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ESCOLA SUPERIOR DE BIOTECNOLOGIA
PORTO

Antibacterial activity of SURFORMA CPL TEXTE

Requested by:

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Objective

Determination of the antibacterial activity of SURFORMA CPL surface according to the method described in ISO 22196 and verification of compliance with the criterion suggested in the standard JIS Z 2801.

Methodology

The sample SURFORMA CPL with the reference TEXTE was supplied by *Sonae Indústria de Revestimentos S. A.* on the 26-01-2021, on pieces with dimensions ca. 50 mm x 50 mm and thickness average of 0,80 mm.

Period of testing: 02-02-2021 to 14-02-2021.

Method of Test:

ISO 22196:2011 - Measurement of antibacterial activity on plastics and other non-porous surfaces.

The test was be performed on three specimens of test material. Specimens was cleaned prior to test with 70% ethanol in water.

Testing conditions:

- Test stains:

  Escherichia coli ATCC 8739

  Staphylococcus aureus ATCC 6538

- Untreated test specimens: Glass slide ca. 50 mm x 50 mm.
- Cover film: polyethylene with 40 mm x 40 mm (area 1600 mm^2) and thickness 0,07 mm.

- Volume of test inoculum: 0,4 mL.
- Antibacterial activity (R) calculated according:

  $\mathbf{R} = (U_t - U_0) - (A_t - U_0) = U_t - A_t$

  Where,
  U_0 is the average of common logarithm of the number of viable bacteria, in cfu/cm^2, recovered from the untreated test specimens immediately after inoculation;
  U_t is the average of the common logarithm of the number of viable bacteria, in cfu/cm^2, recovered from the untreated test specimens 24 h after inoculation;
  A_t is the average of the common logarithm of the number of viable bacteria, in cfu/cm^2, recovered from the sample test specimens 24 h after inoculation.

According to the JIS Z 2801 standard, the criterion for considering that there is an antibacterial effect is $R \geq 2$.

Results

The bacterial concentration obtained in the inoculum was for *Escherichia coli* (ATCC 8739) - 1,0 x 10^6 cfu/mL and for *Staphylococcus aureus* (ATCC 6538) – 3,6 x 10^5 cfu/mL, in both cases within the intended range (2,5 x 10^5 cfu/mL e 1,0 x 10^6 cfu/mL).

The results obtained in the untreated sample (number of viable cells recovered from each test specimens immediately after inoculation, the average number of viable cells recovered immediately after inoculation and the average number of viable cells recovered after 24 hours of inoculation) comply with the conditions required by ISO 22196 standard, so the tests are considered valid.

Table 1 shows the results obtained for the untreated sample (glass slide) immediately after and 24 hours after inoculation. The results are presented in colonies forming units (cfu) per area (cm^2) and in logarithm cfu per cm^2.

Table 1 – Results obtained on no treated sample - Glass slide

Test microorganism		*Average value* [1] cfu /cm^2	Log cfu /cm^2
Escherichia coli ATCC 8739	U_0	8,9 x10^3	3,94
	U_t	3,0 x10^5	5,47
Staphylococcus aureus ATCC 6538	U_0	3,1 x10^3	3,47
	U_t	2,2 x10^5	5,32

[1] Average of the number of viable cells (cfu) of 3 test pieces of each sample and common logarithm cfu immediately after inoculation (U_0) and 24 h after inoculation (U_t) on untreated specimen. Results are presented by cm^2.

The results obtained on untreated sample and sample 24 hours after inoculation were used to calculate the antibacterial activity. Table 2 shows the results obtained for the sample and calculation of antibacterial activity.

Table 2 - Results obtained and calculation of the antibacterial activity for the sample

Test microorganism	*Average value* (A_t) [2] cfu /cm^2	Log cfu /cm^2	***R***
Escherichia coli ATCC 8739	7,8	<1	5,2
Staphylococcus aureus ATCC 6538	<0,63	<0	≥3,9

[2] Average, obtained from 3 pieces of each sample, of the number of viable cells (cfu) and common logarithm of cfu 24 h after inoculation on treated specimen (sample).

Antibacterial efficacy is considered when R is equal to or greater than 2.

Conclusions

The sample tested showed an antibacterial activity value R ≥ 2 whereby the product is considered to be effective as suggested in Japanese Standard JIS Z 2801.

References

JIS Z 2801: 2010 and Amd1:2012 Antibacterial products – Test for antibacterial activity and efficacy

ISO 22196:2011 Measurement of antibacterial activity on plastics and other non-porous surfaces