

DESCRIPTION AND UNIQUE VALUE PROPOSITIONS (UVP)

The technology relates to an antibacterial additive that can be easily incorporated into polycarbonate granules to achieve 99.9% of antibacterial activity of its end products.

UVP:

1. Antibacterial activity¹ is 99.9%
2. Easy incorporation with polycarbonate granules

PROBLEM

Commercial kitchens, bathrooms and hospitals consists of various products and surfaces made of polycarbonates which are prone to the growth of microorganisms that are harmful to humans. Primarily, these surfaces are cleaned by using disinfectants and it is a time and resource consuming process.

SOLUTION

An antibacterial additive for polycarbonates can reduce the growth of harmful bacteria while preserving the properties of the original polycarbonate material. This can also eliminate the burden of disinfecting surfaces manually.

Antibacterial polycarbonates are fabricated either by applying an antibacterial coating or by the addition of an antibacterial additive at the extruding stage. Since the durability of coatings are not promising John Keells Research has developed an antibacterial additive that **can be added to polycarbonate at the extruding stage** which ensures **long-lasting antibacterial activity**.

Antibacterial polycarbonate additive by John Keells Research is a material developed using nanotechnology and its antibacterial activity¹ was tested according to the Japanese standard JIS Z 2801:2010 from a third-party Laboratory in Sri Lanka. Results shows that polycarbonate test pieces fabricated using this technology have an **antibacterial activity¹ of 99.9% for both *E. Coli* and *S. Aureus* bacterial strains**.

Following tables summarize the antibacterial activity¹ of the Polycarbonate with our antibacterial additive;

¹ Antibacterial activity is defined as the ability of a material to eliminate bacteria contacting with that. It is calculated by comparison of the logarithm of the number of the bacteria in the control sample and in the corresponding sample of that material.

ANTIBACTERIAL ACTIVITY

1. Test bacteria: Staphylococcus aureus (ATCC 6538)

Quantitative Assessment of Activity – JIS Z 2801:2010				
Untreated: Conc. Of inoculum on untreated sample at 0 hrs: 2.1×10^4 cfu/ml				Log = 4.30 (U_0)
Untreated: Conc. Of inoculum on untreated sample after 24 hrs: 5.9×10^4 cfu/ml				Log = 4.77 (U_t)
Sample Identification	No. of Bacteria on Treated Sample	Log of Bacteria on Treated Sample (A_t)	Antimicrobial Activity (R)* ($U_t - A_t$)	Microbial Kill (% Reduction)
Treated Sample	60	1.77	3.0	99.9

2. Test bacteria: Staphylococcus aureus (ATCC 8739)

Quantitative Assessment of Activity – JIS Z 2801:2010				
Untreated: Conc. Of inoculum on untreated sample at 0 hrs: 2.1×10^4 cfu/ml				Log = 4.30 (U_0)
Untreated: Conc. Of inoculum on untreated sample after 24 hrs: 8.7×10^4 cfu/ml				Log = 4.94 (U_t)
Sample Identification	No. of Bacteria on Treated Sample	Log of Bacteria on Treated Sample (A_t)	Antimicrobial Activity (R)* ($U_t - A_t$)	Microbial Kill (% Reduction)
Treated Sample	50	1.70	3.2	99.9

Polycarbonate based antibacterial additives (Masterbatches) can be used in an array of applications such as electronic components like light switches, packaging, construction materials, automotive and in medical applications.

TECHNOLOGY READINESS LEVEL 4 (technology is validated in the lab)

IP STATUS Trademarked technology protected as a trade secret

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