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WASTEWATER SOLUTION

Application: an effective odor control solution for a wide range of malodors found on hard surfaces and fabrics, indoors and outdoors



**BioFresh 2000 / EW2000
10X concentrate Liquid**

Application

“BioFresh 2000” is an effective odor control solution for a wide range of malodors found on hard surfaces and fabrics, indoors and outdoors. The advanced chemistry of BioFresh 2000 captures malodors for immediate odor control, while the beneficial microorganisms degrade odor - causing organics. BioFresh 2000 eliminates odors at their source for long -lasting odor control.

Benefits

Effective, long-lasting odor control

- Fast odor elimination by effective neutralization of a wide range of malodors.
- Capture and degradation of odorous molecules and odor-causing organics for long-lasting, in-depth odor control

Superior performance

- Superior performance on cat urine odors compared to competitor products.

Advanced microbial technology

- Beneficial microorganisms for optimal and long -lasting odor control

Product	Application	Specifications
BioFresh 2000	Odor control	<ul style="list-style-type: none"> • Liquid • Fully formulated • 10X concentrate

Performance A panel test was conducted to determine the effectiveness of “BioFresh 2000” on garbage odors. The garbage odors consisted of three solutions: garlic oil, 2-methylbutyric acid (cheese/fruity odor), and trimethylamine (fish odor, molecule similar to urine). Each solution was applied to a towel and treated with Freshen Free. The odor was then evaluated on the following scale: 1 = no bad odor, 2 = bad odor has nearly disappeared, 3 = reduction of bad odor, 4 = slight reduction of bad odor, 5 = no reduction



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of bad odor. The data in Figure 1 demonstrate that “BioFresh 2000” reduces garbage odors after only 30 minutes and provides continuous odor control for as long as 14 days.

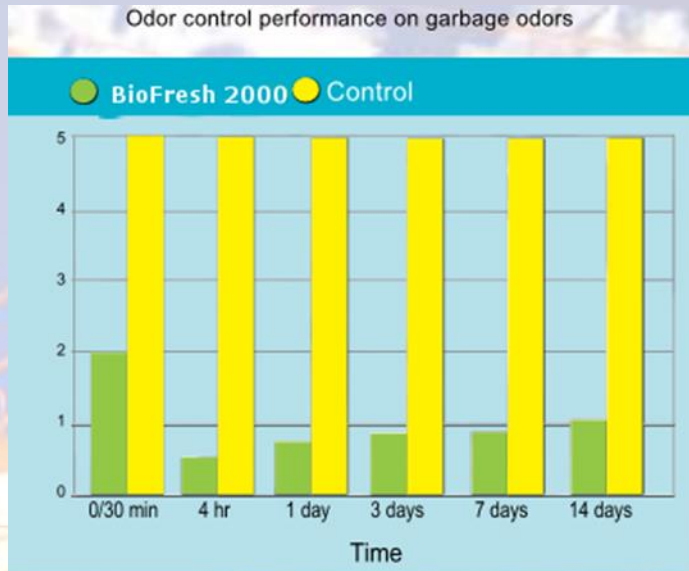


Fig. 1. Panel test results show that BioFresh 2000 provides immediate control of garbage malodors and continues to control the odors after 14 days.

Figure 2 shows the results of a test in which solutions of odorous compounds in individual test tubes with screw caps were combined with BioFresh 2000. After two hours the concentrations of the odorous compounds in the headspace of each test tube were measured compared to water using gas detection tubes.

Compound	Concentration (ppm)	% reduction vs Control
Hydrogen sulfide	8	92
Ammonia	525	46
Dimethylamine	309	46
Trimethylamine	390	49

Fig. 2. “BioFresh 2000” reduces several odorous compounds in solution after only two hours.



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Cat urine was applied to an absorbent material and stored at room temperature for one week. The ammonia concentration was measured in the headspace above the mixture. Figure 3 shows that “BioFresh 2000” controls odors associated with cat urine and continues to effectively control the odors after seven days.

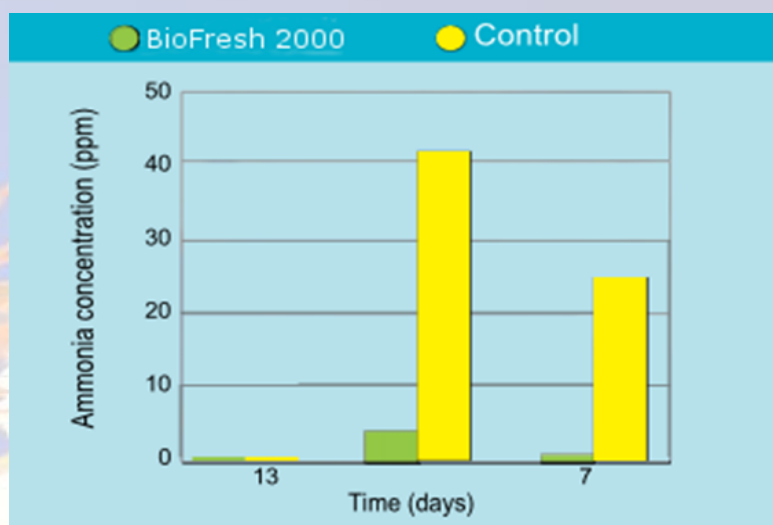


Fig. 3. “BioFresh 2000” controls cat urine odors and continues to control the odors after seven days.

BioFresh 2000 effectively controls a wide range of malodors such as cat urine, tobacco smoke, and butyric acid odors (perspiration and rancid malodors), as demonstrated in Figure 4.

The effectiveness of BioFresh 2000 on cat urine odors was tested using BioFresh 2000 added to aged cat Urine in a test tube. The treated solution was allowed to incubate for five days at room temperature with agitation.

Tobacco smoke odor was tested by exposing pieces of cotton fabric to cigarette smoke in a sealed plastic chamber. The fabric was removed and treated with BioFresh 2000 against a water control using a spray bottle, and then evaluated.

A similar panel test was performed using butyric acid. BioFresh 2000 was added to treat test tubes containing butyric acid solution while water was added in control tubes. The odor control capabilities of BioFresh 2000 were then evaluated.

In each test BioFresh 2000 demonstrates excellent odor control performance.



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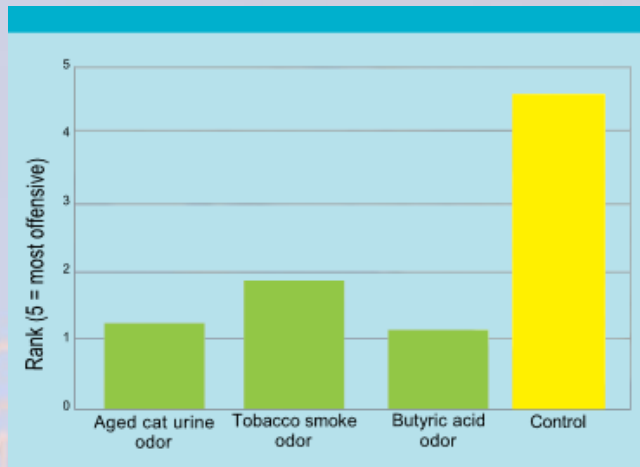


Fig. 4. BioFresh 2000 Free demonstrates effective control of cat urine, tobacco smoke, and butyric acid odors.

In this panel test (Fig. 5) “BioFresh 2000” performs comparably to a leading household brand and better than a leading institutional brand at controlling cat urine odors.

Comparative performance on cat urine odors

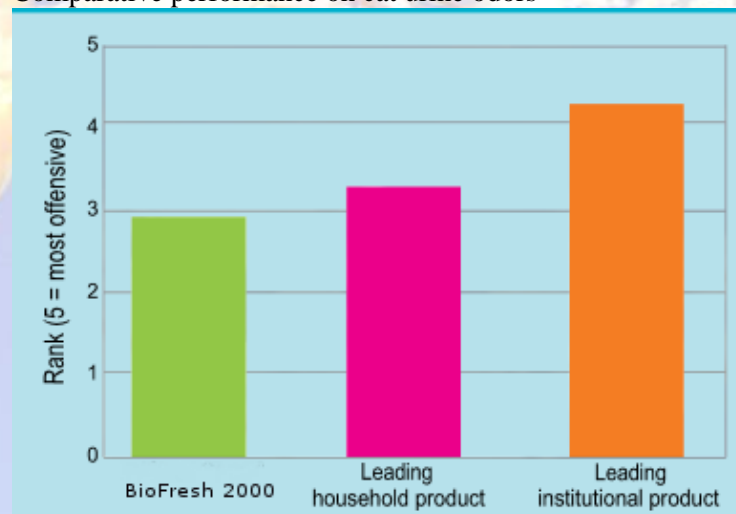


Fig. 5. “BioFresh2000” controls cat urine odors comparably to a leading household brand and better than a leading institutional brand.

Microbial performance of BioFresh 2000

The capability of the beneficial microorganisms in “BioFresh 2000” to degrade odorous molecules is demonstrated by microbial activity shown in Figure 6. “BioFresh 2000“ degrades two odorous molecules



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– 2-methylbutyric acid (cheese/fruity odor) and trimethylamine (fish odor, molecule similar to urine) – eliminating odors at their source.

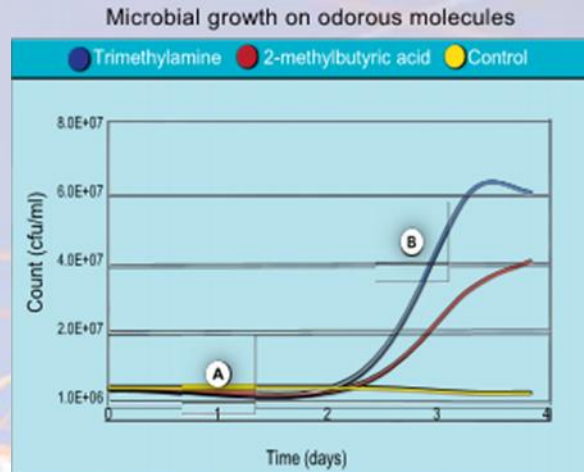


Fig. 6. BioFresh 2000 beneficial microorganism growth on two odorous molecules as the sole carbon source (2-methylbutyric acid and trimethylamine) after three days.

This growth is confirmed by microscopic observations (Fig. 7) showing spores prior to germination (A) and many vegetative microorganisms (B), proving the microbial activity of “BioFresh 2000” in the presence of these malodorous compounds.

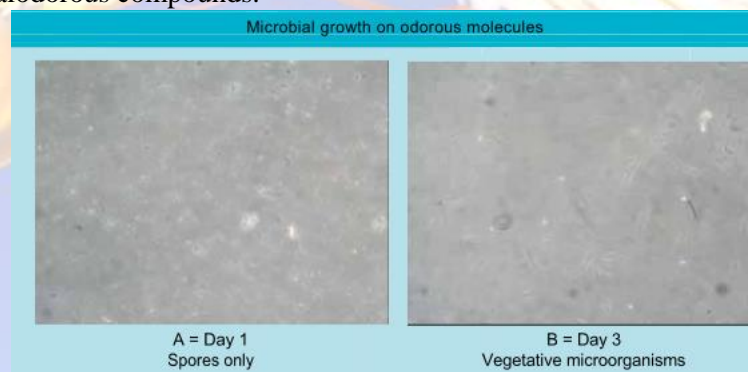


Fig. 7. Microscopic observation: BioFresh 2000 Free beneficial microorganism growth on two odorous molecules as the sole carbon source (2-methylbutyric acid and trimethylamine) after three days.

Odors associated with restrooms and garbage collection areas can be an embarrassing problem in many facilities and in the home. The ability of a beneficial microorganism in “BioFresh 2000” to degrade



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various odorous volatile fatty acids (VFA) such as acetic, propionic, butyric, and iso-valeric acids is demonstrated by oxygen consumption expressed as fluorescence (Fig. 8).

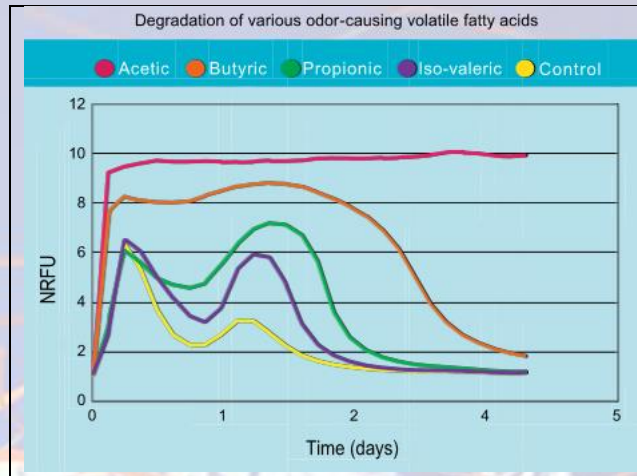


Fig. 8. The ability of a beneficial microorganism in BioFresh 2000 Free to degrade various fatty acids is demonstrated by oxygen consumption expressed as fluorescence. The results show that this microorganism can degrade the short-chain fatty acids such as acetic, propionic, butyric, and iso-valeric acids which are associated with malodors.

The beneficial microorganisms in “BioFresh 2000” provide long-lasting odor control by continuously degrading the organics that cause malodors. Figure 9 shows degradation of chocolate milk, an organic which can cause malodors if left untreated. Microorganisms in “BioFresh 2000” are able to germinate and grow on the chocolate milk. When the entire food source is consumed, sporulation is observed (A). When new food is added to the medium, a new growth phase is observed (B), and regermination occurs each time the odor-causing organic (chocolate milk) is added. “BioFresh 2000” provides long-lasting odor control by continuously eliminating the cause of the odor at its source.



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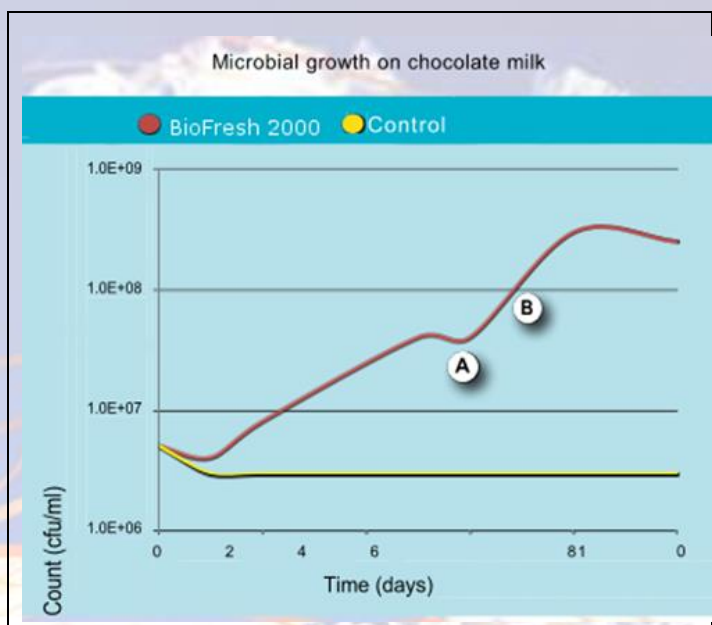


Fig. 9. The microorganisms in BioFresh 2000 consume the chocolate milk and become dormant (spores) when the organic has been degraded (A). Microbial action increases with the addition of new food at day 6 (B). This continuous degradation of organics removes the source of malodors, providing long-lasting odor control.

Recommended use directions

“BioFresh 2000” is a fully formulated concentrate that can be diluted to create a finished ready-to-use product. Prior to diluting, mix the contents of the container well. If possible, use the entire container to formulate the end product. Dilute 1 part BioFresh 2000 with approximately 9 parts your formulation, taking into account the volume of other components (surfactants, color, and fragrance).

Add BioFresh 2000 as the last ingredient in your formulation. Blend slowly for a minimum of 30 minutes to ensure proper spore dispersion in solution. Do not allow the product to stand without agitation during repackaging.

Diluted correctly, BioFresh 2000 provides sufficient preservation for the finished formulation provided that standard facility cleaning protocols are followed.



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“BioFresh 2000” ready-to-use is a liquid formulation that can be sprayed onto surfaces where odors are a problem. The liquid may be sprayed manually or with an automatic dosing or spraying system. Do not use BioFresh 2000 on food contact surfaces. Do not use as an atomizer.

Safety, handling, and storage

Safety, handling, and storage guidelines are provided with all products.

