



2022 Q1

microbial protection newsletter

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who touches your skin with grace?

sensiva™ sc 50 multifunctional

As a well-researched multifunctional sensiva™ sc 50 has seen extensive use since its introduction in 1991. It has become the standard for boosting the activity of preservatives in personal care products but many of its other benefits have been overlooked or are lost to time. Especially given the current reality, the many unique characteristics of pure ethylhexylglycerin deserve renewed attention. sensiva™ sc 50 multifunctional improves the antimicrobial efficacy of preservatives, improves the skin feel, and provides moisturization, it can reduce tackiness in sun, haircare, and lip care products, and it has been shown to be an effective, yet microbiome friendly deodorant.

the stabilized original

Many organic substances undergo oxidative degradation reactions. Ethers for instance are prone to forming peroxides if exposed to air.^{1,2,3} Several different breakdown products can be expected from primary oxidation reactions, like alcohols, ketones, aldehydes, or carboxylic acids. These substances are reactive enough to undergo secondary reactions among each other. Ethylhexylglycerin is a glycerol ether that aside from an ether group contains two hydroxyl groups in vicinal 1,2-conjugation. These 1,2-diols on their part can undergo oxidative cleavage reactions, known as glycol cleavage.

A recent aging-analysis of unstabilized ethylhexylglycerin market samples performed by Ashland again underlines the importance of stabilization technologies. Non-stabilized, aged ethylhexylglycerin can be shown to degrade into many breakdown products that develop during storage. Ultimately, these unidentified impurities with unknown toxicological profile can jeopardize product and consumer safety. When cosmetic products are applied it can cause skin irritation and sensitisation as the most threatening side effects. sensiva™ sc 50 multifunctional contains only stabilized ethylhexylglycerin and was tested and proven safe in comprehensive toxicity studies.⁴

The high purity guarantees that no degradation products develop during storage for a minimum of three years.

ethylhexylglycerin and the influence on the microbiome

The human skin is colonised by billions, mostly harmless microorganisms. This community is called skin flora, also known as the microbiome or microbiota, and is composed of distinct species in different quantities. The microbiome is highly individual for every person and body site specific and can be regarded unique like a fingerprint or the DNA code. However, the composition can change over time. These interpersonal and site-specific variations are determined by the chemical and physical skin parameters such as pH, moisture, temperature, and nutrients, for instance. Some microorganisms prefer oily, others moist and still others only like dry areas. Many aspects such as genetic, age, gender, environment, lifestyle, and personal care routines influence the skin parameters and therefore also the microbiome.^{5,6,7}

The common understanding is that a balanced microbiome contributes to healthy skin. Numerous studies have been carried out to investigate the influence of varied factors on the composition of the microbiome. In general, the broader the diversity of the skin microbiome the better for skin health. The aim of an exploratory study was to investigate the effect of one cosmetic product with a preservative in combination with sensiva™ sc 50 multifunctional on the skin microbiome in comparison to an untreated control area over an extended period under realistic use conditions.⁸ For this study, 23 female and male subjects with healthy skin on the volar forearms were enrolled. A test product was applied twice daily, the effect of the test product on the skin microbiome was assessed at the beginning of the study (baseline), and after 3 weeks. This study concludes that there are no changes in the microbiome composition and diversity after 3 weeks of exposure to a cream containing a blend of 0.9% phenoxyethanol and 0.1% sensiva™ sc 50 multifunctional. No depletion of the biodiversity was observed after application of a test product which contained the above combination. (Fig. 1)

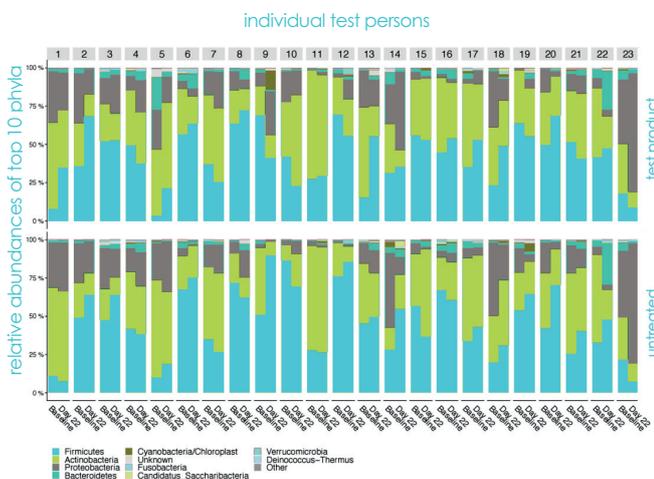


fig. 1: in vivo microbiome study – results relative abundances

booster of cosmetic alcohols and glycols & traditional preservative systems

sensiva™ sc 50 multifunctional is widely known for its ability to boost the activity of preservatives and antimicrobial actives. Early studies combining this material with short chain alcohols and glycols proved this synergy, offering a new way to boost preservative efficacy in finished formulation (Fig 2).

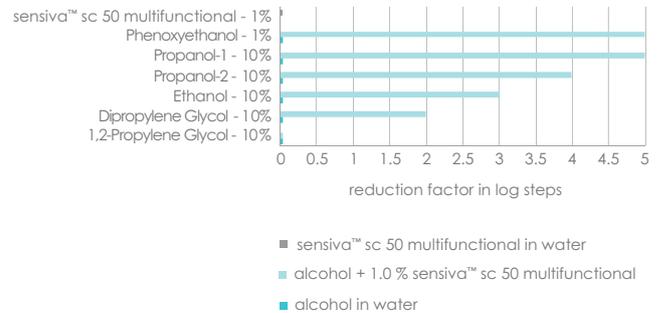


fig. 2: improved efficacy of alcohols in combination with 1% sensiva™ sc 50 multifunctional

As little as 1% sensiva™ sc 50 multifunctional incorporated into an alcohol-based hand sanitizer formulation can boost the antimicrobial efficacy, while improving the moisturization of the skin after use. The surfactant structure of ethylhexylglycerin has been proposed to be one of the mechanisms that allows this material to boost preservative activity. As sensiva™ sc 50 multifunctional has been shown to significantly reduce surface tension, it has been theorised that this multifunctional additive reduces the interfacial tension on the membrane of microorganisms, allowing other antimicrobial materials to penetrate faster and more effectively (Fig 3).⁹

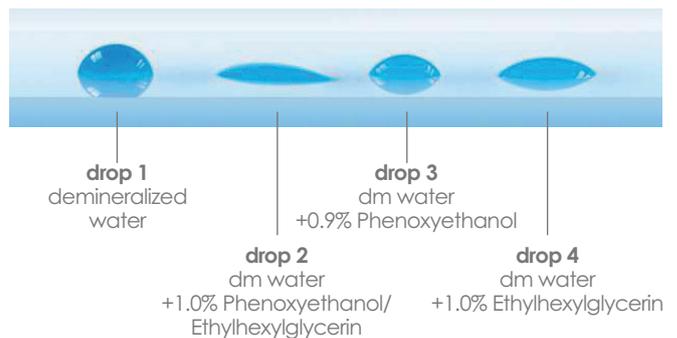


fig. 3: contact angles of aqueous solutions

boosting and fixating of fragrance ingredients

The surfactant characteristic may be the reason that sensiva™ sc 50 multifunctional has been shown to improve fragrance fixation on skin. An internal study, evaluating the effect of this material on fragrances, shows that ethylhexylglycerin has a boosting or fixating effect on many

fragrance components, while producing a fresher or softer scent with others. This ability to bind certain oily substances to the skin might prove beneficial for other formulation components, such as organic sunscreens or lip stains (Fig. 4).

ingredient name	boosting	fixating	fresher scent	softer scent
cinnamyl alcohol	X	X		
aldehyde C-10 (decanal)	X	X		
aldehyde C-16 (ethylmethylphenylglycidate)	X	X		
citral*			X	
citronellal			X	
hydroxycitronellal*		X		
cinnamal*	X	X		
musk ketone	X	X		
diphenyl ether		X		
citronello*			X	
linalool*			X	
alpha-terpineol	X	X		
amyl salicylate		X		
anethole			X	
benzyl acetate				X
isobornyl acetate	X	X		
linalyl acetate				X
linalyl isobutyrate	X	X		X
menthanyl acetate				X
methyl anthranilate	X			
caryophyllene	X	X		
amande amère	X	X		
niaouli			X	
patchouli brun huile essence				X

fig. 4: list of respective perfuming ingredients

* 76/768/EEC article 6(1) (g) substance

x = enhancement of the scent by sensiva™ sc 50 multifunctional

boosting: enhancement of the scent after 1 hour

fixating: enhancement of the scent after 6-24 hours

improves skin feel of cosmetic formulations

The ability of this material to improve the skin-feel of various personal care formulations was demonstrated in a 2010 study.¹⁰ In this study, a panel of trained subjects were asked to rate the feel of two cream formulas containing a prominent level of glycerin; one containing 1% sensiva™ sc 50 multifunctional and one with no sensiva™ sc 50 multifunctional. The results showed the product containing the sensiva™ sc 50 multifunctional to feel less tacky and less greasy, with improved penetration and lower soaping. These results can be extrapolated to the use of sensiva™ sc 50 multifunctional to improve the feel of other formulation ingredients, such as certain sunscreen actives, known to cause tackiness.

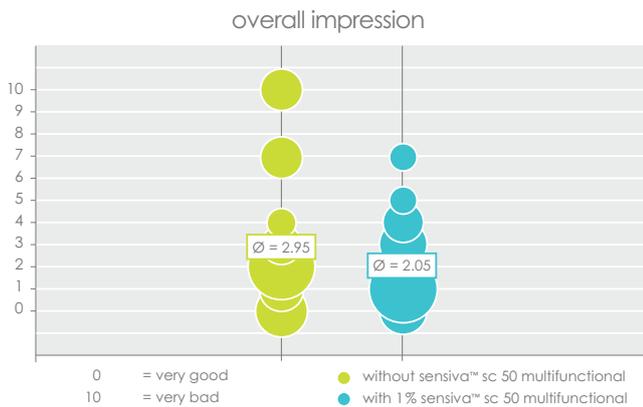


fig. 5: panel results on skin feel with and w/o sensiva™ sc 50 multifunctional

effective against odor causing gram-positive bacteria

sensiva™ sc 50 multifunctional acts selectively against gram-positive bacteria. It exhibits an excellent deodorant activity while being gentle to the skin. In a sniff test we compared an alcohol-based deodorant spray including 0.3% sensiva™ sc 50 multifunctional with the water/alcohol base. When comparing the armpit with deodorant application containing 0.3% sensiva™ sc 50 multifunctional to placebo, the differences are significant. Even after one application, sensiva™ sc 50 multifunctional exhibits significant improvement against placebo in a water/alcohol-based spray.

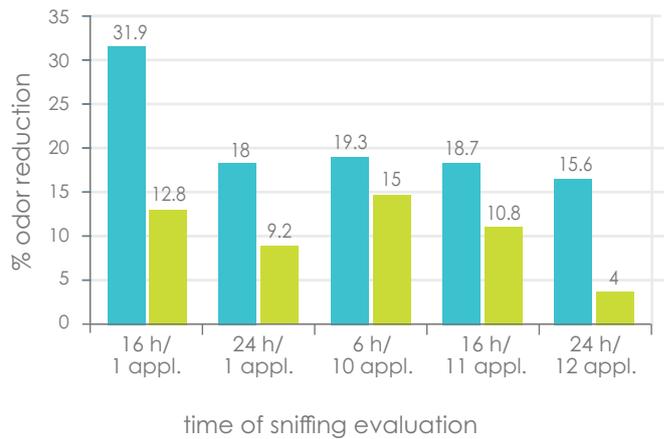


fig. 6: deodorizing efficacy of sensiva™ sc 50 multifunctional

summary

sensiva™ sc 50 multifunctional is unique in its versatility and one of the world's most important multifunctional cosmetic ingredients. It adds value to cosmetic formulations thanks to many different properties. More information about the studies and results with sensiva™ sc 50 multifunctional can be found in the product brochure. Besides the multifunctional property of the molecule, nevertheless, exactly sensiva™ sc 50 multifunctional stands out in the market due to its stabilized quality.

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regional centers

North America

Wilmington, DE USA
Tel: +1 877 546 2782

Europe

Switzerland
Tel: +41 52 560 55 00

India

Maharashtra
Tel: +91 22 61489696

Asia Pacific

Singapore
Tel: +65 6775 5366

Middle East, Africa

Istanbul, Turkey
Tel: +00 90 216 538 08 00

Latin America

Brazil
Tel: +55 11 3649 0455

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