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GRABOPLAST | FLOOR COVERING MANUFACTURERS LTD.

Mrs. Tünde Váradi 16/b Fehérvári St. H-9023 Györ

your message from

your reference

our reference

telephone number

date

28.10.2016

4.5/B27-A1/2016

03672 379-521

09.12.2016

TEST REPORT

1. Gerneral

test report number:

4.5/B27-A1/2016

client:

GRABOPLAST Floor Covering Manufacturers Ltd., Mrs. Váradi

test item:

internal laboratory

number

sample 1

Grabo Fortis, untreated

2789

sample 2

Grabo Fortis, treated

2790

sample drawing:

by client

test aim:

"Plastics - Evaluation of the action of microorganisms" acc. to DIN EN ISO

846:1997, method C

date of receipt:

04.11.2016

processing period:

09.11. - 07.12.2016

processor:

Mrs. C. Stengel, Mrs. Dr. J. Bauer

subcontractor:

none

test method:

1) acc. to DIN EN ISO 846:1997

comment: report execution:

no 4

Report distribution:

1 copy for client

1 copy for OMPG mbH

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Ust.-ID DE 150530258



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2. Test method

Test method description:

Materials, which can be metabolized by microorganisms are determined by incubation together with bacteria or fungi on Carbon-deficient nutrient media. Visual inspection is carried out to evaluate microbial growth next to and on the samples. For testing the resistance of the material against bacteria, method C is recommended.

Material and test conditions:

test organism:	Escherichia coli DSM 1576	oli DSM 1576	
samples: sample 1	Grabo Fortis, untreated	2789	
sample 2	Grabo Fortis, treated	2790	
dimension of sample material	50 x 50 x 2mm		
Nutrient media & cultivation:			
pre-incubation	in tryptone soy bouillon (TSB, Carl Roth) at 37°C and 110 rpm		
medium for inoculation	buffer solution		
incubation	mineral salt agar (MSA), 29°C		
	plate-count-agar, 37°C		
inoculation cell number	6,05 · 10 ⁴ cfu/ml (shall be 2-8 x 10 ⁴ cfu/ml)		



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Method:

Preparation of inoculum:

- cultivation of E. coli in TSB for 24h and 110 rpm
- adjusting to 1·10⁶ cfu/ml in sterile buffer solution by OD_{630nm} and dilution
- for verification of colony forming units (cfu) 100μl of decadic serial dilution were plated on PCA in triplicate

Inoculation of samples:

- melted MSA was adjusted to 55°C
- 5ml inoculum were added to 95ml MSA
- 15ml inoculated MSA were poured into petri dishes
- 5 test specimens per sample were applied directly to the still liquid MSA
- leaving until solidified
- additional 15ml of inoculated MSA were poured into the plates until complete covering of samples

Growth control:

- 100µl of inoculum were plated on PGA and incubated for 24-48h by 29°C

Sterile control

- 15ml MSA without inoculum were poured into petri dishes
- 5 test specimen per sample were applied
- test specimen were covered with 15 ml MSA (w/o inoculum)

Standard clima

 additional 5 test specimen were kept in petri dishes without any nutrient agar by standard clima (23 °C, 50 % rH)

Incubation:

- plates were incubated at 29 \pm 1 °C and 90 % rH until visual bacterial growth was detected, max. 4 weeks

Assessment criteria:

Growth intensity	Asessment
0	no observable growth neither by naked eye nor microscopy
1	visible growth only with microscopy
2	visible growth up to 25% sample surface
3	visible growth up to 50% sample surface
4	extensive growth on more than 50 % sample surface
5	strong growth on whole sample surface

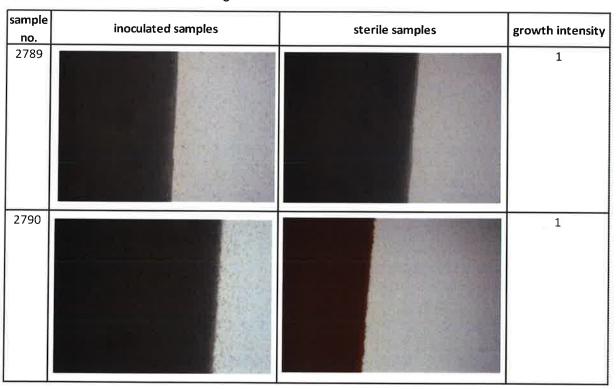


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3. Test results

Test results are shown in table 1.

Table 1: Visual assessment of bacterial growth



4. Assessment

For sample "Grabo Fortis, untreated" (2789) and "Grabo Fortis, treated" (2790) no enhanced bacterial growth on the edge of the samples could be observed and therefore they do not serve as a nutrient source for *E. coli* DSM 1576. In some cases slightly growth of different microorganisms occurred in places, but this can be explained as contamination from non-sterile samples.

Likewise, no growth inhibition could be observed on the edge of the samples and thus no antibacterial activity can be concluded.

Alltogether the samples show good resistance to the bacterium E. coli.

Rudolstadt, 09.12.2016

Dr. Janine Bauer Head of laboratory