



# PRODUCT UPDATE: PROTECTIVE EFFICACY

## SYNOPSIS

Over the past 2 months, **ZShield24™** has been working closely with a fully accredited, **EPA-Registered**, **AOAC-Approved**, **ISO-Certified** and **ANSI-Certified** laboratory, which is widely respected in the testing of microbiological presence/absence for product research and development.

We have asked them to assist us in a comprehensive assessment of our new products:

- ZShield24™** 7-day protective coating
- ZShield24+™** 30-day protective coating

## BACKGROUND

**ZShield24™** employ a natural bio-polymer called Chitosan. Chitosan is a substance extracted and refined from the exoskeletons of crustaceans in this case, snow crabs. Chitosan has been fully reviewed, in use in numerous industries and approved by the:

- FDA** - Approved for both skin contact and inclusion in prepared foods
- USDA** - Approve for application to roots, plant foliage, soil and harvested fruits and vegetables
- GRAS** - It has achieved the coveted title of being "Generally Regarded As Safe"
- EPA** - Exempt from FIFRA Registration due to its lack of human toxicity, coupled with its known antimicrobial properties.



Our **ZShield24™** Products have been carefully prepared with a blend of purified water and other natural ingredients to create a new generation in protective coatings. **ZShield24™** and **ZShield24 GUARD™** contain no synthetic substances, creates a natural and sustainable crystal-clear, microscopic polymeric film that has superior advantages over other antimicrobials:

- Contains no heavy metals as do those which contain nano-silver
- Is non-leaching as do those that contain QAC ingredients
- Does not create a 3-dimensional field which may inhibit proper cleaning or be destroyed with friction.
- Is perfectly suitable for use on glass and all soft or hard surfaces
- Requires no unreasonable PPE's

We had read all of the academic studies and scholarly articles, but we wanted to know **EXACTLY** how good our product was.

## TEST NUMBER 1

In this first study, we put **ZShield24™** up against three distinct groups of pathogens to compare how broadly it protects the material and to determine if it is equally effective on bacteria, mold and spores. Three microbes were selected: *Bacillus subtilis*, *Aspergillus niger* and *Candida albicans*, all of which are known to exist in both active and spore form. This test was conducted on numerous carriers of a single type of surface over 7 days, with readings at Time Zero (directly after inoculation), 3, 6, 24 and 48 hours, and at the conclusion of the 7 days.

- Step 1** → The surfaces of 3 carriers were pretreated with **ZShield24™**.
- Step 2** → 6 carriers were inoculated with the test organisms so as to create 3 positive control carriers.
- Step 3** → Positive and Negative (uncoated, no organism) Control carriers were set aside in a secure location.
- Step 4** → The results were collected and reported as follows:

OGANISM (ATCC)	INITIAL INOCULUM	TIME ZERO	REDUCTION ACHIEVED	3 HOURS	6 HOURS	24 HOURS	48 HOURS	7 DAYS	REDUCTION ACHIEVED
B. subtilis (6633)	1.14 x 10 <sup>5</sup>	10	100.00%	<10	<10	<10	<10	<10	100.00%
A. niger (16404)	4.80 x 10 <sup>6</sup>	200	99.96%	210	70	120	10	<10	100.00%
C. albicans (10231)	2.00 x 10 <sup>6</sup>	1000	99.95%	12500	2500	210	190	10	99.95%

Conclusion **ZShield24™** was proven to be:

- Immediate effective against a gram-positive bacteria,
- Effective within 48 hours against black mold, and
- Ultimately fully effective against the *C. albicans* yeast spores.



## TEST NUMBER 2

In the second study, we wanted to compare the efficacy of **ZShield24™** (our 7 day concentration) against **ZShield24+™** (our proposed 30 day protective coating), this time using Staph aureus (ATCC 6538), a known human health pathogenic organism. This test would be conducted on three different hard surfaces (plastic, laminate and stainless steel) and on one soft surface (cotton) over a 30 day period. We expected to maintain a target 3-Log reduction (99.9%). Each of the multiple test carriers were coated with the active ingredient only once at the beginning of the analysis, inoculated and reported. Four times during the test, the test carriers were challenged by being cleaned with **Synergy™ ProTab™ Cleaning Cloths** hydrated with a 50 ppm Aqueous ClO<sub>2</sub> solution [ **Synergy ENVIROTAB™** ] to determine if the one application coating would break down under such pressure. After each challenge, the organism was reintroduced to see if the same antimicrobial characteristics remained, then testing was resumed.

Below are the results:

### ZShield24™ (7 day [minimum] product)

TEST SURFACE MATERIAL	INITIAL INOCULUM	7 DAYS	1 <sup>ST</sup> REINOCULATION	14 DAYS	REDUCTION SUSTAINED	TARGET LOG <sup>3</sup> ACHIEVED?	COMPATIBLE WITH ENVIROTAB	RESISTANT TO CLEANING	SUSTAINS THROUGH RE-INOCULATION
Plastic	1.78 x 10 <sup>5</sup>	0.00	1.25 x 10 <sup>7</sup>	0.00	99.99999%	YES	YES	YES	YES
Laminate	1.78 x 10 <sup>5</sup>	0.00	1.25 x 10 <sup>7</sup>	0.00	99.99999%	YES	YES	YES	YES
Stainless Steel	1.78 x 10 <sup>5</sup>	0.00	1.25 x 10 <sup>7</sup>	0.00	99.99999%	YES	YES	YES	YES
Cotton	1.78 x 10 <sup>5</sup>	0.00	1.25 x 10 <sup>7</sup>	0.00	99.99999%	YES	YES	YES	YES

### ZShield24+™ (30 day product)

TEXTILE	INITIAL INOCULUM	7 DAYS	1 <sup>ST</sup> REINOCULATION	14 DAYS	2 <sup>ST</sup> REINOCULATION	21 DAYS	3 <sup>ST</sup> REINOCULATION	30 DAYS	REDUCTION SUSTAINED
Plastic	1.78 x 10 <sup>5</sup>	0.00	1.25 x 10 <sup>7</sup>	0.00	1.18 x 10 <sup>6</sup>	0.00	1.25 x 10 <sup>6</sup>	0.00	99.99999%
Laminate	1.78 x 10 <sup>5</sup>	0.00	1.25 x 10 <sup>7</sup>	0.00	1.18 x 10 <sup>6</sup>	0.00	1.25 x 10 <sup>6</sup>	0.00	99.99999%
Stainless Steel	1.78 x 10 <sup>5</sup>	0.00	1.25 x 10 <sup>7</sup>	0.00	1.18 x 10 <sup>6</sup>	0.00	1.25 x 10 <sup>6</sup>	0.00	99.99999%
Cotton	1.78 x 10 <sup>5</sup>	0.00	1.25 x 10 <sup>7</sup>	0.00	1.18 x 10 <sup>6</sup>	0.00	1.25 x 10 <sup>6</sup>	0.00	99.99999%

Conclusion **ZShield24™** & **ZShield24+™** were proven to:

- Continuously execute its biostatic antimicrobial power over Staphylococcus aureus.
- Hold up against periodic cleaning with **ENVIROTAB™** and **ProTab™** Compressed Cloths.
- Maintain efficacy well beyond target (7 days for **ZShield24™** and Log3 at 30 days for **ZShield24+™**).



## SKIN TEST SUMMARY

Employing a combination of AOAC [Method 960.09] and USP [Method 51:Antimicrobial Effectiveness], our **ZShield24™** All-Natural Hand Care Protection was challenged over 24 hours by Staphylococcus a. [ATCC 6538]. A sanitized sample of porcine skin was treated with **ZShield24™**, allowed to dry, and was inoculated with the bacteria. The results were as follows:

- At 4 hours, the initial bacterial contamination had been reduced by 99.957%
- At 6 hours, the initial bacterial contamination held a reduction of 99.956%
- At 24 hours, the initial bacterial contamination still demonstrated a reduction of 99.89%.

Conclusion, **ZShield24™** All-Natural Hand Care Protection can effectively defend your hands against bacterial contamination.

For more information on **ZShield24™** please see our product information sheet and visit our website, [zshield24.com](http://zshield24.com), where you can sign up to stay informed.