

Comments of CEFIC / ERASM / ECOSOL on the Working Document presented on Sludge , 3rd draft, 27 April 2000.

1.- With reference to the Table in Annex IV (page 13) of the working document, the LAS limits of 2600 mg/Kg dm are part of the Danish regulation for the use of sewage sludge in agricultural practices. This limit however:

- a) is not based on the criteria of the European Technical Guidance Document,
- b) is not based on scientific estimations, and
- c) does not take into account the scientific knowledge and existing evidences about the fate and removal of LAS in sludge amended soils.

The Technical Guidance Document on the Risk Assessment of New and Existing Substances (the TGD) gives guidance on the derivation of the predicted environmental concentration (PEC) and the predicted no-effect concentration (PNEC).

The limit value for LAS (2600 mg/kg in dry sludge) has been derived from a PNEC of 5.2 mg LAS per kg dry soil, which was determined at the Danish Environmental Institute in Silkeborg. We have no problem with this PNEC.

The derivation of the PEC, however, is at variance with many elements of the TGD. There are fundamental differences between the criteria applied in Denmark and those in the EU-TGD in areas such as values used for soil depth and density, limits of sludge application, waiting period for planting crops, storage time for sludge, biodegradation occurring during storage and immediately after applying the sludge, and others. Dismissing the influence of those elements provides a scenario which is unrealistic and consequently leads to unnecessary standards for LAS in sludge.

Realistic predictions of environmental concentrations of LAS entering the soil system through sludge application lead to initial LAS levels which are no more than half and possibly less than one-sixteenth of the value assumed by the limit value in sludge.

A realistic terrestrial risk assessment for LAS was recently published ⁽¹⁾. Using the TGD approach, and a PNEC agricultural of 5.2 mg/kg; the corresponding limit value for LAS is greater than 15000 mg/kg dry sludge. Taking sludge treatment processes (eg. aerobic stabilisation, composting) into account, the limit value for LAS would increase with an order of magnitude and be above 100000 mg/kg dry sludge. This because LAS rapidly biodegrades during aerobic sludge treatment or composting.

LAS concentrations in digested sewage sludge (Table 1) are below sludge limit values calculated, based on a realistic scenario ⁽¹⁾. LAS sludge concentrations in Europe are well below objective risk levels and there is no evidence nor indication that the agricultural potential of soils is affected by LAS. Indeed, there are no reported cases of human, animal or crop contamination due to the use of sludge on agricultural soils following the provisions of the current Directive.

2. - There are hundreds of chemicals identified in sewage sludge and it is hardly understandable to base the quality of the sludge on a few chemicals, one of which (LAS) has the most comprehensive environmental safety data profile among all chemicals.

Moreover LAS is not classified as dangerous to the environment under the existing regulations and it should not be included in the list of chemicals subject to control in the future sludge directive.

Surfactants are present in sewage sludge mainly because of their physicochemical properties. Anionics in particular tend to form highly insoluble salts with water hardness ions (Ca^{++} , Mg^{++}). In the primary settling step of Waste Water Treatment Plants (WWTP) around 10-20% of the surfactants present in the raw sewage precipitate / adsorb and escape the biodegradation steps of the treatment process leaving the works with the digested sludge. Furthermore, the anaerobic digesters are neither specifically designed nor intended for the removal of surfactants and therefore these products can be detected in the digested sludge. Table 1 summarises the typical range of surfactant concentrations found in digested sludge .

Table 1.- Typical Surfactant Concentrations in Digested Sludge		
Soap	1,000 - 51,900	mg/Kg dw
LAS (Linear Alkylbenzene Sulfonate)	< 1,000 - 30,200	"
SAS (Paraffin Sulfonates)	270 - 800	"
APE (Alkyl phenol ethoxylates)	0.3 - 1,360	"
AE (Alcohol ethoxylates)	< 700	"

Source : Cavalli L.et.al. IAWQ meeting , October 13-15, 1999, Athens (Greece)

The information about the presence and behaviour of surfactants in sewage sludge is abundant and well documented , mainly for LAS, in particular on the following aspects:

- Monitoring during sewage treatment.
LAS is highly removed (>98%) in WWTP. The biological removal is in the range of 75-85% and the physical removal from 15 to 25%. The half life is around 1-2 hours⁽²⁾. The physically removed LAS leaves the plant mainly adsorbed/precipitated with the sludge and is further degraded in sludge amended soils and composting.
- Removal of LAS during aerobic digestion of sludge.
LAS is eliminated from 70 to 90% in laboratory sequencing batch reactors experiments⁽³⁾ , and >95% in commercial aerobic digesters of WWTP⁽⁴⁾.
- Removal of LAS during soil amendment operations.
LAS is completely eliminated (>99%) in sludge amended soils with average half lives in the range of 10 – 30 days depending on the type of soil , crop ,

etc. There is an abundant data base of real monitoring in a variety of agricultural fields amended with sewage sludge⁽⁵⁾.

- Removal of LAS during composting.
LAS is completely degraded (>96%) during composting of sewage sludge with agricultural waste products ,i.e; straw, saw dust, tree clippings,...etc⁽⁶⁾.
- Leaching potential of LAS.
In Fate and Leaching studies of LAS in sludge amended soils , the migration potential was limited to the first 3 cm thick soil layer. No LAS has been found in percolating water through soil⁽⁷⁾.
- Monitoring of up take potential by plants using ¹⁴C LAS.
In studies using ¹⁴C LAS on sludge amended soils used for agricultural purposes (potatoes , tomatoes , ...) no intact LAS was adsorbed by the plants, Furthermore , no LAS was detected in the percolating water ,leaching water , through the soil core ⁽⁸⁾.
- Bioconcentration
LAS does not bioconcentrate (BCF < 100) in aquatic organisms ⁽⁹⁾
- Neither LAS nor its biodegradation products have shown estrogenic characteristics potential ⁽¹⁰⁾

3-. Unnecessary sludge limit values for rapidly biodegradable organics, such as LAS, may promote alternative disposal methods such as incineration. Discouraging a sound re-use of sludge in agriculture as fertilizer and soil conditioner deprives farmers of the material, limits the potential for nutrient recycling, and places an extra burden on the Member States or Local Water authorities (who may now have to build incinerators). This latter financial burden will be imposed on the public.

Causing a reduction in the use of LAS by means of unnecessary sludge limit values will lead to a corresponding reduction in the utilization of its precursor LAB and ultimately to the likely closure of LAB producing facilities.

A typical size LAB plant employs about 40 people direct and 10 people indirect. The closure of these facilities will therefore lead to an increase in unemployment. Further the spin off effect towards subcontractors and suppliers can be estimated to an equivalent of approximately 35 people bound to lose their jobs as well. It needs to be stated that three out of the four European LAB production facilities are located in areas where industrialization and economic growth had been achieved with great efforts and represent an important occupational opportunity in these regions.

From an economical point of view the closure of a standard 100k ton LAB facility will generate a loss of turnover of approximately 100 Million Euro with an estimated decrease in Income Tax collection of 4.0 Million Euro by the local governments. Furthermore the closure cost of such an LAB facility are estimated to range from 3 to 6 Million Euro.

Finally, such a constraint, arbitrarily imposed upon detergents manufacturers regarding their freedom to formulate with ingredients demonstrated to be safe to man and the environment will inevitably lead to more expensive washing

products, an outcome that is certainly not in the interest of the European consumer.

Consequently, there are no scientific basis to support the use of LAS concentrations as a parameter of quality criteria of sewage sludge. The existing evidence proves that LAS undergoes complete biodegradation through the different alternatives used to dispose of the sludge, and that it is not a matter of concern for the environment. It is therefore the position of CEFIC / ERASM / ECOSOL that this criterion be removed from the proposed draft document. Moreover, alternatives to the sound re-use of sludge in agriculture, such as incineration, and impact on the LAB industry are expected to have significant economic implications.

Brussels, May 2000.

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ECOSOL is the European Centre of Studies on LAB-LAS (a CEFIC sector group)***