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Organic pollutants & Sewage sludge

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- oxygen demanding waste
- disease causing agents
- plant nutrients
- Sewage
- Synthetic organic compounds
- oil

- dissolved oxygen (DO) essential requirement of aquatic life i.e. flora and fauna
- optimum DO is 4-6ppm
- decrease in DO is the index of organic pollutants in water
- all organic pollutant undergo degradation by bacterial activity in presence of DO
- The net result is deoxygenation process and quick depletion of DO.
- water is a carrier of pathogenic microorganisms and can cause immense harm to public health.

- water borne diseases are typhoid and parathyphoid fever, dysentary and cholera, polio and infectious hepatitis came from faeces and urine of infected people finally discharged in the water bodies

- Sewage and runoff from agricultural lands provide plant nutrients in natural biological process called eutrophication algal bloom and large amount of other aquatic weeds cause serious problems. In long time waterbody ends up in dead pool of water.

- production of synthetic organic chemicals has multiplied many times since 1950s
- these includes fuels, plastics, plasticizers, Fibres, elastomers, solvents, detergents, paints, insecticides, food additives and pharmaceuticals
- impart objectionable and offensive tastes, odours and colour to fish and aquatic plantseven when they are present in low concentration.
- Oil pollution in the seas has increased over the years due to the increased use of oil based technology. The source of oil pollutions are oil spills from cargo oil tanker on the seas, losses during off-shore exploration and production of oil and leakage from oil pipelines crossing waterways and reservoirs.

- oil pollution reduces light transmission through the waterways and hence photosynthesis by marine plants
- reduces dissolved oxygen in water and
- causes damage to the water birds, coastal plants and animals
- in other words one can say it damages marine life on a massive scale and also effect the sea food which enters the food chain

Sewage Sludge

- Sewage sludges contain a wide range of environmental contaminants owing to the diverse sources of effluents discharged into sewers.
- This includes human excretion products, household chemicals, automobile fuels, lubricants and cleaning compounds, storm water runoff from highways containing PAHs and other fuel combustion products, and effluents from many different industries.
- PAH concentrations in sewage sludges tend to range between 0.5 and 10 $\mu\text{g/g}$ in sludge dry matter with similar levels of PCBs, although $> 1000 \mu\text{g/g}$ are sometimes found.

•The organic contaminants frequently found in sewage sludges include:

—halogenated aromatics (PCBs—polychlorinated biphenyls, polychlorinated

terphenyls, PCNs—polychlorinated naphthalenes, and polychlorobenzenes)

—aromatic amines and nitrosamines

—phenols and halogenated aromatics containing oxygen

—polyaromatic and heteroaromatic hydrocarbons (PAHs) and halogenated

—aliphatic and aromatic hydrocarbons

—phthalate esters

—pesticides

- Of all the organic contaminants listed here, the PAHs and PCBs are currently considered to constitute the greatest hazard to human health. The range of heavy metal concentrations found in sewage sludges..

- In addition to contaminant chemicals, sewage sludges may contain some pathogens which were not destroyed during the sewage treatment process.

- Many of these will perish when exposed to extremes of temperature and UV light but care should be taken with this serious potential risk.

- A relatively high proportion of the sludge produced in many countries is applied to agricultural land as a means of disposal (67% in the UK).

- This sludge has many useful properties for agriculture (source of N and P and physical soil conditioner) but its use is limited by its concentrations of persistent contaminants.

- Sewage sludges are frequently used in the landscaping of derelict land where they act as a growth medium for plants grown for amenity purposes rather than food.

- The nutrients they contain may also have a beneficial effect on soil micro-organism populations which could help to stimulate the biodegradation of persistent organic pollutants.

Thank you