

99-MB, Soft Cleaning Paste

Inherent biodegradability in an aerobic aqueous medium
Zahn-Wellens / EMPA Test – OECD 302 B

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1 GENERAL INFORMATION

Sponsor	Kinga Maróti-Bene, Scrub Daddy Hungary Zrt., Rosmarin street 1, HU-6636 Mártély
Order and test item receipt dates	August 16, 2023 and August 16, 2023
Test facility	Econetta Ltd., Ifangstrasse 11, CH-8952 Schlieren
Start and end of the test	October 17, 2023 – November 14, 2023
Test method	The applied test method is based on the guideline "OECD Guidelines for the Testing of Chemicals, Guideline 302 B: Inherent Biodegradability, Zahn-Wellens / EMPA Test, adopted July 1992" and supplemented with determination of CO ₂ production (Econetta internal SOP: ACH-1018).
Report no.	A23-01247

2 TEST ITEM

Name	99-MB, Soft Cleaning Paste
Sponsor's Reference/Batch no.	Not available
Appearance	Solid, light orange
Purity	Mixture/formulation considered as 100% pure
Econetta internal sample no.	M2308-05974

3 TEST CONDITIONS

Test design and no. of replicates	Blank control (medium + inoculum): 2 Procedure control (medium + inoculum + reference item): 2 Test item suspension (medium + inoculum + test item): 2
Test units	2.3 l glass bottles with 2.0 l test volume aerated with CO ₂ -free air and fitted to gas-absorption bottles containing 400 ml of 0.13 M KOH
Inoculum	Not adapted activated sludge from the aeration tank of the ARA Werdhölzli (CH-8048 Zürich), a municipal biological wastewater treatment plant. 200 mg/l dry matter in the final mixture. Sampling: October 12, 2023; 9:00 AM
Test medium	Mineral salts medium according to guideline OECD 302 B
Incubation	Continuous stirring for 28 days at 22±2 °C in the dark



Reference item	Diethylene glycol (C ₄ H ₁₀ O ₃)
Nominal test concentrations	1618 mg/l test item 112 mg/l reference item
Reference value of the test item	Total organic carbon (TOC): 3.1%, determined by an external laboratory according to DIN EN 15936:2012-11 Total carbon (TC): 7.2%, determined by an external laboratory according to DIN 51732: 2014-07. Determined for calculation of total inorganic carbon. Value is not considered in the calculation (note footnote ¹).
Application of test + reference items	A stock solution of test item in test medium was prepared on the day of test start and its pH was set to 7.2-7.6. This solution was diluted to about 50 mg DOC/L for the test. The reference item was applied by stock solution. The pH of the test suspensions was 7.2-7.6.
Endpoints and Measurements	<u>DOC (dissolved organic carbon) elimination:</u> aliquots of the test suspensions were taken before addition of the inoculum and after 3 hours, 1, 3, 7, 14, 21, 27 and 28 days of testing and analyzed for their DOC content (and simultaneously IC content; see below) using a TOC-L CSH TOC analyzer (Shimadzu Schweiz GmbH, Römerstr. 3, CH-4153 Reinach). The reference value for the calculation of the elimination is the 3-hour value ("day 0.125" in Table 1). Due to significant adsorption of the test item to the sludge the elimination was additionally calculated based on the value before sludge addition. <u>Mineralization (CO₂-production):</u> the CO₂ produced by the test suspensions was trapped in gas-absorption bottles containing 0.13 M KOH and measured as inorganic carbon (IC) with the TOC analyzer mentioned above. Samples were taken at the same time points as for the DOC determinations (except 3 h). This IC content was added to the IC content of the test suspension (see above) and thus corresponds to the total IC produced. The reference value for the calculation of the mineralization is the organic carbon introduced in the test suspension (Table 1).

4 TEST RESULT

Test item suspension: (see also Table 1 and Figure 1)

DOC elimination after 14 and 28 days (respectively): 101% and 101%

Significant elimination through adsorption onto the activated sludge or by other physico-chemical processes was observed as shown by a decrease in DOC values of 67% between before addition of the sludge and 3 h after. Therefore, the elimination calculated based on the DOC measured before sludge addition has to be reported additionally: 100% after 14 days and 100% after 28 days. These values are relevant in view of elimination processes occurring in a wastewater treatment plant.

Note: Possible undissolved organic carbon could not be detected in all measurements from d 0.125 due to the centrifugation process used for separating the activated sludge in the samples.

Mineralization after 28 days (maximum): 79%. *The dissolved part of the test item contains a significant amount of inorganic carbon (approximately 18% of the total dissolved carbon) which results in an overestimation of the mineralization determination.*¹

Procedure control: (see also Table 1 and Figure 1)

DOC elimination after 14 days: 100% (the test is therefore valid since the degradation of the reference item exceeded 70% within 14 days).

Mineralization after 28 days (maximum): 71%.

¹ As the amount of dissolved inorganic carbon in the test suspension remains relatively constant, it is assumed that the undissolved inorganic carbon at the test start remains undissolved for the entire duration of the test therefore, involvement in the mineralization process is rather unlikely. For this reason, only the dissolved inorganic carbon is considered in the calculation.



SIGNATURE

The applied test method is accredited according to ISO/IEC 17025. Raw data and a copy of the final report are stored in the archives of Econetta Ltd. in Schlieren for 5 years.

Project Leader Ecotoxicology

Larissa Wettstein

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Date: December 1, 2023

Specifications about accuracy and precision of measurement methods will be given on request. All test results relate only to the afore-mentioned test item, as received in the laboratory (no responsibility is taken for the test item prior its arrival in the laboratory). This report shall not be reproduced or utilized in the form of extracts by any means, electronic or mechanical, including photocopying and microfilm, except in full without the written approval of the testing laboratory.

5 ANNEX: TABLES AND FIGURES

Table 1 DOC and IC data for 99-MB, Soft Cleaning Paste and the control units, and corresponding degradation data

Day	Blank control	Procedure control		Test item		Procedure control	Test item
		gross	net	gross	net		
DOC data [mg DOC/L]						Elimination [%]	
0	0.0	57.1	57.1	46.9	46.9	-	-
0.125	3.0	59.3	56.2	18.6	15.6	0	0
1	2.6	56.8	54.2	5.9	3.3	4	79
3	2.3	49.7	47.4	3.0	0.7	16	96
7	2.5	2.7	0.2	2.6	0.1	100	100
14	2.4	2.3	-0.1	2.3	-0.1	100	101
21	2.4	2.5	0.1	2.2	-0.1	100	101
27	2.7	2.5	-0.2	2.7	0.1	100	100
28	2.7	2.6	0.0	2.6	-0.1	100	101
CO₂ data [mg IC/L]						Mineralization [%]	
Reference value for calculation, introduced C [mg/L]						57.1	116.5
0	0.0	0.0	0.0	0.0	-9.6	0	-19[*]
0.125	1.0	1.1	0.1	5.3	-5.3	0	-11[*]
1	4.4	4.5	0.1	17.8	3.7	0	7
3	8.1	11.0	2.9	35.9	18.2	5	36
7	13.6	50.3	36.7	49.7	26.5	64	53
14	20.2	60.0	39.8	61.2	31.4	70	63
21	25.0	64.9	39.8	68.6	33.9	70	68
27	27.7	68.4	40.7	76.9	39.5	71	79
28	28.3	69.0	40.7	76.2	38.3	71	76

*Note: As the sample 99-MB, Soft Cleaning Paste has an IC content of 18%, An IC correction was applied, resulting in negative mineralization values on day 0 and 0.125.

Table 2 pH values at the end of the test

Test vessel	Mean of replicates
Blank control	6.9
Procedure control	6.9
Test suspension	7.5

Figure 1 DOC elimination and mineralization curves for 99-MB, Soft Cleaning Paste and the procedure control

