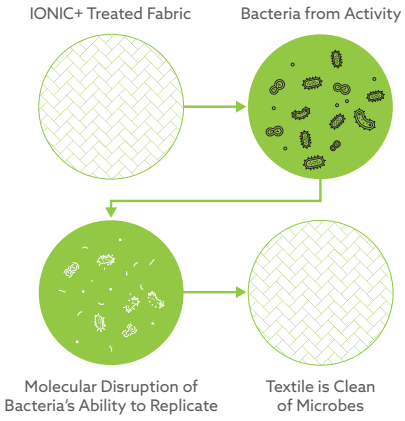
IONIC+® BOTANICAL ANTIMICROBIAL

NATURALLY SELF-CLEANING ANTIMICROBIAL FABRIC

ionic+®
Botanical Antimicrobial

THE SCIENCE OF PLANTS

The active ingredient in IONIC+® Botanical Antimicrobial - citric acid - has been used to inhibit bacterial and microbial growth, prevent infection, and promote human health since the late 18th century. The application and science of citric acid is widespread and it has been integrated into products across a broad range of industries: food, medicine, cosmetics, soaps, detergents, and more.



When applied properly, our proprietary citric-based formula changes the pH value on the fabric. The combination of citric acid, IONIC+® ingredients, and oxygen participates in an exchange that inhibits bacterial growth, disrupting cell division and replication, leaving the fabric clean of microbes.

THE MOST ADVANCED ANTIMICROBIAL SYSTEM ON THE MARKET

We are NOBLE - the global leader in fiber science. Our smart technologies are developed to power products that solve real problems; protecting, saving, healing, and improving lives. We consider this **The Noble Advantage**.

For more than 25 years, NOBLE has pioneered antimicrobial technologies in textiles. We deliver high performance products that contribute to a more sustainable, healthy environment.

IONIC+® ANTIMICROBIAL ADVANTAGE™

IONIC+® technology offers a wide range of antimicrobial technologies that protect against the growth of microbes on fabric for clothing, footwear, bedding, luggage, furniture, medical wound care products, and other soft surface applications.

IONIC+® DURABLE ANTIMICROBIAL: TOPICAL
Citric-based surface treatment bonds directly to fabric

BENEFITS

- Revolutionary citric-based antimicrobial technology
- Tested and proven EPA Registered Formula, Oeko-Tex Standard 100
- Renewably sourced: made with citric acid
- Fights microbes that accumulate on fabric
- Eliminates odor-causing bacteria on fabric
- Fewer washes to conserve energy, water, and natural resources
- Reduces fabric degradation over time
- Naturally self-cleaning botanical antimicrobial

- Applying the treatment at the finishing stage allows for flexibility in production and application (fabric style, color, weight, volume, etc.).
- Meets or exceeds state-of-market performance and has achieved a 50x wash durability rating

*Pending EPA Registration Approval

MARKET SEGMENT: APPAREL/FOOTWEAR/HOME/LIFESTYLE

DELIVER A LIFESTYLE WITH CONFIDENCE BUILT IN.

Humans can distinguish at least 1 trillion odors. When bacteria and their resulting odors are eliminated from fabric by a self-cleaning mechanism, life is more convenient. Clothing and other soft material items stay fresher longer, and extended cleaning intervals mean less work and more time for the important things in life.

Humans produce two kinds of sweat. Eccrine is the watery, salty, neutral-smelling sweat found on the skin all the time. Apocrine sweat is a thick, oily fluid made up of fatty compounds. Both are produced from the glands and neither stinks on its own. Microbes on the skin eat the apocrine compounds and produce the molecular waste that creates odors and stains. IONIC+® antimicrobial treatments make clothing, bedding, footwear, and accessories inhospitable to microbes, mitigating the impact of odors, stains, and degradation.

MARKET SEGMENT: HEALTHCARE

ADDED CARE OF FABRIC SCIENCE FOR PATIENTS AND PRACTITIONERS.

When used in bedding and patient/staff apparel, IONIC+ eliminates odor, resists stains, and is comfortable against the skin. Its self-cleaning nature requires no behavior modification to ensure efficacy.

Numerous studies show that fabrics in healthcare settings quickly become contaminated with microbes while in use. Adding IONIC+® antimicrobial properties to fabrics limits the bioburden on the surface.

MARKET SEGMENT: HOSPITALITY/TRANSPORTATION/FURNITURE

WORRY-FREE WANDERING. SAFETY IN SOFT SURFACES.

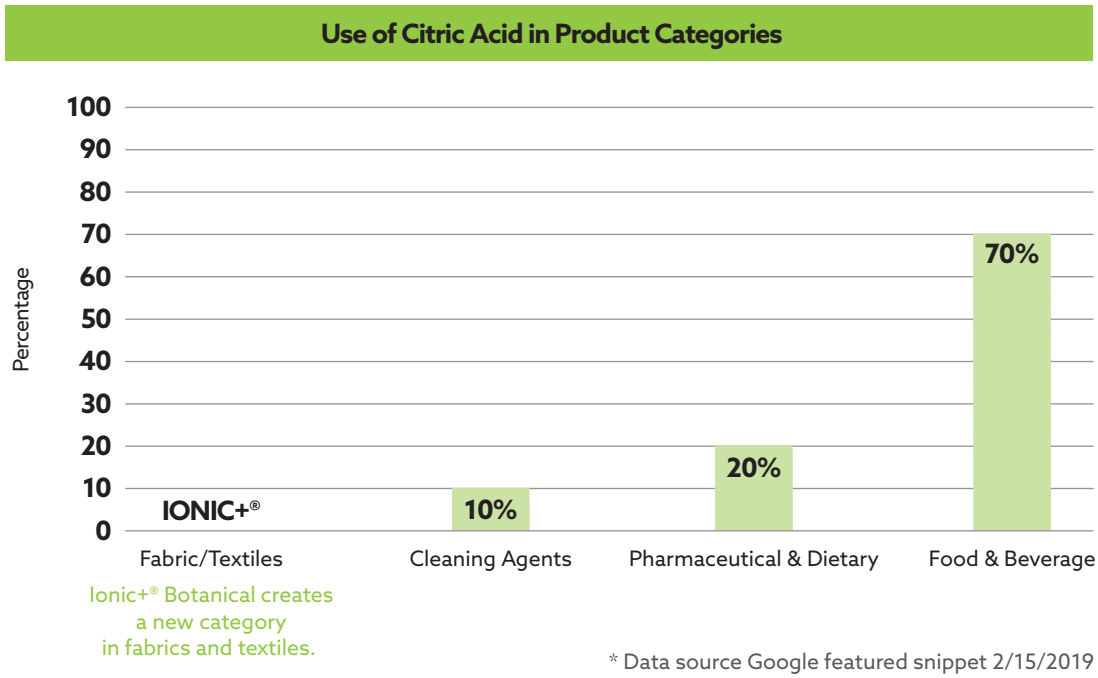
People will always travel, commute, and move about the world. Now, more than ever, they understand that soft surfaces can build up bacteria. Added to the fabric, IONIC+® technology acts methodically to clean microbes from these surfaces, from train seats to baby seats, while the world turns at a rapid pace.

Microbes are everywhere. In our global society, where borders are not boundaries, transmission of these microbes expands exponentially. Using antimicrobial materials in the creation of products like luggage, hospitality areas, and mass transit seating, is a proactive step forward in preventing bacteria from building up on these soft surfaces.

BETTER PRACTICES AND RENEWABLE RESOURCES

A SUSTAINABLE CHOICE WITH A COMMON PLACE

The characteristics of citric acid make it an important additive for a variety of industries. Food and beverages use an estimated 70% of manufactured citric acid, pharmaceutical and dietary supplements use 20%, and the remaining 10% goes into cleaning agents.*



Ionic+® Botanical creates a new category in fabrics and textiles.

* Data source Google featured snippet 2/15/2019

SUSTAINABLE BENEFITS

SAVE ENERGY AND USE LESS WATER
As IONIC+® antimicrobial technology inhibits odor-causing bacterial growth in apparel, towels, and bedding so it can be laundered less frequently.

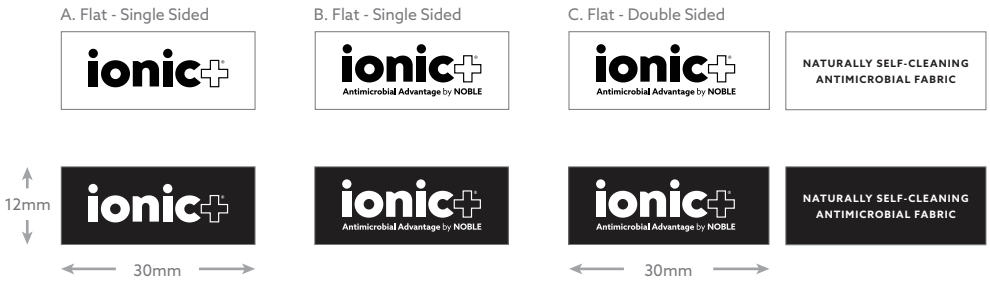
INVEST IN RENEWABLE DURABILITY
IONIC+® Botanical technologies are biobased treatments that bind to fabrics, ensuring functionality for up to 50x washes, double the market standard of topical treatments.

STAY WITH WHAT YOU KNOW
To combat microbes on fabric, IONIC+® Botanical uses citric acid, one of the most common ingredients found in everyday items like food and cleaning products.

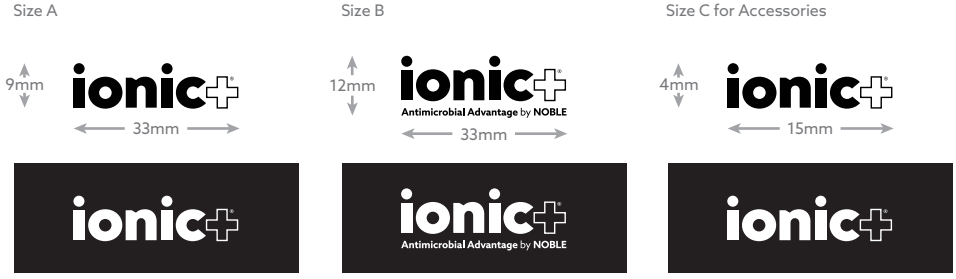
IONIC+® BRAND SUPPORT FOR ALL END USE PRODUCTS*

HANGTAGS One universal, multilingual tag for all products in all sizes, printed on 100% recycled paper

PRINTED FABRIC LABELS A universal label: three styles, positive and reverse designs



HEAT TRANSFERS A universal emblem: three styles, positive and reverse designs



* Additional languages for Asia available upon request. Brand support is complimentary on orders that are placed 60 days before in-hand date.

NOBLE REGULATORY AND AFFILIATIONS

US FOOD & DRUG ADMINISTRATION
510(k) Medical Device Clearances

EUROPEAN COMMUNITY CERTIFICATION
Used in Customer-Cleared Class 1, 2 and 3 Medical Devices

US ENVIRONMENTAL PROTECTION AGENCY
Antimicrobial Registrations

OEKO-TEX®
Standard 100 Certification

BLUESIGN
System Partner

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NOBLE Biomaterials is a global leader in antimicrobial and conductivity solutions for soft-surface applications. The company produces advanced material technologies designed for mission-critical applications in the performance apparel, healthcare, industrial, and emerging wearable technology markets. Its flagship brands, X-STATIC®, IONIC+®, and CIRCUITEX®, are used by world-class licensees to provide odor elimination, infection prevention/management, biometric monitoring, and conductive protection benefits. Our headquarters and manufacturing facilities are located in Scranton, Pennsylvania, and we have a network of offices across Asia, and South America. Visit our website to learn more.

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