

Land Pollution

Land pollution is the deterioration (destruction) of the earth's land surfaces, often directly or indirectly as a result of man's activities and their misuse of land resources.



SOURCE OF LAND POLLUTION

⚙ Land pollution is mainly due to the following sources.

⚙ Industrial wastes

⚙ Urban wastes (municipal waste)

⚙ Agricultural practices

⚙ Radioactive pollutants

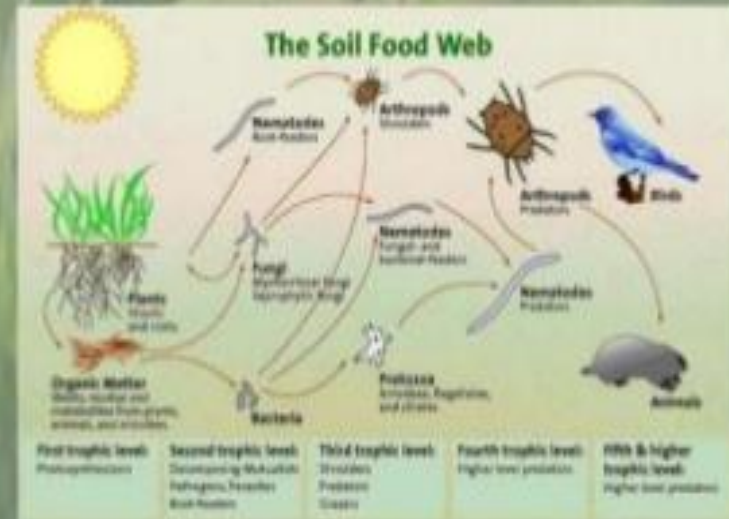
Use of Chemicals

- Use of chemicals include –
Pesticides, insecticides, fertilizers.
- Excessive use of these chemicals increases salinity of the soil.
- It adversely affects the micro-organisms present in it causing soil to lose its fertility.
- Results in loss of minerals present in the soil.



Land Pollution by Pesticides

- The use of pesticides decreases the general biodiversity in the soil.
- Also affect to the soil micro-organisms & decrease the soil fertility.
- Effect on growth of the plants.
- Residual effect of the pesticide in the soil.
- Enter to the food chain & bio magnification.



Pesticides and herbicides (and other farming chemicals) often end up contaminating soils. Direct discharge of wastewater by industries can also cause that.

Leakages in sewage systems, underground storage tanks and leaching of soluble substances from landfills can also result in contamination.

Rainwater or floods from other polluted lands and water bodies spread contaminants to soils in other locations.

EFFECTS OF SOIL POLLUTION...

EFFECT ON INDUSTRIAL WASTE

- Destroy bacteria & beneficial microorganisms present in the soil.
- Compound accumulated in the soil for long time destroy the living organism.
- Product such as synthetic fiber, plastic produce toxic vapour



Toxins

- Are virulence factor of most of bacteria and one of the major cause of tissue damage.
- Poisonous substances produced by microorganism
- It may be protein lipid or any tissue

Bacterial Toxins

endotoxin

exotoxin

Properties of bacterial endotoxin

1. Integral part of the cell wall of Gram-negative bacteria. Released on bacterial death and in part during growth. Release is not required for biologic activity.
2. Formed only by Gram-negative bacteria
3. Lipopolysaccharides. Lipid A portion is responsible for toxicity.
4. No specific receptor.
5. Moderately toxic. Fatal to animals in large doses.
6. Relatively heat stable. Toxicity is not destroyed above 60°C for hours.
7. Weakly antigenic. Antibodies are protective.
8. Not converted to toxoid.
9. Synthesis directed by chromosomal genes.
10. Usually produce fever in the host by release of interleukin-1 and other mediators..

BioActive

Properties of bacterial exotoxin

1. Excreted by living cells
2. Produced by Gram-positive and Gram-negative bacteria
3. Polypeptides
4. Usually bind to specific receptors on cells
5. Highly toxic. Fatal to animals in very small doses
6. Relatively heat labile. Toxicity destroyed over 60°C
7. Highly antigenic. Stimulate formation of antitoxin. Antitoxin neutralizes the toxin
8. Converted to toxoid by formalin. Toxoid is nontoxic but antigenic. Toxoids are used to immunize, e.g. tetanus toxoid
9. Usually controlled by extra-chromosomal genes, e.g. plasmids, phage gene
10. Usually do not produce fever in the host.

Soluble substances that alter normal metabolism with deleterious effects on the host cells.

Poisonous substances produced by microorganisms (*and Others*).

toxins - primary factor - pathogenicity 220 known bacterial toxins .

40% cause disease by damaging the Eukaryotic cell membrane.

Host range

Known for bacteria, but possible that they play a role in diseases caused by fungi, protozoa, and worms.

Characteristics of bacterial exotoxins and endotoxins

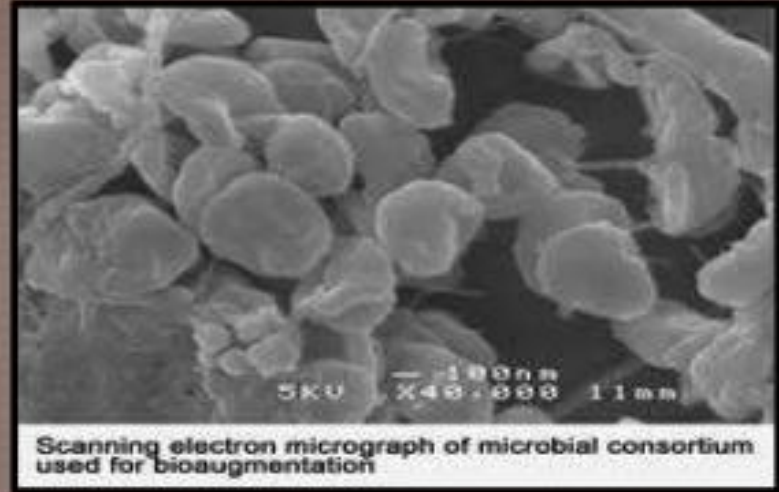
Property	Endotoxin	Exotoxin
Chemical nature	Lipopolysaccharide m.W = 10 kda	Protein m.W =50-1000 kda
Relationship to cell	Part of outer membrane	Extracellular, diffusible
Denaturated by boiling	No	Yes
Antigenic	Yes	Yes
Form toxoid	No	Yes
Potency	Relatively low (>100 ug)	Relatively high (1 ug)
Specificity	Low degree	High degree
Enzymatic activity	No	Often
Progenicity	Yes	occasionally

Prevention of land pollution

- Reduce use of pesticides, insecticides & fungicides.
- Overuse of these chemicals leads to soil pollution.
- Manures & biofertilizers like rhizobium can be used to increase fertility of soil.



- Bioaugmentation is the practice of inoculating contaminated soil with large numbers of appropriate microorganisms.
- Its cheaper than pollution clean up methods which involve physically moving the soil.
- This may not work in some types of soil as it requires plenty of soil, moisture & oxygen to work effectively.



EFFECT ON MICRO-ORGANISMS

Loss of variety of micro-organisms due to :

- Change in genetic make-up of the soil.
- Certain animals die.
- Loss of supply of food chain.
- Imbalance in food chain.





**The greatest prevention to land pollution is in the three
'R's' ...**

**Reduce Waste, Re-use things and
Recycle things. This is true even for governments. They
can also use the three 'R' rule to minimize the amount of
waste that ends up in landfills. After the three 'R's,
remember to turn the rest of the garbage into compost.**

What You Can Do



Wow! This is Easy!

- 1. Buy biodegradable products.**
- 2. Store all liquid chemicals and waste in spill-proof containers.**
- 3. Eat organic foods that are grown without pesticides. Look out for fertilizer or pesticide free products when you go to the market.**
- 4. Don't use pesticides if you can.**
- 5. Buy products that have little packaging.**

References

<https://images.app.goo.gl/E1LxEkH1wwXzrdnF9>

<https://www.slideshare.net>

<https://www.slideshare.net/amerazobaay/bacterial-toxins-123248555>

<http://eschooltoday.com/pollution/land-pollution/what-is-land-pollution.html>