	
Brassica carinata A.Br.			0.35, 0.52, 1.17, 21.40, 3.01, 7.90 and 66.3	
Beta vulgaris var. cicla			0.31, 0.59,) 3.43, 23.60, 4.54, 13.20 and 82.5	
Lactuca sativa var. crispa	Cd, Co, Cr, Cu, Ni, Pb, and Zn	Kera, Addis Ababa	1.59, 0.81, 8.01, 36.20, 2.78, 12.70 and 94.4	
Brassica carinata A.Br.			0.87, 0.78, 4.06, 21.50, 2.34, 8.57 and 105	
Beta Vulgaris var. cicla			1.09, 1.23, 5.53, 25.10, 4.12, 15.90 and 129	
Lactuca sativa var. crispa	Cd, Co, Cr, Cu, Ni, Pb, and Zn	Mekanissa, Addis Ababa	0.78, 1.45, 5.07, 31.00, 7.86, 9.22 and 67.7	
Brassica carinata A.Br.			0.71, 0.63, 6.32, 15.50 4.00, 6.74 and 91.3	
Beta Vulgaris var. cicla			0.86, 1.86, 6.21,, 31.30, 6.67, 8.79 and 78.9	
Lactuca sativa var. crispa	Cd, Co, Cr, Cu, Ni, Pb, and Zn	Lafto, Addis Ababa	1.79, 1.30, 6.95, 35.00, 4.30, 8.46 and 82.50	
Brassica carinata A.Br.			1.17, 0.71, 6.57, 27.80, 5.19, 9.50 and 109.00	
Beta Vulgaris var. cicla			1.65, 1.61, 7.62, 37.10, 7.99, 13.80 and 117	
Lactuca sativa var. crispa	Cd, Co, Cr, Cu, Ni, Pb, and Zn	Hana-Mariam, Addis Ababa	0.49, 0.91, 5.40, 20.90, 7.08, 9.14 and 72.2	
Brassica carinata A.Br.			0.44, 0.78, 2.09, 17.40, 3.78, 4.14 and 85.5	
Beta Vulgaris var. cicla			0.68, 1.83, 4.58, 30.30, 10.30, 7.19 and 77.7	
Lactuca sativa var. crispa	Cd, Co, Cr, Cu, Ni, Pb, and Zn	Akaki08, Addis Ababa	0.80, 0.78, 2.88, 24.70, 5.30, 9.23 and 67.60	
Brassica carinata A.Br.			0.39, 0.70, 5.13, 22.90, 3.14, 4.95 and 84.10	
Beta Vulgaris var. cicla			0.58, 1.47, 3.93, 44.30, 6.40, 8.61 and 98.90	
Lactuca sativa var. crispa	Cd, Co, Cr, Cu, Ni, Pb, and Zn	Akaki. Addis Ababa	1.05, 0.94, 5.39, 19.60, 4.42, 6.92 and 79.80	
Brassica carinata A.Br.			0.72, 0.73, 3.92, 13.30, 3.29, 4.84 and 92.60	
Beta Vulgaris var. cicla			0.71, 1.18,) 3.89, 34.20, 5.98, 11.80 and 87.5	
Cabbage	Cd, Cu, Pb and Zn	Arba Minch (Sikela) commercial market	0.03, 2.48, 0.93 and 1.54 (ppm)	37
Carrot			0.04, 2.41, 0.48 and 2.66 (ppm)	
Potato			0.09, 2.20, 0.74 and 4.43 (ppm)	
Tomato			0.06, 1.24, 0.24 and 1.60 (ppm)	

Name of crop	Name of Heavy metals	Study area	Value of heavy metals in crops (mg/kg)	Authors
Abyssinia kale (dark green leaf)	Zn, Cu, Ni, Co, Mn, Cr, As and Pb	Akaki, Addis Ababa	35.1, 2.6, 1.4, 0.47, 28.1, 8.8, 0.05 and 0.5	[38]
Abyssinia Kale (bright green leaf)			52.85, 6.8, 2 1.0, 0.42, 14.2, 2.7, 0.3 and 2.8	
Cabbage			43.2, 2.5, 1.0, 0.4, 18.3, 2.2, 1.4 and 12.3	
Abyssinia kale (dark green leaf)	Zn, Cu, Ni, Co, Mn, Cr, As and Pb	Kera, Addis Ababa	49.3, 6.1, 1.5, 0.47, 11.9, 3.9, 0.11and 1.06	
Cauliflower leaf			17.9, 1.5, 0.7, 0.39, 0.26, 2.0, 0.05 and 0.56	
Swiss Chard			219.3, 11.6, 11.6, 0.35, 868.5, 2.2, 0.09 and 0.9	
Cabbage			40.1, 10.4, 1.5, 0.3, 22.6, 6.2, 0.7 and 6.9	
Lettuce			48.9, 7.0, 1.2, 0.46, 23.7, 6.1, 0.1 and 1.07	
Abyssinia Kale (dark green leaf	Zn, Cu, Ni, Co, Mn, Cr, As and Pb	Deber Berhan university	16.1, 4.1, 1.47, 0.3, 76.9, 1.8, ND and ND	
Abyssinia kale (bright green leaf)			10.9, 2.1, 1.1, 0.47, 94.4, 2.5, 0.04 and 0.5	
Swiss Chard			60.1, 9.4, 1.2, 0.47, 49.6, 2.15, 0.05 and 0.5	
Collard			48.78, 2.4, 7.5, 0.47, 53.9, 1.7, 0.16 and 1.5	
Cabbage			20.2, 1.9, 3.1, 0.39, 65.4, 3.5, ND and 1.05	
Lettuce			84.9, 9.9, 5.3, 0.47, 299.5, 2.6, 0.04 and 0.46	
Russian kale			50.5, 8.5, 2.8, 0.47, 42.1, 4.3, 0.08 and 0.9	
Siberian kale			78.9, 8.7, 7.7, 0.4, 106.8, 3.0, 0.16 and 1.5	
Lettuce	Cd, Cr, Pb and Zn	Kuskuam upper	0.07, 1.08, 1.17 and 46.29	[39]
		Burayu	0.05, 0.81, 1.24 and 36.83	
		Ziway Ethioflora	0.03, 0.76, 0.52 and 20.76	
Swiss Chard	Cd, Cr, Pb and Zn	Kuskuam lower	0.05, 0.68, 0.16 and 30.35	
		Burayu	0.05, 0.58, 0.43 and 30.68	
Ethiopian Kale	Cd, Cr, Pb and Zn	Kuskuam lower	0.09, 0.62, 0.36 and 34.02	
		Burayu	0.06, 0.76, 0.73 and 33.10	
		Ziway kentole	0.02, 0.58, 0.53 and 17.69	
Carrot	Cd, Cr, Pb and Zn	Burayu	0.05, 0.52, 0.04 and 28.34	
Grape	Pb, Cd, Zn, Cu, Co and Ni	Mojo, Meki and Zeway Irrigation Farms, Ethiopia	0.22, 0.04, 2.33, 2.13, 0.21 and 1.42 ppm	[40]
Watermelon			0.29, 0.03, 2.11, 1.19, 0.14 and 0.39 ppm	
Papaya			0.17, 0.06, 2.84, 0.93, 0.08 and 0.74 ppm	
Strawberry			0.23, 0.03, 1.02, 3.14, 0.27 and 1.08 ppm	
Onion			0.16, Nill, 16.4, 6.38, 0.58, 0.37 ppm	
Tomato			0.15, 0.05, 17.68, 2.04, 0.45 and 2.20 ppm	
Cabbage			0.21, 0.03, 8.43, 1.66, 1.23 and 1.05 ppm	
Carrot			0.24, Nill, 13.61, 5.09, 1.54 and 1.21 ppm	
Tomato	As, Pb, Cd, Mn, Cr, Hg, Ni and Co	Mojo area farmlands in central Ethiopia	1.93, 3.63, 0.56, 27.20, 1.49, 3.43, 1.86 and 0.63	[41]
Cabbage			5.73, 3.56, 1.56, 302.23, 4.63, 4.23, 4.13 and 1.86	
Potato tuber	Zn, Pb and Cd	Mecha districts	20.6-28.0, 2.0-6.2 and <0.1	[42]
		Yilmana Densa	42.9-7.77, 15.3-17.4 and <0.1	

5. Health Risk from Heavy Metal Contaminated Food Crops

Food safety is a major public health issue and importance of the association with consumption of foodstuffs exposed by toxic heavy metals has increased worldwide [43]. WHO/FAO have expressed its anxiety about the impact of food safety on public health. These indicated that unsafe food could be significant reason for chronic and non-chronic diseases including dairrhea, cancer, heart disease, various kidney diseases, and birth defects [44]. However, heavy metal contaminated food consumption is a big problem in human and animal health. Which is caused by natural and anthropogenic activities [45]. Usually, agricultural foods are adulterated with pollutants, especially, HMs by direct and indirect industrial activities, automobile exhaust, pesticide and herbicide application and excess heavy metal based fertilization [46].

In general heavy metals exist in the environment in smaller quantities became part of various food chains through bio-magnification and their concentration increase to such a level that may prove to be toxic to humans and animals [47]. The contamination chains of toxic heavy metals usually

follows acyclic order: industry, atmosphere, soil, water, food and human or animals.

Therefore, increasing the concern of heavy metals in food items, mainly in developing country like Ethiopia, about exposer, intakes and absorption of heavy metals by humans. Peoples are increasingly demanding a cleaner environment in general, and Minimis in the amounts of contaminant reaching peoples because of increasing human activities [48].

6. Conclusion and Recommendation

This review work generalized as the status of heavy metal levels in different food crops that gown in different agricultural farm land of Ethiopia. According to different studies, toxic heavy metals entered in to different food crops from air, fertilizer, irrigation water, pesticide, herbicide and other agricultural activities. Although in some part of Ethiopia industry is a major source of many contaminants in the food chain. Industrial activities have the potential to generated wastewater, solid wastes and air pollution, all them, which enter to the food chain and caused as different sever diseases to human, animal and plants. Toxic heavy metals enter to plants primarily through the roots from the soil solution and goes to the food chains. Heavy metal contaminated food increase dietary heavy metal intake may contribute to development of various disorders. Therefore, concerned body necessary to monitor the levels of toxic heavy metals in food chains. In Ethiopia, long term deposition of toxic heavy metals in agricultural soil result in toxicity of food crops, and different studies have proven that toxic heavy metal contaminated food crops, vegetables, fruits can accumulate higher levels than the recommended value set by different organization EU, USEPA, FAO, WHO and others.

Although, well regulated in many developing countries, industry is a big source of many contaminants in food. Although well regulated in some countries, industry is a major source of many contaminants in food. In Ethiopia, industrial activities have a potential to generate wastewater effluence, solid wastes and air pollutants, all them enter to food chains and attack humans and animals. Therefore, there is a need to monitor the environment from contaminates and set rule and regulation about waste management.

Conflict of Interest

The authors have no conflict of interest to disclose.

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