

TroyCare™

A Beautiful Beginning...



TROY

The Gold Standard for Performance

2021
Global

Troy Personal Care Product Selection Guide



Troy preservatives are engineered for compatibility and superior antimicrobial protection

A World of Experience

Troy Corporation is a world leader in environmentally friendly antimicrobials and performance additives for a broad range of markets and industries. In addition to Personal Care (PC) and Household, Industrial, & Institutional (HI&I) markets, Troy is the technology and service leader in paints & coatings, adhesives & sealants, plastics, and many other industries. Troy brings a long history of innovation, with sound and responsible environmental, community, and corporate stewardship. Troy provides unique solutions that have been improving products for over 60 years.

Preservation Technology

Troy is known globally as *The Gold Standard for Performance*, offering the highest levels of preservative protection in the industry. TroyCare™ preservatives deliver the protection PC manufacturers and consumers demand. Beyond extremely cost-effective product preservation, TroyCare preservatives also deliver unique performance attributes that set the products apart in the market.

Health & Safety Advantages

The need for preservatives that are safer to use is stronger than ever. Troy preservative technology is safe to use and environmentally sustainable, while offering optimum efficacy against a full scope of microorganisms.



Preservative Selection Guide

This selection guide is designed to match TroyCare™ products with the most common application areas. Please contact a Troy representative for any application or requirement not covered.

Milder and multifunctional preservative solutions

Product Name	Use	INCI Name	Active Content (wt. %)	EINECS No.	CAS No.	Use Levels (wt. %)
 TroyCare™ LSB1	Broad-Spectrum	Levulinic Acid	80	204-649-2	123-76-2	0.4 - 1.0
		Sorbic Acid	5	203-768-7	110-44-1	
		Benzoic Acid	15	200-618-2	65-85-0	
TroyCare™ PE73	Broad-Spectrum	Phenoxyethanol Ethylhexylglycerin	70 30	204-589-7 408-080-2	122-99-6 70445-33-9	0.4 - 0.8
TroyCare™ PE82	Broad-Spectrum	Phenoxyethanol Ethylhexylglycerin	85 15	204-589-7 408-080-2	122-99-6 70445-33-9	0.5 - 0.9
TroyCare™ PE91⁺	Broad-Spectrum	Phenoxyethanol Ethylhexylglycerin	90 10	204-589-7 408-080-2	122-99-6 70445-33-9	0.5 - 0.9
TroyCare™ EPP19⁺	Broad-Spectrum	Ethylhexylglycerin Phenylpropanol	10 90	408-080-2 204-587-6	70445-33-9 122-97-4	0.5 - 0.9
TroyCare™ EPP28	Broad-Spectrum	Ethylhexylglycerin Phenylpropanol	15 85	408-080-2 204-587-6	70445-33-9 122-97-4	0.5 - 0.9
TroyCare™ EPP37	Broad-Spectrum	Ethylhexylglycerin Phenylpropanol	30 70	408-080-2 204-587-6	70445-33-9 122-97-4	0.4 - 0.8

⁺ This product is not available in all regions. Please contact your Troy representative for details.

Customized Preservative Solutions

Increasing regulations and heightened customer awareness continue to restrict the use of many traditional personal care preservatives. While preservative suppliers have introduced numerous milder and 'greener' alternatives, these often require higher use levels which can cost significantly more and create formulation challenges.

More than ever, the need for customized preservative solutions is becoming clear. Troy is at the forefront of this next wave of innovation. TroyCare™ Customized Preservative Solutions can be optimized for specific formulations or formulation types. Preservation costs can be decreased while reducing or eliminating formulating challenges. Every formulation is unique. Use the preservative that is optimized for your formulation.

Effective pH Range	Description	Suggested for Protecting			Product Name
		Rinse-Off Products	Leave-On Products	Wipes	
2 - 6	COSMOS Approved. Clear, low color, odorless solution. Broad-spectrum control with a completely organic acid system. Readily soluble in most systems at use levels. Patent Pending.	✓	✓	✓	TroyCare™ LSB1
3 - 12	This clear, broad-spectrum preservative is optimized to protect leave-on personal care products. It is readily soluble in most systems at use levels.		✓	✓	TroyCare™ PE73
3 - 12	This clear, broad-spectrum preservative is designed to protect a wide-range of personal care products. It is readily soluble in most systems at use levels.	✓		✓	TroyCare™ PE82
3 - 12	This clear, broad-spectrum preservative is designed to protect a wide-range of personal care products. It is readily soluble in most systems at use levels.	✓		✓	TroyCare™ PE91
3 - 12	This clear, multifunctional solution provides mild fragrance and skin softening emolliency. Additionally, it provides broad-spectrum protection for a wide-range of personal care products.	✓		✓	TroyCare™ EPP19
3 - 12	This clear, multifunctional solution provides mild fragrance and skin softening emolliency. Additionally, it provides broad-spectrum protection to a wide-range of personal care products. It is readily soluble in most systems at use levels.	✓		✓	TroyCare™ EPP28
3 - 12	This clear, multifunctional solution provides mild fragrance and skin softening emolliency. Additionally, it provides broad-spectrum protection, optimized for leave-on personal care products. It is readily soluble in most systems at use levels.		✓	✓	TroyCare™ EPP37



TroyCare™ Customized Preservative Solutions Cover the Spectrum of Product Preservation

Shampoos & Conditioners,
Hand Soaps, Body Washes

Wet Wipes, Sunscreens,
Creams & Lotions, Color Cosmetics

More Antibacterial ← → **More Antifungal**

TroyCare™ EPP19 / EPP28

TroyCare™ PE91 / PE82

TroyCare™ FE01

TroyCare™ EPP37

TroyCare™ PE73

TroyCare™ FE02

IPBC based preservative solutions

Product Name	Use	INCI Name	Active Content (wt. %)	EINECS No.	CAS No.	Typical Use Levels (wt. %)
TroyCare™ ID10	Broad-Spectrum	DMDM Hydantoin Iodopropynyl Butylcarbamate	26 2.9	229-222-8 259-627-5	6440-58-0 55406-53-6	0.2 - 0.4
TroyCare™ ID25	Broad-Spectrum	DMDM Hydantoin Iodopropynyl Butylcarbamate	37 1.6	229-222-8 259-627-5	6440-58-0 55406-53-6	0.3 - 0.5
TroyCare™ FE01	Broad-Spectrum	Iodopropynyl Butylcarbamate Phenoxyethanol	1 99	259-627-5 204-589-7	55406-53-6 122-99-6	0.4 - 1.0
TroyCare™ FE02	Broad-Spectrum	Iodopropynyl Butylcarbamate Phenoxyethanol	2 98	259-627-5 204-589-7	55406-53-6 122-99-6	0.4 - 1.0
TroyCare™ FP06	Antifungal	Iodopropynyl Butylcarbamate	6	259-627-5	55406-53-6	0.1 - 0.20
TroyCare™ FL10	Antifungal	Iodopropynyl Butylcarbamate	10	259-627-5	55406-53-6	0.01 - 0.10

Additional antimicrobial solutions

Product Name	Use	INCI Name	Active Content (wt. %)	EINECS No.	CAS No.	Typical Use Levels (wt. %)
TroyCare™ BC04	Broad-Spectrum	Methylchloroisothiazolinone Methylisothiazolinone	1.5	247-500-7 220-239-6	26172-55-4 2682-20-4	0.05 - 0.10
TroyCare™ BD55	Antibacterial	DMDM Hydantoin	55	229-222-8	6440-58-0	0.10 - 0.30



Effective pH Range	Description	Suggested Applications			Product Name
		Rinse-Off Products	Leave-On Products	Wipes	
3.5-10	Clear, colorless aqueous solution. Broad-spectrum control optimized for systems requiring balanced bactericidal & fungicidal protection. Completely water-soluble	✓	✓	✓	TroyCare™ ID10
3.5-10	Clear, colorless aqueous solution. Broad-spectrum control optimized for systems requiring greater bactericidal protection. Completely water-soluble	✓			TroyCare™ ID25
4 - 9	Clear solution. Broad-spectrum control optimized for systems requiring balanced bactericidal & fungicidal protection. Readily soluble in aqueous systems at use levels	✓	✓		TroyCare™ FE01
4 - 9	Clear solution. Broad-spectrum control optimized for systems requiring greater fungicidal protection. Readily soluble in aqueous systems at use levels		✓	✓	TroyCare™ FE02
3.5 - 10	Clear, colorless solution. Completely water-soluble. Ideal for highly aqueous or clear formulations. Patent #5906981	✓	✓	✓	TroyCare™ FP06
4 - 9	Clear PEG solution. Readily soluble in aqueous systems containing polar organics. The most cost-effective fungicide	✓	✓	✓	TroyCare™ FL10

Effective pH Range	Description	Suggested Applications			Product Name
		Rinse-Off Products	Leave-On Products	Wipes	
2 - 8	Clear, aqueous solution. Completely water-soluble. Stabilized with magnesium nitrate.	✓			TroyCare™ BC04
3 - 10	Clear, colorless aqueous solution. Completely water-soluble.	✓	✓	✓	TroyCare™ BD55



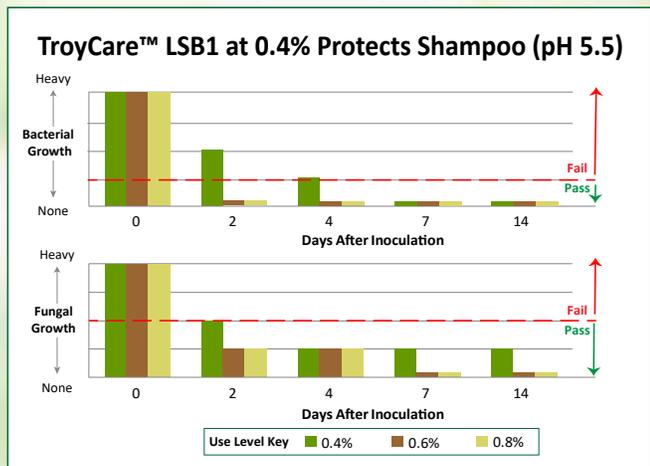
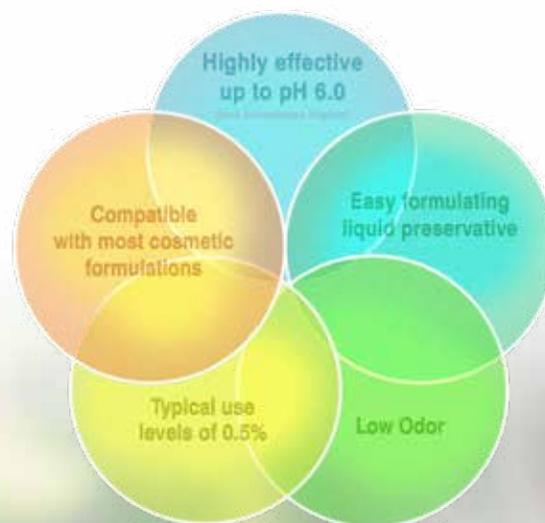
TroyCare™ LSB1



The Natural Choice for Antimicrobial Protection

TroyCare LSB1 natural preservative is an organic acid based product incorporating naturally sourced and natural-identical ingredients with consumer friendly INCI listings. TroyCare LSB1 offers superior broad-spectrum efficacy compared with other natural preservatives, as well as performance at lower use levels for exceptionally low cost-in-use. Additionally, TroyCare LSB1 is effective over a wider system pH range than other natural preservatives, offering greater compatibility in a broad range of personal care and cosmetic formulations. The graph below illustrates the performance of TroyCare LSB1 in shampoo. As the results show, TroyCare LSB1 is effective against bacteria and fungi in this formulation at use levels as low as 0.4%, which translates into very low cost-in-use. Furthermore, efficacy in a pH 5.5 formulation is a distinct advantage for TroyCare LSB1, as most other natural preservatives fail to offer protection at pH levels this high.

TroyCare™ LSB1 has proven to be a sustainable preservative that fits today's consumer trends while still delivering excellent performance and cost efficiency. In fact, TroyCare™ LSB1 received COSMOS Natural certification by Ecocert, indicating that the preservative is suitable for use by the most eco-conscious formulators around the world.



IPBC in Personal Care

Naturally Derived Preservation

Invented by Troy Corporation, IPBC (iodopropynyl butylcarbamate) is a globally approved preservative system that offers safe handling attributes and is readily biodegradable. While IPBC is a synthetic preservative, its major component, iodine, is a naturally occurring element found in a variety of sources, including seaweed, sea salt, and even soil deposits. 45% of the IPBC molecule, by weight, derives from these natural sources.

Regulatory Discussion

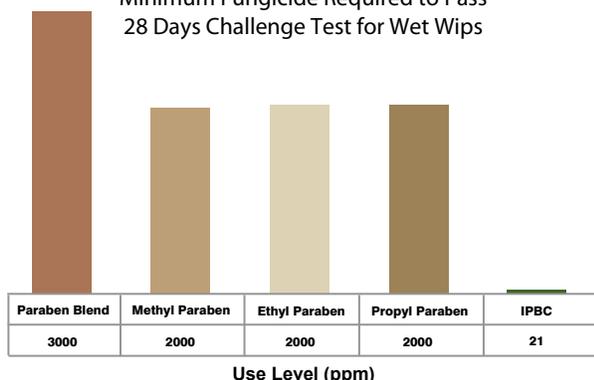
IPBC has been used widely and safely to protect cosmetics and personal care products for over 30 years. In recent years, the use of IPBC in cosmetics and personal care products in the European Union (EU) has been subject to restrictions under the Cosmetics Directive (see Table 1). The restrictions were implemented due to concerns for people in Nordic countries whose diet contains high levels of iodine. The EU placed limits on IPBC concentrations in rinse-off and leave-on products, and prohibited IPBC use in oral

care and all-over, leave-on products, as well as leave-on products intended for children under the age of three. The EU's IPBC restrictions, however, *are not based on sensitization, irritation, or other adverse health effects*. Many regulatory bodies worldwide, including the USA and Japan, allow broader use of IPBC and permit higher use levels. IPBC remains one of the safest preservatives for use in cosmetics and personal care products.



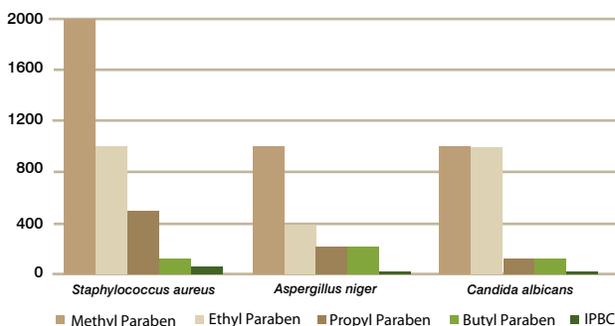
More than a Parabens Replacement... A Performance & Cost-in-Use Upgrade

Minimum Fungicide Required to Pass 28 Days Challenge Test for Wet Wipes



Preservative	Min. Use Level (ppm)	Cost-in-Use (\$/kg)
IPBC	21	\$0.004/kg
Paraben Blends	3000	\$0.01/kg

IPBC MIC Levels Significantly Lower than Typical Parabens



TroyCare™ IPBC antifungal solutions offer performance, cost-efficiency, and consumer perception advantages over parabens.

- Long history of safe use in personal care and cosmetics
- Proven longer-term protection & lower dose rates than parabens

The Troy Advantage

Technical Service

Representatives can provide formulation assistance, product evaluation, and microbiological & analytical testing to assist you in developing an optimum formulation that meets your profitability objectives.

Regulatory Support

Regulatory support is offered globally with regional and national expertise to meet your needs. Experts can assist you in determining where products can be sold, and what use levels are acceptable.

A Global Supply Network

A global supply network is in place to ensure product availability and fast delivery. Contact your local representative to ensure the product you need is available when you need it.



Call your nearest Troy representative for immediate assistance or visit us online at www.troycorp.com. When visiting the website, become a registered user to obtain access to a wide range of resources.

TroyCare™ Preservatives

INCI Name	Comments
Iodopropynyl Butylcarbamate (IPBC)	<p>European Union Cosmetics Directive Annex V, Part I Maximum concentration:</p> <ul style="list-style-type: none"> • 0.02% in rinse-off products • 0.01% in leave-on products • 0.0075% in deodorant/antiperspirant products. <p>Not to be used for oral hygiene, lip-care, or all-over lotion. Not to be used in products intended for children under 3 years of age, with the exception of rinse-off products Source: European Commission Cosmetics Directive 76/768/EEC</p> <p>USA Maximum concentration: 0.1% in all rinse-off and leave-on applications</p> <p>Japan Maximum concentration: 0.02% in all rinse-off and leave-on applications</p>
Phenoxyethanol	Maximum concentration: 5% in USA, 1% Rest of World
DMDM Hydantoin	Maximum concentration: 0.6% established by SCCS
Methylchloroisothiazolinone/ Methylisothiazolinone	0.0015% (15 ppm) in rinse-off products (global) 0.00075% (7.5 ppm) in leave-on products (USA) Restricted from use in leave-on products (EU / ASEAN)

B-F Indicator™ Dip Slides



B-F Indicator Dip Slides are practical tools for determining the presence of harmful microorganisms common to manufacturing environments. Left unchecked, these microorganisms can negatively affect the properties, performance, and overall quality of finished products and shorten expected shelf-life. Most importantly, monitoring product quality significantly reduces the likelihood that consumers will come in contact with harmful microorganisms. B-F Indicator Dip Slides help indicate the presence and type of destructive microorganisms and offer a simple means for estimating microbe population density.

By comparing the microbial warning signs visible on the B-F Indicator Dip Slides to illustrations on the Microbial Comparison Chart supplied with each kit, plant personnel can instantly gauge the type and relative level of microbial contamination. The level of microbial contamination is necessary for plant managers to determine the need for corrective action and the method.

Applications

B-F Indicator Dip Slides are excellent tools for monitoring microbial contamination in home and personal care applications. The kits indicate the presence, type, and extent of destructive microbes in aqueous-based products and are useful for testing raw materials, intermediates, finished products, and storage vessels at various stations throughout the manufacturing process.

- Raw Material Quality Check
- Intermediate Quality Check
- Process Trouble Shooting
- Process Water Monitoring
- Environmental Monitoring
- Final Product QC (Quick)





The Gold Standard for Performance

Services

As a Performance Partner, Troy offers a variety of services to support our product line of preservatives and additives to meet customer needs and provide market solutions.

Troy invites you to take advantage of the Troy services that can help you achieve your market objectives.

- Technical Service representatives can provide formulation assistance, product evaluation, and microbiological, analytical, and field testing to assist you in developing an optimum formulation that meets your product objective.
- Regulatory support is offered globally with regional and national expertise to meet your needs.
- R&D scientists work to anticipate future industry needs and develop innovative technology. Contact your Troy representative to discuss your unique requirement that may not be met by materials currently on the market. In fact, Troy may have just what you need already under development and if not, may be able to work with you to achieve your objective.
- A global supply network is in place to ensure product availability and fast delivery. Contact your local representative to ensure the product you need is available when you need it.

Contact your nearest Troy representative for immediate assistance or visit us online at www.troycorp.com. When visiting the website, become a registered user to obtain access to a wide range of resources.

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