



Soil Pollution and Ways to prevent it in the Management of Urban Space

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ABSTRACT

Soil pollution is one of the types of environmental pollution. Soils are as cathartic in nature. In addition to being suppliers of food, it has also refined property. This property can be obtained due to their physical properties, chemical properties and biological properties. One of the major concerns of today's agriculture is soil contaminated with pollutants harmful to human. Soil pollution is as a major environmental problem in the known world. Various sources of pollution such as agricultural pollution, oil pollution, heavy metals, industrial wastes and so reduce the quality of the soil, spread in groundwater levels and the incidence of other environmental problems. However, the lack of proper management of organic waste can lead to the increase of concentration of salts, heavy metals, pathogenic microorganisms, soil pollution, water pollution, agricultural products, fish etc.

Keyword:

soil contamination,
decontamination,
environmental,
agricultural products,
contaminants

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INTRODUCTION

The major problems of environment are soil pollution, water and groundwater, plants and crops, materials and chemical toxins. The indiscriminate and uncontrolled use of these substances cause irreparable damage and acute poisoning that can be chronic or fatal (1).

There have been efforts to increase agricultural production both in agriculture and in industry often indirectly (through air and water pollution) and direct cause soil pollution and loss of soil organisms and reduce pollution. Substances that are entered directly into the soil are contaminants, but soil erosion by wind, etc. is not considered as pollutant (5).

Importance of soil In addition that soil is an important component of achieving sustainable development, the following functions are considered:

- Sustaining biological activity, diversity and productivity
- Setting the water flow and solute transport division
- Filtering, buffering, reducing and detoxifying organic and inorganic materials, including municipal solid waste and urban waste and atmospheric deposition
- Storage, cycle nutrients and other elements in the biosphere

Identifying and predicting soil contamination

Unlike air pollution, the chemical composition of soil pollution is not easily measurable, even if the presence of harmful substances and hazardous compounds in soil is approved; but if the soil is disturbed normal function, this disorder can be well observed because the quality of plant, for example, the desired product is reduced and compounds and elements are found to be inappropriate or excessive. Iranian soil is not contaminated to the extent that the soil of advanced industrialized countries is contaminated; but the rapid advance of technology and the development of factories and industrial establishments, as well as high consumption of chemical fertilizers and pesticides, and other chemicals in agriculture in recent decades have provided many possibilities for contamination of Iranian soil. With the establishment of joint-stock companies and cooperatives and rural agricultural and agro-industrial complex, and great attention to raising the level of agricultural production, chemical fertilizers and pesticides, insecticides, and herbicides are growing. As a result, imports of these chemicals also increase every year (24).

But the soil is contaminated by other methods in Iran and through the use of pesticides on health, such as aerosol, approximately 3 to 10 tons of toxic substances are imported to the country. Some of these toxins are so dangerous and deadly that if one millionth would enter the body of organisms (4, 12).

Soil pollution through chemical fertilizers in Iran is due to indiscriminate use of these substances. High consumption of chemical fertilizer in some parts of the area wet and in the dry region of the country has damaged the soil and living things.

Soil pollutants

- Industrial pollution
- Oil contaminants
- Agricultural pollutants
- Waste

Industrial pollution

Waste, industrial plants, chemical, petrochemical, textile and mining due to the presence of heavy metals such as lead, mercury, nickel and cobalt in the soil and they are the most important pollutants. Resistance of heavy metals in soil is much longer than other contaminants, and soil contamination by heavy metals is virtually permanent. Heavy metals include lead, cadmium, silver and mercury.

Some of the harmful effects of heavy metals include the following: impairment of soil biological activity, toxic effects on plants and harmful effects on humans of entry into the food chain (22).

Factories waste is poured into rivers. This is in addition to surface water pollution soil pollution also leads to contamination of underground sources. Smoke and pollutants that form toxic gas and steam coming out of the chimney of huge factories, in addition to urban air pollution cause respiratory problems for humans is causing acid rain. Most contaminants in soil resources, around the refinery (16, 17).

The impact of acid rain and ground water resources plants

The effects of acid rain can be effects on ecosystems, flora and fauna of the seas, oceans, land, forests and vegetation, types of construction materials on human health (12). Acidification of the seas and oceans, aquatic toxicity and reduced biodiversity in these environments.

Acid rain can also trigger the release of toxic elements such as aluminum and salcium which is toxic for plants and trees. The effects of acid rain cause water stress due to increased transpiration in plants. The acid in rainfall causes degradation of the protective leaf cuticle. Sulfuric acid into plant cells and stomata also reduces the absorption of CO_2 . In the event of a sharp decline, ph microorganisms also disappears (23).

Precipitation in the form of snow accumulated during winter is over, with the coming of spring and snow melt, lakes encountered with additional acid. Acid snow into streams spawning takes place at the same time. This inhibits the conversion of egg to baby fish. When acid rain passes the soil surrounding the lake, it releases Aluminum and takes it to lake. Aluminum is one of the most deadly poison that threatens fish because it directly attacks the gills. Sam is one kind of fish to produce mucus that is blocking the oxygen supply and suffocates fish within a few days as a result (3, 4).

However rain acid is considered as a chemical tool for lakes, but it is a destructive tool for forests. In the first phase, when it rains on the branches and leaves of trees, it would lead to destruction of nutrients that cannot be revived. In the second phase, acid rain causes the disconnection of transportation. Thus, the hydrogen ions in the acid rain caused soil colloids with cations replacement of aluminum, salcium and potassium, magnesium and calcium. The numerous beneficial minerals need to be away from the root zone. Increased toxic cations (such as aluminum) causes toxicity in the plant. In the third stage the whole system is targeted plant. Aluminium released by acid rain, tree roots so severely that absorb the hungry and poor absorption of minerals remaining in the soil closes. By blocking the roots, the leaves of the tree die, and the tree eventually comes

down. Figure 2 shows the absorption of aluminum by tree roots. Germany's famous Black Forest is a wooded area that over the past 31 years the forest trees, especially pine trees on the way to oblivion and has continued deforestation. Now 55 percent of the trees in the forest area of 751 thousand square kilometers in an area located under the pressure of damages. The image part of the forest current situation and 21 years ago is shown in Figures 3 and 4. Comparing these pictures shows that trees near the summit of the mountain during the last 21 years, and the mountain is bare trees (2, 7).

Oil pollution in the soil

It is so long time that oil and its derivatives in the transportation or storage cause to soil pollution. Oil pollution is an inevitable consequence of rapid population growth and industrialization process that soil contamination by oil products are widely around the facility Hydrocarbons Exploration, and refining and transferring this material is visible in the form of topical routes. In addition to the direct emissions of the pollutants, dust from fuel oil associated gas over the years have been able to add toxic and harmful substances to the regional soil. The oil will penetrate to a greater depth of soil that decontamination is more difficult and expensive (8, 9).

Oil pollution monitoring:

1. Preventing the spread of oil on a large scale
2. Improving soil aeration and agitation plow through
3. Increasing soil nutrients such as nitrogen and phosphorus
4. Integration of soil microorganisms' oil

Agricultural

pollutants:

Excessive use of fertilizers and agricultural pesticides, antibiotics and hormones in livestock and irrigation with contaminated wastewater from agricultural factors affect soil pollution. Pesticides are entered in various ways including through direct application on soil, by spraying aerosols directly trip to the ground, toxins are adsorbed on the surface of soil particles suspended in the air and sat on the ground, and crop residues which are added to the soil and toxins absorbed by soil organisms. Chemical fertilizers change soil properties that reduce soil permeability to air and water and harden soil (11).

To avoid soil contamination, in addition to the use of animal fertilizers instead of chemical fertilizers, compensatory measures can be done to strengthen the rehabilitation of contaminated soils. Agricultural products can be used without any problems (24).

Performance of pesticides in soil:

1. decomposed by soil microorganisms
2. Chemical degradation (e.g. hydrolysis)
3. Attract and bind organic and inorganic components of soil
4. Absorbed by plant roots
5. Volatility
6. The effects of dilution water flow processes

One of the effects of pesticides on the environment is derived by the production of synthetic nitrogen fertilizers which may cause significant changes in the global chemical, biological cycles,

Agriculture affects "Diversity" and a reduction in competing ecosystems, and biological diversity have been reduced due to rare species at risk and makes serious risks. Agricultural land is also increasing the amount of co2 and as

one of the main arena of fossil fuels contributes to increasing co2 and increases greenhouse gases.

Chemical pesticides and soil pollution

Ways to enter chemicals into the soil
Through direct application on soil
By spraying pesticide particles suspended in the air straight trip to Earth

Toxins are adsorbed on the surface of soil particles suspended in the air and sat on the ground

The remains of plants that contain toxins and are eventually added to the soil.

Toxins absorbed by soil organisms

Factors affecting the stability of chemical pesticides in soil

- toxic chemical nature: the nature of the toxic chemical by chemical stability, the ability to escape from the environment, solubility, concentration and the formulation is determined.
- Soil type: stability of toxins in the soil, the texture and organic matter content.
- Amount of organic matter: soil organic matter, is one of the important factors affecting the stability of toxins.
- The clay is one of the factors affecting the stability of toxins, the colloidal substances in the soil.
- Temperature: chemical analysis and bacterial toxins, principally through a gas or vapor from the soil and all these processes are under the effect of temperature environments.
- Soil moisture: In most cases, the publication of toxins in the soil with the relative humidity increases.
- Vegetation: plants may be largely due to overshadow show more stability.
- Soil acidity: phosphorus compounds in acidic soils show greater stability.
- Inorganic ions: the effect of soil, amount of minerals, the stability of toxins through the impact on buildings and soil types (21, 23).

Soil tasks

- Environment and providing food for plants
- Natural reservoir of residue
- Keep the roots of trees and plants in the mountains and pastures which leads to prevent soil erosion and protect the environment.
- Deliver nutrients to plants
- Tank food that gives them gradually Testing roots.
- Human waste sites
- Soil as a filter used in water treatment plants or industry.
- Local soil is used to convert harmful waste into compost.

Factors affecting the survival and transmission of microorganisms in the soil

- Physical and chemical properties of soil
- Physical and chemical properties of microorganisms
- Type and flow
- Organic matter type, amount and type of use
- Climatic conditions, including:

Humidity: Humidity is considered one of the most important factors in the survival of microorganisms is known for a variety of them, moisture is the most important factor of survival.

Temperature: a rise in temperature usually reduces the survival of pathogens or reduce the pathogenicity of power. In contrast, temperatures below 10 degrees keep the pathogens for a long time.

The type and amount of organic matter: organic matter due to the prevailing negative charges in most ph soil microorganisms, especially viruses do not absorb much impact.

Soil texture: fine-textured soils due to the strength of adsorption

And a higher specific surface area and pore over the fine sandy soil, more effective in maintaining pathogens and reduce the risks of them. Coarse-texture of soil is important, especially in terms of maintenance pathogen (10).

Soil structure: there are regular structures in the soil due to water crossings as ground penetrating deeper than they are causing microorganisms. Compressed or structureless soil and raw soil under tillage operations shows great resistance against pathogens crossing (13).

The type and severity of the course: In general, there is saturation currents in addition to providing a good environment for the survival of pathogens, increasing the power influence on the underlying layers (15).

During the non-saturation, increasing water flow in the soil increases the profound influence pathogen. But slow down the flow of sediment microorganisms, especially of larger soil particles, and an important factor in the establishment of pathogens in soil layers is considered (18).

Type of organic material and its consumption

The number and type of organic matter consumed source of pathogens play an important role in the development of microbial contamination. Among the types of organic materials, urban and rural waste, compost and manure, and sewage are the most contaminated hospital waste in terms of the type and number of pathogenic form (19). Removal of material is also effective in increasing or reducing pollution, so that discharge wastewater at once and too much penetration pathogens, especially viruses' depth is 160 cm (21). While in the use of wastewater for a gradual or with irrigation water, penetration depth reaches up to 40 cm pathogens mature. On the other hand, in the case of mixing organic matter with the soil, so the power drain survival of pathogens due to interaction with other microorganisms in the soil and reduced to less than half. But in the absence of mixing them rapidly, in large part because they have good food and sufficient moisture, remaining to be harvested, and ultimately contamination of surface waters is the result (25).

Conclusion

Soil contamination is caused by human presence of chemicals or changes in the natural soil environment. This type of contamination is typically caused by the use of pesticides, contaminated surface water infiltration to subsurface strata, oil and fuel dumping, leaching of wastes from landfills or direct discharge of industrial waste into the soil. The most common chemicals are petroleum hydrocarbons, solvents, pesticides, lead or other heavy metals (20).

A soil pollution worsen the quality, texture and content of minerals from the soil or disrupt the biological balance of organisms in the soil. Soil pollution has negative effects on plant growth. Contamination of the soil associated with the indiscriminate use of fertilizers, pesticides, insecticides and herbicides, dumping large amounts of solid waste, deforestation, and soil erosion. Products of industrial waste

include gases such as carbon dioxide, including the most important (CO₂), carbon monoxide (CO), nitrogen dioxide (NO₂) and sulfur dioxide (SO₂). These gases created by combustion in industry and cars and cause risks to the environment. Food factories produce liquid and solid waste. Municipal waste consists of material that is discarded by households and industries, including paper, plastic materials, and other organic materials.

Another cause of soil pollution is urban sewage that is the fields or is buried in the pits. The wastes reduce soil quality, and it is one of the possible causes of soil degradation. One of the problems of sewage and industrial waste into the soil is heavy metals. Heavy metals such as lead, cadmium, selenium, etc. that are stored in the soil colloids are dangerous and entering into the food chain to leave irreparable losses. Another example of soil contamination that can be named is acid rain that is seen in pollution and smoke from factories in the industrial and populous cities. Acid rain in soil pollution is the worst form of pollution because in the first place, it causes the loss of forest cover and secondly causes pollution of water resources. Also pollution from agricultural activities, petroleum, and industrial pollution come from factories and mines that are other important factors of soil pollution (12).

Suggestions

- To strengthen the soil and increase production as much as possible, manure is used because manure contains nutrients for plants. Soil organic matter or humus soil and having to maintain and improve its properties.
- Ways of reducing pollution from toxic substances can be used with no or decrease in soil, correct management of soil and plant in order to prevent further circulation of and reduce air pollution as well as soil stability of toxins in the soil can be reduced. In the absence of manure should be available, the straw is used as organic materials. Then, by adding suitable chemical fertilizers have created a complete fertilizer where there is organic matter and mineral matter.
- Purification and sterilization of organic waste. Including methods of removing pathogens to use biological filters, stabilization ponds and sedimentation, sand filtration, activated carbon, ozone, chlorine coagulant aluminum hydroxide, calcium phosphate, iron phosphate cited.
- Determining the appropriate location for disposal of organic waste in terms of slope, depth to groundwater, surface and underlying tissue layers with a layer of soil and bedrock are restricting flow to the surface.
- Use of wastewater and organic fertilizers in the hot and dry season before the arrival of precipitation.
- Taking appropriate intervals after consumption of wastewater treatment plants not to grow vegetables and root crops coming.
- Avoiding the use of organic materials pollutants limit more than once, especially if you have too much moisture in humid conditions.
- Non-use of untreated wastewater in irrigation systems in vegetable cultivation.
- Biological methods of pest control can reduce pesticide use and thus minimize soil contamination is Hara.

- Reuse of materials such as glass containers, plastic bags, paper, etc. One of the solutions is to reduce soil pollution. Deforestation, overgrazing of livestock in natural pastures and digging shrubs for fuel use of bare soil. And vulnerable soil against rain and wind and its fertile layer washed by water or wind erosion, drained and thereby provided. With the creation of green spaces and maintaining vegetation, soil and planting trees to prevent erosion, pollution mobilization in the soil.

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