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On the Decomposition of Detergents in Sea-Water

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Between 1950 and 1960 the synthetic detergents replaced the "natural" soaps, so far in use in household and industry. However, connected with the technical advantages of the detergents were disadvantages to the water household, e.g. the detergents used, in the beginning could not be decomposed biologically and very soon led to great detrimental effects to the life in the rivers. In many countries it would only have been possible under great technical difficulties to decompose to a large extent the biologically hard detergents. Therefore, in Germany another way has been found. The "Detergents Law" of 1962 determined that with effect from 1 October 1964 only biologically decomposable (soft) detergents are allowed in trade. According to a further regulation nowadays only such detergents may be used which are at least 80 % decomposable biologically. The detergents are controlled by a biological and precisely fixed test.

In practice it has been noticed that the formerly used tetrapropylbenzolsulfonate with a branched alacyl chain is, on the average, decomposed by 30 %, whereas the new products with a straight chain are decomposed by 90 %, in which case the unpleasant characteristics disappear.

All these observations concern fresh water. By the entrance of sewage from household and industry into the river mouths and coastal regions it is likely that also sewages containing detergents get into the salt or brackish water. It was, therefore, to be investigated whether the biological decomposition of detergents in water with different salinity takes place in the same manner as in fresh water. We made investigations concerning the decomposition of soft detergents in a model plant for biological sewage treatment. It was found that the salinity does not have any influence. The formation of mud was at first somewhat delayed, after some time, however, the normal formation of mud started. During our experiments with different salinities the introduced "soft" detergents were decomposed by 80 to 90 %.

The results of these experiments show that the soft detergents, which enter into sea or brackish water with household or industrial sewage are decomposed biologically in the same way as in fresh water.