

Reference Nr. 22_111240

Reception Date: 20-09-2022

Delivery Date: 28-10-2022

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Sample

Type of sample: CERAMIC PIECES

Muestra control - XS Nexus White.
Muestra a ensayar - XS Gravity Pearl MT Tono
N045M0203C

Client

CIFRE CERÁMICA, S.L.

Ctra. VilaReal-Onda, Km-10
12200 – CASTELLÓN DE LA PLANA

Container: CARTON
Reason of the test: REQUESTED FOR CLIENT
Taken to the laboratory by: COURIER COMPANY

Taken by: CLIENT
Conservation and storage: ROOM TEMPERATURE

Beginning: 24-10-2022

End: 28-10-2022

TEST CARRIED OUT:**ANTIBACTERIA EFFICACY DETERMINATION IN CERAMIC SURFACES TREATED ACCORDING TO ISO 22196/JIS Z 2801:2010 REGULATION.****I.- PROCEDURE:**

Test was carried out according to procedures based on JIS Z 2801:2010 regulation "Quantitative determination of antimicrobial efficacy of treated surfaces". Assays were made at the same time in the target sample "treated sample" and in a control sample of the same material without any treatment.

Samples references: [Muestra control - XS Nexus White.](#)
[Muestra a ensayar - XS Gravity Pearl MT Tono N045M0203C](#)

- Microorganisms used: *Escherichia coli* (CECT 434)
Staphylococcus aureus (CECT 239)
- Neutralizer used: D/E Sterile Neutralizing broth solution (Difco)
- Surfactant used: Tritón X 0,05% in sterile distilled water
- Solvent for bacterial dilutions: NB 1/500
- Assay room temperature: 22 ± 2 °C
- Incubation temperatura: 36 ± 1 °C

According to internal procedure PM-CP-007, bacterial suspensions of known concentrations were obtained around 10⁶ cfu/ml. With these concentrations samples surfaces were contaminated and 24 hours after being in contact the inoculum with the material.

II.- RESULTS:

1. Results obtained at 0 time (inoculum re-counting that are applied in samples), are next:

Sample	Direct re-counting	Recounting 1/10	Recounting 1/100
E. coli	> 300	>300	49
St. aureus	> 300	>300	37

It corresponds to the number of colony forming units (cfu) inoculated for 0,1 ml in 100 ml of neutralizer and it is approximately:

- $4,9 \times 10^3$ for *E. coli*.
- $3,7 \times 10^3$ for *St. aureus*.

Therefore, in 0.1 ml of bacterial suspension, which is what is inoculated in the ceramic, we have approximately:

- $4,9 \times 10^5$ for *E. coli*.
- $3,7 \times 10^5$ for *St. aureus*.

2. Results obtained in the CONTROL SAMPLE (XS Nexus White) after being 24 hours in contact are next:

Sample Non Treated	Direct re-counting	Re-counting 1/10	Re-counting 1/100
E. coli	> 300	>300	45
St. aureus	> 300	298	40

$$N = \frac{C \times D \times V}{A}$$

$$N \text{ for } E. coli = \frac{45 \times 100 \times 100}{16} = 28125 = 2,8 \times 10^4$$

$$N \text{ for } St. aureus = \frac{298 \times 10 \times 100}{16} = 18625 = 1,8 \times 10^4$$

The logarithm of these values (Ut) will be used to calculate antimicrobial activity value after.

3. Results obtained in the TREATED SAMPLE (XS Gravity Pearl MT) after being 24 hours in contact are next:

Sample Treated	Direct re-counting	Re-counting 1/10	Re-counting 1/100
E. coli	18	2	0
St. aureus	13	2	0

$$N \text{ for E. coli} = \frac{18 \times 1 \times 100}{16} = 112,5$$

$$N \text{ for St. aureus} = \frac{13 \times 1 \times 100}{16} = 81,25$$

The logarithm of these values (At) will be used to calculate the reduction percentage after.

4. Calculation of antimicrobial activity value (R according to JIS Z 2801:2010 Regulation) XS Gravity Pearl MT:

$$R = U_t - A_t$$

$$R \text{ for E. coli} = 4,4 - 2,1 = 2,3 \rightarrow 99 \%$$

$$R \text{ for St. aureus} = 4,3 - 1,9 = 2,4 \rightarrow 99 \%$$

III.- CONCLUSIONS:

According to the results obtained we conclude that **the treatment carried out in ceramic has significant antibacterial effects** and reduces quantity of assayed bacteria.



Responsable de Calidad
Dña. Cristina Padilla Roldán

- Results are valid exclusively for the described sample
- The uncertainties of the test measures are calculated and available.
- Values in bold are outside the established limits

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