

DATE: November 4, 1970

cc: R. E. Keller

SUBJECT: BIODEGRADATION TESTING OF
MCS 1016 AND AROCLOR 1242

→ R. H. Munch
W. B. Papageorge
E. S. Tucker

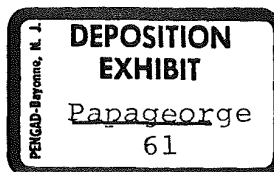
TO: W. R. Richard WRICH
T-380

The following summarizes the biodegradation testing status on MCS 1016 and Aroclor 1242. A more detailed progress report will be issued next week covering the biodegradation testing program in general.

With respect to MCS 1016 and Aroclor 1242, semi-continuous activated sludge units were started on August 10, 1970 at a feed rate of 1 mg of test material per day. Routine feeding and periodic sampling on the units have continued since that time. In the accompanying tables, the overall disappearance rate data obtained in the analyses together with other parameters are given. It was apparent after a 5-week period of sampling and analysis that the disappearance rate data being generated had a high degree of scatter. For this reason, various changes in apparatus and procedure were and are being tried to determine the source of the scatter.

The first change which suggested itself was the addition of stirring to the sludge units. It was felt that the aeration alone was not giving sufficient agitation to ensure representative sampling of the units. All units have since been modified to permit magnetic stirring. This appeared to have some salutary effect, but by no means eliminated the scatter. The method of sampling was next investigated. Initially sampling had been carried out with a wide-bore pipette. Since each unit is equipped with a side-arm for draining, testing was carried out to determine if sampling through the side-arm gave more consistent data. The results again were not conclusive. At the present time, the effect of the LAS addition used as a control is being investigated. For the time being, feeding of LAS has been stopped. It is felt that the LAS because of its surfactant properties could be affecting the adsorption of the test material on the sludge. This could lead to scatter since the LAS concentration decreases during the cycle from its feed level value to essentially zero.

An examination of the chromatograms does give a positive indication that biodegradation is occurring for both materials. Taking the ratio of



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selected component peak heights relative to the major component peak height common to both materials shows that the ratios are changing during a test cycle. Differences between the two materials are not significant at this stage.

It should be pointed out that since the composition of the two materials are not drastically different, differences in biodegradation rates may not show up until a much longer period of feeding has expired.

V. W. Saeger

E. M. Emery

js

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Biodegradation by Semi-Continuous Activated Sludge Treatment

Unit No. 6

Material: Aroclor 1242

Sampling Date (After Feeding)	1 2	2 3	3 4	4 5	5 6	6 7	7 8	8 9	9 10	10 11	11 12	12 13	13 14	14 15	15 16	16 17	17 18	18 19	19 20	20 21	21 22	22 23	23 24	24 25	25 26
Aroclor 1242 Fed over 24 Hours								1.0	---																
Aroclor 1242 in Mixed Liquor After Feeding								1.16	1.12	1.47	2.04					3.16	6.32	1.60	2.02					0.92	2.2
Aroclor in Mixed Liquor 21 Hrs After Feeding								0.91	0.53	1.42	1.04					1.85	1.49	1.49	1.17					2.64	5.7
Aroclor in Aroclor 21 Hrs After Feeding								0.25	0.47	0.05	1.10					-1.63	4.73	0.11	0.61					-1.75	-2.2
Disappearance Rate (%)								22	44	3	57					-53	76	7	29					-117	-10
Sludge Volume, ml	150	160	165	165	185	170	160	165	180	185	190	160	180	200	205	200	200	200	200	195	200	200	200	200	200
Spended Solids, mg/l				200							2000								2000						
MLSS, mg/l				5		210		42	40	40	115	170				20	40	40	45	170				200	40
pH	7.50	7.45	7.20	7.50	7.20	7.25	7.35	7.41	7.44	7.51	7.52	7.51	7.55	7.48	7.50	7.70	7.44	7.47	7.46	7.43	7.42	7.41	7.41	7.41	7.41
Disappearance Rate (%)	70.5	---																							

Sampling Date (After Feeding)	17 18	18 19	19 20	20 21	21 22	22 23	23 24	24 25	25 26	26 27	27 28	28 29	29 30	30 31	31 32	32 33	33 34	34 35	35 36	36 37	37 38	38 39	39 40	40 41	41 42
Aroclor 1242 Fed over 24 Hours	1.0																								
Aroclor 1242 in Mixed Liquor After Feeding	4.30	3.65				1.93	3.25	2.26	5.22						2.30	4.09	2.90							4.16	
Aroclor in Mixed Liquor 21 Hrs After Feeding	3.10	2.76				2.11	2.16	4.44	4.44						1.72	2.49	1.52						3.51	3.33	
Aroclor in Aroclor 21 Hrs After Feeding	1.20	0.11				-0.12	1.09	1.58	0.74						0.58	1.60	1.28						0.32		
Disappearance Rate (%)	28	-2				-9	34	55	14						25	39	46						6		
Sludge Volume, ml	210	210	210	210	165	160	135	160	155	160	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165
Spended Solids, mg/l	2000								2100								2000								2000
MLSS, mg/l	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
pH	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45

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Biodegradation by Semi-Continuous Activated Sludge Treatment

Und No. 8

Material: MCS 1016

Sampling Date (After Feeding)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
g MCS 1016 Fed every 24 Hours								1.0	---																
g MCS 1016 in Mixed Liquor After Feeding								1.49	0.91			2.72					3.46	3.05	3.58	4.44				2.47	3.47
g MCS 1016 in Mixed Liquor 21 Hrs After Feeding								1.36	0.38			1.21					3.23	3.91	4.25	2.21				2.55	4.40
Decrease in MCS 1016 every 21 Hrs (g/L)								0.13	0.52			1.51					0.23	-0.26	-0.67	2.23				-0.08	-0.73
Disappearance Rate (%)								9	58			56					7	-28	-19	50				-3	-20
Influent Volume, ml	170	175	185	190	205	180	175	170	140	110		200	170	200	205	210	205	200	210	185	200	210	200	200	200
Dependent Solids, mg/L				3040								2100								3020					
Aerated Liquor Remained, ml				5		270		40	40	40		45	210				20	40	40	45	240			20	40
DO	7.50	7.42	7.28	7.22	7.27	7.21	7.33	7.40	7.44	7.48		7.49	7.49	7.51	7.48	7.47	7.44	7.40	7.40	7.46	7.22	7.32	7.52	7.46	7.46
AS Disappearance Rate, % (Sample 104%)	79.5	---																							

Sampling Date (After Feeding)	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
g MCS 1016 Fed every 24 Hours	1.0	---																							
g MCS 1016 in Mixed Liquor After Feeding	4.22	6.75				5.62	11.25	12.97	15.75					2.22	4.24	2.78					2.56	4.40			
g MCS 1016 in Mixed Liquor 21 Hrs After Feeding	4.13	*				10.24	11.87	8.49						1.23	4.25	1.78					4.55				
Decrease in MCS 1016 every 21 Hrs (g/L)	0.06					-4.62	-1.62	4.50						0.39	-0.61	1.05					-1.02				
Disappearance Rate (%)	1					-92	-16	35						18	-14	38					-27				
Influent Volume, ml	200	200	190	200	195	180	190	195	145	130	135	150	140	155	150	130	130	150	140	140	140	140	140	140	140
Dependent Solids, mg/L		2740							3250							3090									2100
Aerated Liquor Remained, ml	40	45	130			20	40	40	45	340				20	40	45	225			20	40	40	40	45	45
DO	7.45	7.40	7.51	7.52	7.43	7.41	7.43	7.52	7.42	7.52	7.54	7.63	7.62	7.55	7.48	7.44	7.51	7.60	7.70	7.60	7.53	7.57	7.47	7.47	7.47

