

SASOL

ISOCARB 12

**Biomimetic Performance
Booster for AP/Deo Formulations**

Sasol Performance Chemicals



About Us

Sasol's Performance Chemicals business unit markets a broad portfolio of organic and inorganic commodity and speciality chemicals. Our business consists of four key business divisions: Organics, Inorganics, Wax and PCASG (Phenolics, Carbon, Ammonia and Speciality Gases). Our offices in 18 countries serve customers around the world with a multifaceted portfolio of state-of-the-art chemical products and solutions for a wide range of applications and industries.

Our key products include surfactants, surfactant intermediates, fatty alcohols, linear alkyl benzene (LAB), short-chain linear alpha olefins, ethylene, mineral oil-based and synthetic paraffin waxes, cresylic acids, high-quality carbon solutions and high-purity and ultra-high-purity alumina. Our Speciality Gases business supplies its customers with high-quality ammonia, hydrogen and CO₂, as well as liquid nitrogen, liquid argon, krypton and xenon gases.

Our products are as individual as the industrial applications they serve, with tailor-made solutions creating real business value for customers. Ongoing research activities result in a continuous stream of innovative product concepts that help our customers position themselves successfully in future markets.

Our products are used in countless applications in our daily lives to add value, security and comfort. Typical examples include detergents, cleaning agents, personal care, construction, paints and coatings, leather and metal processing, hot-melt adhesives, bitumen modification and catalyst support for automotive catalysts and other diverse speciality applications including oil and gas recovery, aroma production, plastic stabilisation, and polymer production. Every day, our researchers explore ways to improve our products and develop innovations that improve the quality of people's lives.



ISOCARB 12 – Reduce Stress-Induced Sweat and Malodour

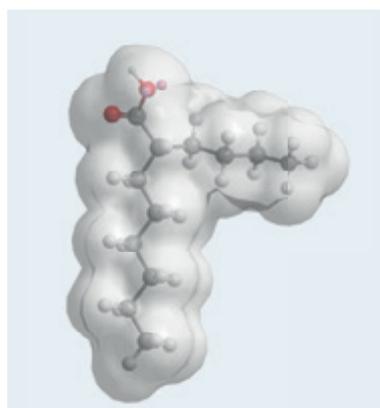
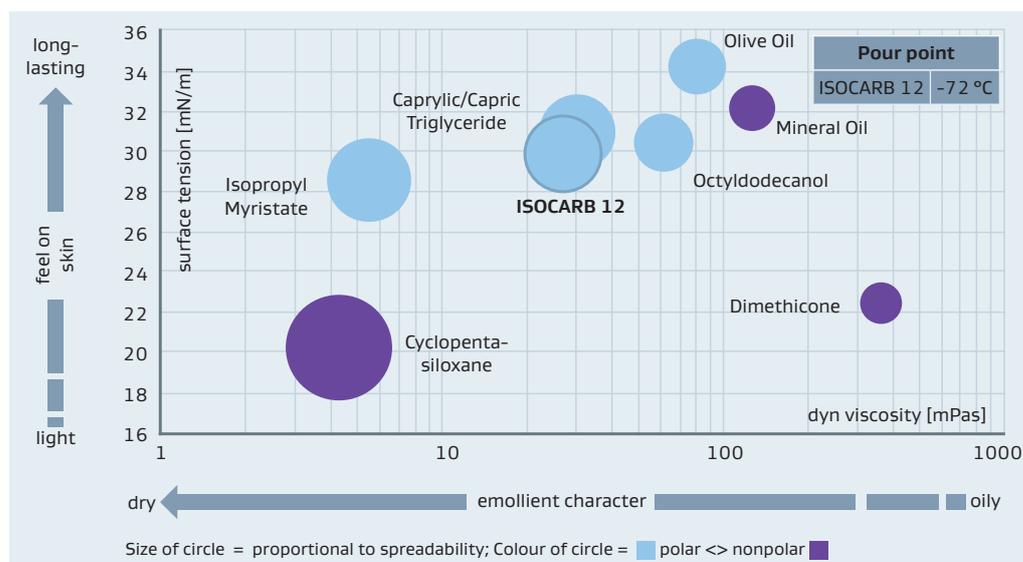
Description

ISOCARB 12 is a primary, saturated carboxylic acid with defined branching of the carbon chain.

Features

- Colourless and odourless liquid acid with low pour point
- Highly polar and medium spreading emollient
- Emollient with excellent stability towards calcium and magnesium ions
- Compatible with silicones, lipophilic cosmetic ingredients and AP/Deo active ingredients

Figure 1:
ISOCARB 12 – emollient properties at a glance



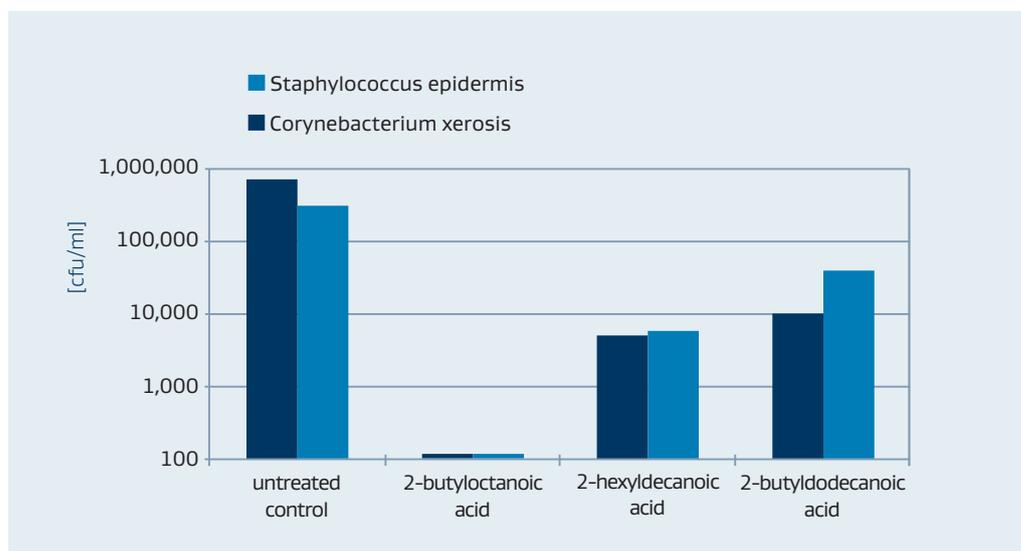
Lipid Composition of the Uropygial Gland Secretion of Asio Otus

The lipid composition of uropygial gland secretion of the long-eared owl (*Asio otus*) contains waxes of higher 2-alkyl-branched fatty acids, predominately 2-butyl-substituted fatty acids (55.6 %).¹⁾ These higher 2-alkyl-branched fatty acids are believed to contribute to the antimicrobial defence system of the avian plumage.



The antimicrobial efficacies (see Figure 3) have been evaluated of such higher 2-alkyl-branched fatty acids obtained either from uropygial gland secretion or chemically synthesised. The most pronounced reduction in bacterial growth was observed with 2-butyloctanoic acid suppressing the growth of *Staphylococcus epidermis* and *Corynebacterium xerosis* below detection limit. It could be also demonstrated that chemically synthesised 2-butyloctanoic acid displayed antimicrobial performance similar to that of the acid isolated from nature.²⁾

Figure 3:
Antimicrobial efficacy of
2-alkyl-branched fatty acids isolated
from uropygial gland waxes⁵⁾



Study about the Prevention of Stress-Induced Sweating and Axillary Malodour Formation in Teenagers

The human axilla region is characterised by a dense arrangement of sebaceous, eccrine and apocrine sweat glands and provides an ideal humid and semi-occlusive environment for skin bacteria growth. The sweat secreted by the axillary glands contains various non-smelling precursor substances such as glutamine and steroids, which are biotransformed by lipophilic corynebacteria and staphylococci species into volatile, odorous substances such as 3-methyl-2-hexenoic acid and sulphanylalkanol.³⁾

During stressful situations in everyday life, the eccrine and apocrine sweat glands become activated, resulting in enhanced sweat secretion accompanied by a strong axillary odour and making it very unpleasant for the affected person.

Stinkless – Under stress

A study⁴⁾ was conducted to investigate stress-induced sweating and malodour formation in teenagers who are known to experience stressful situations such as exams at school or job interviews. A test panel of 40 healthy adolescents (20 females and 20 males) aged 16 to 18 years participated in the Trier Social Stress Test (TSST), considered to be the most standardised and reliable test set-up to induce moderate psychosocial stress in a laboratory environment. The TSST induced high amounts of sweat and strong axillary malodour in this test panel of teenagers (Figure 3 and Figure 4).

Specially developed to meet the needs of adolescent consumers, novel AP/Deo products (female and male AP aerosols) containing aluminium chlorohydrate (ACH) and 2-butyloctanoic acid (**ISOCARB 12**) were applied as AP/Deo active ingredients and perfume to mask sweat odour.

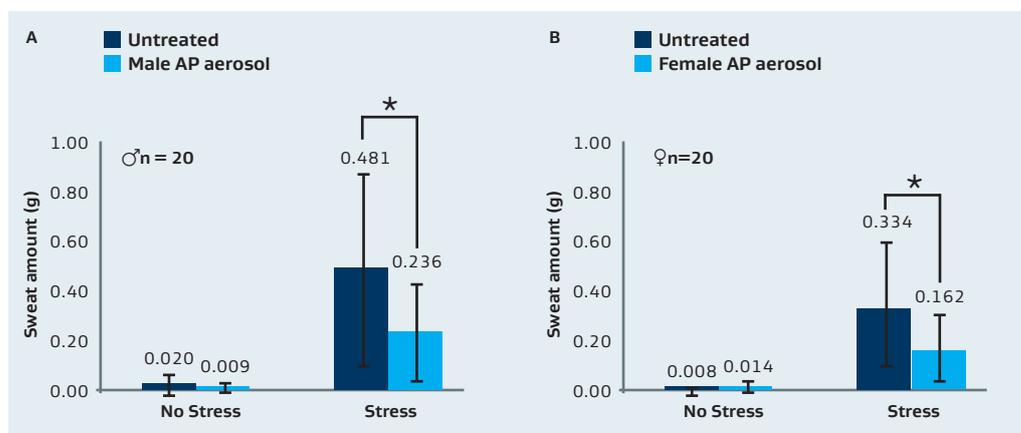
The study clearly showed that stress-induced axillary malodour among teenagers can be very effectively controlled by **a combination of aluminium chlorohydrate (ACH), 2-butyloctanoic acid (ISOCARB 12) and perfume.**

It was possible to reduce stress-induced sweat secretion under the challenging conditions of the Trier Social Stress Test (TSST) **by 50 % regardless of gender, thus indicating that the tested formulations have a very strong antiperspirant effect.**



Figure 3:
Emotional sweating during
Trier Social Stress Test (TSST)⁶⁾

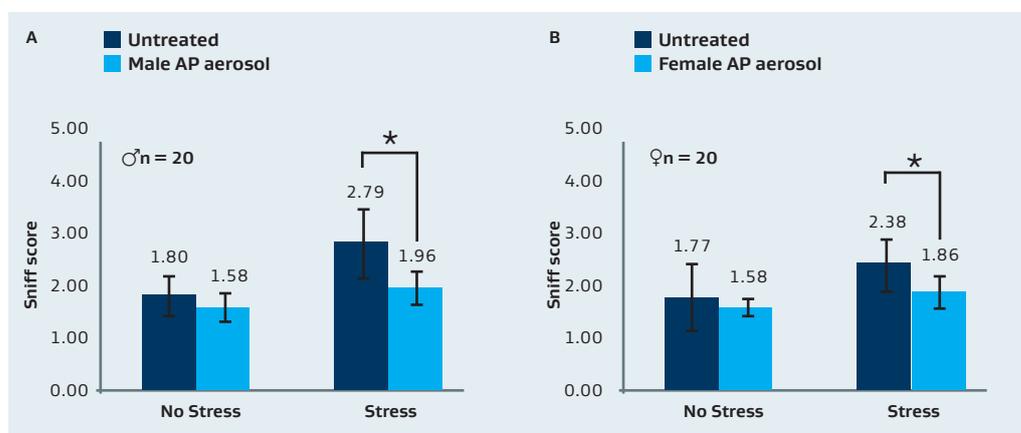
* Asterisks indicate significant
differences ($P < 0.05$)



In a comparison of male and female teenagers, the test results also showed significantly higher stress-induced axillary odour scores (2.79 versus 2.38) for male teenagers caused by increased apocrine sweat gland activity due to a higher testosterone level. After application of the aerosol formulation containing a **combination of aluminium chlorohydrate (ACH), 2-butyloctanoic acid (ISOCARB 12) and perfume**, a significant decrease in malodour formation of **30 % in male adolescents and 22 % in female adolescents** could be achieved.

Figure 4:
Axillary malodour production during
Trier Social Stress Test (TSST)⁶⁾

* Asterisks indicate significant
differences ($P < 0.05$)



References

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- Martin, A., Hellhammer, J., Hero, T., Max, H., Schult, J., Terstegen, L., Effective prevention of stress-induced sweating and axillary malodour formation in teenagers, *Int. J. Cosmet. Sci.* 33, 90–97 (2011)

Pictures taken from

- Jacob, J., Traupe, B., Roll, C., Eigener, U., Sauermann, G., Hoppe, U., Wolf, F., α,α -dialkylated acetic acids as novel nature-identical antimicrobials for the treatment of fungal infections and superinfections in humans, poster
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Physical Properties

Typical physical properties are listed in the table below. Actual properties will vary from lot to lot.

ISOCARB 12

Packaging:
160 to 180 kg in coated (phenol resin) steel drums 

Storage:
Protect from moisture and sunlight; keep between 5 and 30 °C

Shelf life:
48 months from the date of manufacture, when properly stored and handled

Certificates
(Sasol Germany GmbH):
ISO 14001; ISO 9001; OHSAS 18001, EMAS; Kosher Certificate

Typical properties		
INCI name		Butyloctanoic acid
CAS no.		27610-92-0
Appearance @20 °C		clear, colourless liquid
Molecular weight	g/mol	200
Purity	wt %	96 min.
Water content	wt %	0.1 max.
Colour	Hazen	30 max.
Acid number	mg KOH/g	273 to 283
Ester number	mg KOH/g	0.3 max.
Refractive index	nD20	1.4393
Viscosity @20 °C	mPas	27.0
Density @20 °C	g/ml	0.885 to 0.890
Surface tension @20 °C	mN/m	29.9
Pour point	°C	-72
Boiling range	°C	270 to 298
Flash point	°C	157

Sasol is a producer of ingredients for cosmetics and personal care products. Our global manufacturing network along with highly skilled marketing, research and development teams are dedicated to helping you achieve your performance and formulation requirements. Take advantage of Sasol's experience in product development.

ISOCARB 12 – Medium spreading, pleasant and non-sticky emollient enhancing protection against stress-induced sweating and microbial-induced malodour formation in AP/Deo formulations



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