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Antibacterial Testing of Xela Purleve Hygenic Door Handle Parts

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SUMMARY

- Xela HDPE sleeves manufactured with 1.5% Microban Additive 4000-100N successfully passed antibacterial testing.
- Acetal caps and PP handles with 1.5% Microban Additives also successfully passed antibacterial testing.

ARTICLES

The following articles were received for testing:
Xela extruded HDPE sleeve with no Microban
Xela extruded HDPE sleeve with 1.5% Microban Additive 4000-100N
Xela Acetal POM caps with no Microban
Xela Acetal POM caps with 1.5% Microban Additive 1100-100N
Xela PP handles with no Microban
Xela PP handles with 1.5% Microban Additive 5030-100N

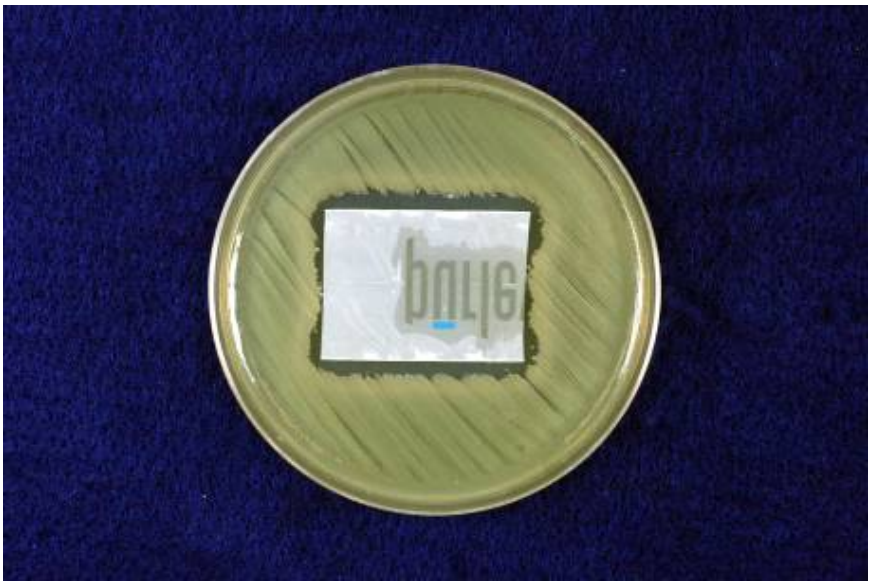
TESTING

The test choice was the qualitative Kirby-Bauer zone of inhibition test. The **Kirby-Bauer** test is a qualitative test that is based on the visual assessment of a zone of bacterial inhibition around and under a test sample after it has been placed on a bacterial lawn and incubated for 24 hours.
What is a failure? A failure is reported in the instance where there is bacteria found underneath the test sample in contact with the agar media.
What is a pass? A pass is reported in the instance where there is no bacteria found underneath the test sample in contact with the agar media. In the case where the test substrate is able to exhibit a strong inhibitory activity against bacteria, a zone of clearance may also be seen around the test sample. The average distance from the sample edge to the edge of bacterial inhibition is measured in millimeters.

In this case, the organism used for testing was E. coli (ATCC 25922), a common Gram-negative bacteria. The photos below are an example of the Kirby-Bauer testing.

Control Sleeve Sample: the E. coli bacteria has grown all the way to the edge of the sample and is also found underneath the sample (can't see this from the photo- the microbiologist has to lift the film to examine the agar bed under the sample). This shows that an untreated sleeve film is unable to inhibit the growth of bacteria.

Treated Sleeve Sample Replicate 1: the film is exerting an antimicrobial effect against the bacteria. Note there is an area of inhibition around the sample where the growth of the bacteria has been effectively suppressed.



Treated Sleeve Sample Replicate 2: the film is exerting an antimicrobial effect against the bacteria. Note there is an area of inhibition around the sample where the growth of the bacteria has been effectively suppressed.

Results Table

Sample	Zone of Inhibition	Comments
Control film	None	FAIL
Treated film with 1.5% 4000-100N replicate 1	3mm	PASS
Treated film with 1.5% 4000-100N replicate 2	3mm	PASS
Untreated Acetal Cap	4mm	PASS
Treated Acetal Cap with 1.5% 1100-100N	4mm	PASS
Untreated PP handle	3mm	PASS
Treated PP handle with 1.5% 5030-100N	6mm	PASS

Note that the untreated Acetal cap and untreated PP handled showed antibacterial efficacy. That is regarded as highly unusual as these materials are intrinsically not antibacterial. We immediately suspected that the Acetal parts and PP handles labeled as untreated might contain our additive. This might have happened if the untreated parts were run immediately after the treated parts through the injection molder. The possibility of additive carrying over is very high as it typically takes many shots before the molder is effective purged of the antimicrobial additive. To confirm this, we carried out an extraction on the Acetal and PP parts, and the following were found:

Sample	Additive “B”/ppm
Untreated Acetal Cap	1000ppm
Treated Acetal Cap with 1.5% 1100-100N	1200ppm
Untreated PP handle	1600ppm
Treated PP handle with 1.5% 5030-100N	1500ppm

This shows that the parts labeled as “untreated” did indeed contain the Microban additive, and hence the Acetal and PP parts labeled as untreated should have been considered treated.

CONCLUSIONS

The Xela door handle parts showed good antibacterial efficacy. This included the Acetal caps, the PP handles and the olefin sleeve.