**Butyltins removal and behavior during wastewater treatment by waste stabilization ponds**

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Butyltins (BTs) includes tributyltins (TBT) and its degradation products dibutyltins (DBT), and monobutyltins (MBT). The EU water framework directive (WFD) has classified the most toxic one (TBT) as a “priority hazardous substance”, whose emission, discharges and losses is targeted for phasing out or complete removal. The established TBT environmental quality standard for TBT in continental water bodies are less than 1 ng(Sn)/L, in the whole water sample (dissolved and particulate phases). Monitoring studies conducted on rivers, highlighted the fact that the discharge from waste water treatment plants (WWTP), is the main source of butyltins pollution in the water column and river sediments. Many studies have investigated organotins in conventional wastewater treatment plant (activated sludge, biofilters) but no studies were related to wastewater treatment by Waste stabilization ponds (WSP’s), who is widely used to treat wastewater from small rural town in Europe.

The aim of this work is, to provide data about the occurrence of butyltins in wastewater of rural town, to study the behavior of butyltins during treatment by WSP’s and its relationship with the design characteristics of the ponds in each treatment step.

The presence of butyltins were investigated by GC-ICP-MS in samples of dissolved water (<0,45 µm), suspended particulate matter (SPM) (>0,45 µm), and bottom sludge, taken from each pond, and also from the influent and effluent of the WSP’s of Gigean (GG) (6000 E.H), and Montbazin (MBZ) (4500 E.H). Both WWTP include two anaerobic ponds, and three facultative ponds, and pour in the watershed of « la véne», a French mediterranean river where the presence of butyltins has been demonstrated and linked to the discharge from those WSP.

In both WSP’s results reveal the following points:

* The systematic occurrence of the three butyltin in all samples in the following order: MBT>DBT>TBT.
* In raw sewage butyltins concentrations in SPM ranged from 64% to 99%, and from 77% to 84% in MBZ and GG respectively.
* During treatment, settling of SPM in each pond is the main removal mechanism of butyltins especially in the two first anaerobic ponds where up to 93% (MBZ) and 60% (GG) of butyltins are removed by settling of SPM because of the 3m depth and high hydraulic retention time (HRT) that characterise those ponds.
* Settling of SPM, lead to the accumulation of persistent butyltins concentrations in sludges because of their slow anaerobic biodegradation.
* A high spatial variability of butyltins distribution was observed in the sludge, which is highly linked to hydrodynamics, which govern the SPM re-suspension, transport and settling inside each pond.
* butyltins re-suspension were noticed in facultative pond during some sampling campaigns, which could be a result of the thermal re-stratification that characterise those shallow ponds.
* The shallowness, which characterise facultative pond, enable photo-degradation and aerobic biodegradation of butyltins in the supernatant.

Removal rate ranged between 60-97% and 52-87% in MBZ and GG respectively, but non-negligible Butyltins concentrations are discharged from both WSP’s.