

DYPHOX Am BioPark 13 93053 Regensburg

Varcotec GmbH
z.Hd. Hrn. Frings
Curiestraße 2
D- 70563 STUTTGART

26 August 2020

Dear Mr. Frings,

the products of TriOptoTec GmbH, which are marketed under the brand Dyphox®, are based on the process of photodynamics: a photophysical process of energy conversion. The photodynamic catalyst (= special dye) is activated by visible light. This energy is then transferred to the oxygen in the air ("precursor"). This produces the antimicrobial agent singlet oxygen. It destroys microorganisms in a chemical process by oxidation of cellular components such as membrane lipids and proteins ("Mode of Action").

All Dyphox® additives, which are incorporated into coating systems, and thus also the coatings themselves, contain the same catalyst "PN-B". The dosage is individually adjusted to the requirements for efficacy of the customer.

We have collected extensive data on the antiviral efficacy of our product DYPHOX Universal 510-R and on our photocatalyst "PN-B" in aqueous suspension. Enveloped and non-enveloped viruses can be killed with high efficacy (Table 1 and 2).

page 1 of 3

DYPHOX

Am BioPark 13
93053 Regensburg

T +49 941 462 925-0
E info@dyphox.com

www.dyphox.com

Geschäftsführer: Franz Xaver Auer
Amtsgericht Regensburg HRB 11866 UST-IdNr. DE270575767
Bankverbindung: Sparkasse Regensburg
IBAN DE61 7505 0000 0027 1540 53 BIC BYLADEM1RBB

DYPHOX Antimikrobiell. Sicher. Permanent.

Table 1: Evidence of the antiviral efficacy of the Dyphox® photocatalyst "PN-B" in aqueous suspension. Tests were carried out according to a modified version of DIN EN 14476 by Eurovir Hygiene-Labor GmbH.

Virus strain	enveloped / non-enveloped	Antiviral efficacy (reduction in log ₁₀)
Influenza A Virus (H1N1)	enveloped	> 3,3
TGEV-Coronavirus	enveloped	> 4,6
Adenovirus, Type 5	non-enveloped	> 5,5

Table 2: Evidence of the antiviral efficacy of the DYPHOX Universal 510-R coating. Tests were carried out as modified version of a quantitative carrier test in accordance with the RKI guideline (1995) by Eurovir Hygiene-Labor GmbH.

Virus strain	enveloped / non-enveloped	Antiviral efficacy (reduction in log ₁₀)
Influenza A Virus (H1N1)	enveloped	> 3,8
TGEV-Coronavirus	enveloped	> 5,5
Adenovirus, Type 5	non-enveloped	Ca. 2,0

The antibacterial efficacy of Dyphox®-additive systems can be reproducibly confirmed in various coating systems from different manufacturers, including wall paints, 1K acrylate water-based coatings, 2K polyurethane coatings and SolGel systems (Table 3).

Table 3: Evidence of the antibacterial efficacy of various products containing Dyphox® additives. Tests were carried out by QualityLabs BT according to a modified version of ISO 22196.

Product	Test strain	Gram positive / Gram negative	Antibacterial efficacy
Wall paint Relius AntiBac Pro	<i>S. aureus</i>	Gram positive	> 4,0
Varnish Haering AntiBak Aktiv	<i>S. aureus</i>	Gram positive	> 4,0
Printing Varnish Varcotec Lock 3 VGL15	<i>S. aureus</i>	Gram positive	> 4,0
DYPHOX Universal 510-R	<i>S. aureus</i>	Gram positive	> 4,0
DYPHOX Universal 510-R	<i>E. faecium</i>	Gram positive	> 4,0
DYPHOX Universal 510-R	<i>A. baumannii</i>	Gram negative	> 4,0

The present test results and the comparison of the data allow us to conclude an antiviral effect of Dyphox® additive-containing printing varnish systems.

Summary / Conclusion:

- The same photocatalyst ("PN-B") is used for all Dyphox® containing products.
- The "mode of action" and the biocidal agent are the same for all products.
- The same antibacterial efficacy is given for the Dyphox® containing systems: wall paint, printing varnish, varnish and SolGel.
- As the antimicrobial efficacy is evident with different coating systems, it seems to be independent of the binding agent in the matrix.
- Based on available data, we expect an antiviral effect for Dyphox®-containing 1K water-based printing varnishes.

26.08.2020

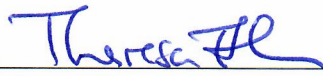
Date

26/08/2020

Date



Dr. Andreas Späth
CTO



Dr. Theresa Frank
Microbiology