

Substance tested	Species tested	Parts per million	6 hours	12 hours	18 hours	24 hours
Polycomplex A-11.....	E.a ¹	100	100 (100)			
Do.....	A.s ²	100	100 (100)			
Do.....	E.a	27	57 (71)	100 (100)		
Do.....	E.a	10	33 (33)	33 (33)	33 (33)	
Do.....	A.s	10	0 (0)	33 (33)	33 (33)	
Do.....	H.c. ³	5	0 (0)	0 (75)	0 (75)	
Do.....	E.a	5	0 (0)	0 (0)	0 (0)	
Do.....	A.s	5	0 (0)	0 (0)	0 (0)	
Do.....	A.s.a ⁴	5	0 (0)	0 (0)	0 (0)	
Janslov-60.....	A.s	100	100 (100)			
Do.....	A.s	50	100 (100)			
Do.....	E.a	27	100 (100)			
Do.....	A.s	10	0 (0)	0 (0)	0 (0)	
Hemco No. 2.....	A.s	100	100 (100)			
Do.....	E.a	50	0 (30)	60 (86)	86 (100)	100 (100)
Do.....	E.a	27	100 (100)			
Do.....	A.s	10	0 (0)	0 (0)	0 (0)	0 (0)
Muratti.....	E.a	100	70 (100)	100 (100)		
Do.....	E.a	50	100 (100)			
Do.....	E.a	27	0 (0)	14 (29)	43 (43)	85 (85)
Do.....	E.a	10	8 (8)	17 (25)	17 (42)	25 (58)
Product-20215.....	E.a	27	29 (29)	29 (29)	57 (57)	57 (57)
Mangus.....	E.a	27	0 (0)	0 (0)	0 (0)	0 (0)
Crude oil.....	E.a	50	0 (0)	15 (15)	30 (30)	30 (30)
Ekoperl.....	E.a	500	0 (10)	10 (10)	10 (10)	10 (10)
Do.....	A.s.a	500	0 (0)	0 (0)	0 (0)	0 (0)
Pevatone.....	E.a	1,000	100 (100)			
Do.....	A.s.a	500	0 (0)	0 (0)	0 (0)	0 (0)
Minstron.....	E.a	1,000	100 (100)			

¹ Eucinostomus argenteus—moharra.

² Atherinomorus stipes—silversides.

³ Herangula clupeiola—herring.

⁴ Abudedefduf saxatilis—sergeant major.

The results of the above experiments should, therefore, be viewed as expressing the very minimum in terms of toxicity. Thus, these same detergents would show equivalent toxicities at smaller concentrations (ppm) if the tests were run for the standard 48 or 96 hours. Even for the 18 hour tests there is seen a high level of toxicity.

2. Detergents usually consist of many substances forming a complex mixture. Different products use differing amounts of solvent (s) as a base for the mixture. Test concentrations are prepared from the concentrated product as it is sold on the market. This is considered to be a 100% solution and test dilutions are prepared accordingly. Because the different products contain widely varying percentages of solvents and because the solvents of each one product may vary considerably in toxicity, it is very difficult to accurately compare any two products. To circumvent this problem, it would be necessary to analyze each component of a given product independently as well as in its various combinations. This approach would be especially difficult because many ingredients of commercial detergents are considered trade secrets.

3. From a practical use standpoint, different detergents should not only be compared in terms of toxicity but also in terms of their relative effectiveness as a dispersent or emulsifier. Caution must be used here also since it is difficult to quantify the effectiveness of a detergent. Also, one a substance (eg. oil) is emulsified or dispersed, the oil itself may display new and different toxic effects on living systems which in an unemulsified state are not as apparent.

4. It is hoped that the above three considerations will be recognized as important ones before the use of detergents is proposed. There is a real need for research in this area so that we may be prepared to cope most effectively with future problems such as that posed by the *Ocean Eagle* disaster.

ABSORBANT STUDIES

Absorbing ability

Of the three products tested, Ekoperly and Pevatone appeared to be each initially as effective, while Minstron was less so. Pevatone, however, seemed to absorb most of the oil on the outside of its relatively large particles whereas Ekoperl, being more granular, seemed to allow much of the oil to diffuse into the granules. Minstron, with its very small particles, proved least effective since it did not form a stable complex with the oil.