clearing the air

BY KATHLYN SWANTKO

We dive into the confusing world of ANTI-MICROBIAL products to set the record straight on what they can and can't do.

The war against bacteria taking up residence in our clothing—let's call it the anti-microbial battle zone—has become the talk in the war rooms at a variety of apparel and gear companies selling to the outdoor, adventure and fitness markets. Anti-microbial anything is the current sweetheart among benefits. Great, but what does it mean? Among fabric technologies, few are as challenging to understand or are as confusing to compare as those lined up on the anti-microbial front—a group that just keeps growing.

"More than seven times as many anti-germ products were produced in 1998 than in 1992," Curtis White, director of R&D at AEGIS Environments (producer of AEGIS Microbe Shield technology), told GearTrends. "And consumers' demands for anti-microbial products have grown dramatically since 1998. This growth trend is global and continues today."

The confusion about anti-microbials comes not only from the number of products currently available, but also from the terminology used to describe them, the regulatory requirements involved, and comparisons based on the technical differences applied to fabric. Good golly, Miss Molly! What is a poor retailer or consumer to do when faced with comparing one product to what seems like a million others, all touted to reduce the stink and microbial nasties?

Help is on the way. GearTrends has jumped in the proverbial phone booth to save the day. We spent countless days and weeks asking experts a slew of questions to clear the air on anti-microbial confusion, then tried to sort out all the techie gobbledygook and jargon to help you make sense of it.

What's Out There

Ask almost anyone to name the major benefit associated with anti-microbial products and you'll likely hear they control the stink associated with sweat-generated bacteria during rigorous workouts and treks—blech. But that's not all. They also protect fabrics from musty mildew odors and deterioration that can occur while garments or gear are in storage, or even during transit from the manufacturer to the retailer.

You'll find anti-microbial products in numerous outdoor products and other activewear: socks, underwear, base-layer garments, in-soles, shoes, boots, gloves, backpacks and sleeping bags—and they're moving into other fabric applications. Companies that have developed popular anti-microbial products for fabrics include Aegis Environmental Management, Avecia, Clariant, Microban Products, Milliken, Rhom and Haas, Sanitized, Thomson-Research and X-Static.

How The Heck Do They Work?!

Malodorous conditions seem to be the biggest bane for many. It is not just the presence of micro-organisms that causes the odor. According to Joey Faulk, anti-microbial sales leader for Milliken's Alphasan product (the anti-microbial agent used in Milliken's VISA Endurance, as well as other branded products), it's the byproduct of these micro-organisms that cause the *pee-yew*.

"Anti-microbial products work by inhibiting and preventing the microbial population from growing, and preventing their normal life processes," Faulk said. "Therefore, the anti-microbial products prevent the increase of the microbial waste products, which is the key source of odor in garments. They essentially attack what's causing the odor in the first place—the bacteria." In other words, anti-microbial products prevent your garments from becoming a microbe's outhouse.

In general, there are two basic types of anti-microbial products: Those that use chemical technologies that are migratory, allowing the anti-microbial agents to move from the surface on which they are applied; and those that rely on non-migratory technologies, which use agents to permanently bond the treatment to the fabric's surface.

All of the anti-microbial products used in fabrics essentially use chemical technologies, according to White of AEGIS. And, since most of the chemical products are water soluble to one degree or another, the treatment could gradually disappear after numerous wearings and washings—assuming the items do, in fact, get laundered. However, companies have taken steps to slow and limit the leaching potential in most products, resulting in the treatment essentially lasting the useful life of the garment.

"Some companies incorporate leaching technologies into fibers, which slow the release rate or the leaching action, others use micro-encapsulation, chemical binders or engineer their active ingredients to have very low water solubility," White explained. "All of these products are designed to work at levels that are still anti-microbial and durable for the intended end-use and demands of the customer."

No matter how anti-microbials are used in a fiber, they all function the same. In most cases, slow leaching anti-microbial technologies create a "zone of inhibition" (ZOI). As the anti-microbial chemistry leaches from the fabric—usually as it's need-

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ed to do battle—it inhibits the growth of the micro-organism by chemically entering or reacting with the micro-organism.

The AEGIS anti-microbial is an example of a non-migratory anti-microbial. The active ingredient in AEGIS Microbe Shield technology forms a colorless, odorless, positively charged polymer, which chemically bonds to the treated surface. When a micro-organism comes in contact with the treated surface of the fabric, the Microbe Shield acts like a "sword" and punctures the cell membrane (touché!), which electronically shocks and kills the cell—ouch! Since nothing is transferred to the now dead cell, the anti-microbial doesn't lose strength, and the "sword" is ready for the next cell to contact it.

Companies like Odor-Eaters, Dr. Scholl's, Burlington Brand, Spalding, Wilson and others use the AEGIS Microbe Shield technology in socks. Microbe Shield is also used by Asics, Hanes and New Balance in running shoes and in Burton snowboard boots. Others, in the U.S. and global markets, including Asics, DeFeet and Ex Officio, use the treatment in underwear, running gear and adventure wear.

A Sliver Of Silver

In recent years, silver has become one of the most popular types of anti-microbial products in the marketplace, and is used in Unifi's A.M.Y., Milliken's Alphasan and Noble Fiber Technologies' X-Static.

For Derek Gunn, Unifi's product development manager, silver ions are where it's at: "Our story is all about the garment, because that's where the protection is, and that's where it stays. We produce our product by encapsulating silver ions in the form or an inorganic matrix into our polyester yarns during the fiber extrusion process. This matrix slowly releases silver ions through an ion-exchange mechanism. Though the release is slow, it is fast enough to maintain an effective concentration at, or near, the surface of the material. These same silver ions penetrate the cellular walls of certain micro-organisms and disrupt the energy-producing processes with the cells. This leads to the demise of the micro-organism before there is a chance at proliferation." Unifi's A.M.Y. is used in a new base-layer application from Marmot.

Faulk of Milliken stressed the effectiveness of silver to keep the garment battling bacteria for its lifetime: "When the silver ions are impregnated into the textile fibers via the extrusion process, you actually end up with a fully incorporated anti-microbial in the final material," he said. "Therefore, it doesn't boil off or flash off. It doesn't leach or migrate. So, the product is incorporated into the garment, and stays with the garment, to protect the garment over time." Milliken's Alphasan product is used in Milliken's VISA Endurance, as well as DAK Americas' SteriPurAM polyester fiber, and other branded end-use products.

Noble Fiber's X-Static touts the use of pure silver technology as a product that delivers multiple solutions to the textile/apparel market. You find it in products used by adidas, Fox River, Medalist Performance Sports Apparel, Pearl Izumi, Puma, Salomon, Spyder and Umbro.

"We use the natural anti-microbial of X-Static silver-coated nylon," said Greg Cummings of Fox River. "The nylon fiber is bonded to the pure silver in a permanent intimate blend so that it never washes off or wears off. In fact, X-Static's anti-microbial abilities are enhanced with moisture. So, the more sweat, the better it works. The X-Static provides a natural anti-microbial that keeps feet odor-free. The advantages of X-Static are odor control, durability and the benefit of other high-performance features like thermo-regulation and anti-static qualities."

Scott Blessing, president of Medalist Performance Sports Apparel, is also part of the silver fan club.

"The key thing about silver technology is that it is not only an effective anti-microbial against odor, but it also has the heat reflective component, which is really more important to the winter market than odor control is," Blessing said. "The No. 1 thing that consumers desire in cold temperatures is to be warm and comfortable. And X-Static is the warmest solution available for a base-layer product to wear next to your skin, and it's also anti-static. So, X-Static is not a single platform technology, it's multi-dimensional."

Blessing also points to the various endorsements that X-Static has received over the years as proof of the products' qualities. Even the military uses X-Static; it's been through Level 3 Department of Defense laboratory testing, and NASA has endorsed it.

Test It Out

Laboratory tests are one thing, and they are commonplace to give a company a quick, reproducible indication of real-life activity. But real-life testing can of course only truly happen in, well, real life, according to AEGIS's White.

"Real-life tests can include wear trials, odor panel studies, weathering and other end-use applications," he explained. "To perform these types of tests on every anti-microbial product is impractical, expensive and, in some cases, impossible due to the number of samples needed to be statistically significant in bringing a product to the marketplace in a reasonable amount of time. Laboratory tests have been designed to give the highest degree of confidence to the end-user that their treated article will perform as indicated on the product registrations and listings."

Safety And Regulatory Issues

Set your worries aside: Those products that may have been safety risks to people and the environment don't generally exist in the market anymore, White said. And, these days, all anti-microbial products are required to be registered with and regulated by the EPA—sometimes even by the FDA.

Still, should end-users be concerned over the fact that these chemical-based products are chemical pesticides? Are they really safe? White stated that currently no anti-microbial companies have reported any major health issues. Since money talks—they are being bought and sold—it seems consumers and retailers are now comfortable with the safety issues.

One issue remains, however: Although mechanisms have been added to migrating anti-microbials to slow the leaching properties, White said these products can of course still make contact with skin. If someone is particularly sensitive, rashes and other irritations can develop.

"The key to the use of any anti-microbial is to be sure that it is used within its EPA registration and with all of the care and quality-assurance testing used for any other performance textile treatment," he said.

Companies like Fox River, Medalist Performance Sports Apparel, Milliken and Unifi stress the safety of silver-based products, because of their long-time use in our everyday lives.

"Silver is a natural material," Milliken's Faulk said. "It's been known as an effective anti-microbial for a very long time. People use silverware for serving food. When we were first born, silver nitrate drops were put into our eyes for protection. You can actually buy colloidal silver over-the-counter at vitamin and nutrition stores. So, silver is a very safe material for humans."

Your Bottom Line

But how does this all help the bottom line? Even if all the technical lingo, terms and explanations seem confusing—we are after all talking about the worlds of chemistry, microbiology, scientific testing and governmental regulation—it's invaluable to try to wade through them and find a small understanding to be able to better educate customers.

But any product must also be able to sell itself by using good packaging, by finding best retail positioning and, perhaps most

importantly, by educating sales associates.

"Numerous retail buyers have stated that anti-microbial products are quickly moving to a standard requirement for the products they buy. As manufacturers look to enhance the value of their products, they should recognize anti-microbial products as the 'feature with a future,'" said White of AEGIS.

Common, yes, and increasingly more so, but anti-microbial does not necessarily get "top billing" of features and benefits. Generally, these products are still being sold as having a simple additional value, especially with performance fabrics, and are earmarked as such just with the words "anti-microbial" or "anti-bacterial" on the label or package. One value to consider for adventure travelers, backpackers or others who want to cut down weight by limiting numbers of items packed is, however, the value of anti-microbial. Less stink and fewer bacteria mean more comfortable multiple uses after simple quick rinses.

This means the education of the sales associate is particularly important. In this case, the benefits of the anti-microbial should be used to provide more selling points for the product for this particular customer's needs. The advantages of the product should be touted by sales associates and appear on the packaging. Ex Officio's underwear packaging says it simply: "17 Countries. 6 Weeks. And One Pair of Underwear." MoSox's tagline quips: "The Official No Stink Socks." (MoSox uses Sterling Fiber's Biofresh anti-microbial product.)

Manufacturers told us consumers will notice the benefits of the anti-microbial treated garment, even if the activity and time of wear is limited. But, of course, the improvement will be experienced greater in more rigorous and extended wear situations.

"What we have heard about the odor protection feature of X-Static socks is that it is most noticeable when people use the sock day after day without washing, such as on a multi-day trek," said Fox River's Jenni Dow. "We've even had folks tell us their boots smelled better, too. It's the residual effect of wearing X-Static socks in the boots—the anti-microbial benefits of silver begin working on the bacteria in the boot's lining."

"The benefits that a person would notice are less odor and less microbial degradation," said Faulk about Milliken's Alphasan. "The more demanding the end-use product receives, the more dramatic the effect. Intense applications, such as extended-wear garments create more microbial growth, so the difference between treated and untreated is much larger. For this reason, rigorous applications may notice more of an anti-microbial benefit." »