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Optimisation of the Experimental Conditions for the Anaerobic Biodegradation of Surfactants –

Final Report of the TEGEWA ad-hoc Working Group

Anaerobic Biodegradability of organic compounds in digested sludge by measurement of gas production, as described in the OECD test guidelines No. 311, has severe limitations, specifically that it is time consuming, difficult to handle, and - most importantly - prone to false negative results. TEGEWA, the German association of producers of specialty chemicals, commissioned a study to further investigate the constraints of the test methodology when applied to surfactants. Three surfactants, anionic alkylethercarboxylate (C_{12} + 4 EO), non-ionic branched alcohol ethoxylate (C_{10} + 7 EO), non-ionic linear fatty alcohol ethoxylate (C_{12-18} + 7 EO) were used in the study as test substances. Polyethyleneglycol (PEG 400) was used as the positive control.

The results of the study revealed that a strict control of the experimental conditions, namely the pre-digestion time of the sludge, the amount of sludge used in the study, and the concentration of the (possibly inhibitory) test substance are key to increase the reproducibility of the test results and improve the biodegradation potential of the surfactants studied. Nevertheless, the authors suggest that the test protocol, as laid down in the OECD 311 test guidelines, may be not be sufficiently suitable to determine the anaerobic biodegradation properties of surfactants. Against this background ERASM decided to initiate the AnBUSDiC project.

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