

# Persistent Organic Pollutants Sege and Andersen, 2002 and EC Report 2008...

(Sources: households, restaurants, atmospheric waters in a combined sewer systems, industrial effluents)

color, solutions, wood processing, medicines  
detergents, cosmetics

Oils and lubricants, pesticides in gardens, tar, salt  
from defrost, rain

# ent Organic Pollutants...

**There are numerous in sewage sludge**

**Remain in the sludge after the sludge anaerobic digestion**

**POP are hidrofobics (some of them volatalise) and are bound to the soil organic matter**

**POP are known as “internal degraders”**

**POP are accumulated in the WWTP (PCBs, dioxins and pesticides DDT)**

**Reuse of such sludge may result in the POP circulation in the soil**

# Persistent Organic Compounds

- “ PAH : Polynuclear aromatic hydrocarbons
- “ PCB : Polychlorinated biphenyls
- “ PCDD/F : Polychlorodibenzodioxins/furans
- “ AOX : Sum of organohalogenous compounds
- “ LAS : Linear alkylbenzenesulphonates
- “ NPE : Nonylphenol and  
Nonylphenoethoxylates
- “ DEHP : Di(2-ethylexyl)phtalate

# of Organic Compounds in Soil

**transformation/degradation processes  
(metabolism, photolysis, catalysis)**

**retention processes (absorption,  
adsorption/desorption, precipitation,  
solubilisation,  
sublimation, co-ordination reactions)**

**transport processes (by fauna and flora,  
leaching, runoff, volatilisation)**

## ...Organic compounds

**Soils and sludge ingestion while grazing is the main route for animal contamination.**

**Accumulation of bioaccumulative compounds such as PSDD, PCBs, PAHs may occur in milk or meat**

**Runoff, may play an important role in the transfer of org.compounds**

**Most of the organic pollutants are not taken up by the plants**

## Uptake of Organic pollutants by livestock

“Livestock may ingest organic compounds in two ways: by direct ingestion or grazing.

Soil ingestion may account for significant part of the animal diet (between 0 and 30 %).

Intake will greatly depend on the amount of organic pollutant bound to soil particles.

The direct ingestion of sludge-treated soil by grazing livestock is considered to be the principal route of trace organic bioaccumulation in the food chain which may result from agricultural utilisation of sewage sludge [Smith 1996].

Ingestion routes are the same as for heavy metals.”

# Limit values for concentrations of organic compounds and dioxins in sludge for use on land

Organic compounds	Limit values(mg/kg dm)
1. AOX	500
2. LAS	2600
3. DEHP	100
4. NPE	50
5. PAH	6
6. PCB	0.8

Dioxins	Limit values (ng TE/ kg dm)
7. PCDD/F	100

## Organic pollutants

“Degradation pathways depend on the aerobic and anaerobic degradation conditions

**Microbial activity important for some of the org. pollutants**

**Leaching of org. pollutants-(insignificant, but must not be neglected)**

**PCBs and PCDD/Fs have affinity with soils particles and will bind to soil**

**By Runoff about 20% of org. pollutants found in surface waters**

**Most of org. pollutants are not taken up by plants”**