



IOI OLEOCHEMICAL

PHARMA

ENGINEERED LIPID EXCELLENCE FOR
**TOPICAL
APPLICATIONS**



CONTENTS

Tried & Trusted, Quality & Innovation	4
Emollients	6
Special Cream Bases	8
Water-free Formulations – Invivo Studies	11
Emulsifiers	12
Solubilizers & Penetration Enhancers	16
Viscosity Regulators	20

Tried & Trusted, Quality & Innovation

With our nature-based excipients you can develop modern pharmaceutical topical formulations that combine functionality, regulatory compliance and a pleasant skin feel. While the advantages of localized drug delivery for acute conditions are clear, the issue of patient compliance becomes particularly significant in chronic skin diseases, where formulation techniques, sensory properties and the origin of ingredients can become important to achieving medication adherence.¹

Our brands **IMWITOR®**, **MIGLYOL®**, **SOFTIGEN®**, **SOFTISAN®**, **DYNASAN®** and **WITEPSOL®** stand for proven quality, unique performance, and perceivable benefits in the final formulation.

The development and production of excipients for topical application started back in the 1950s at the former Chemische Werke Witten, now known as IOI Oleo GmbH. The state-of-the-art production guarantees the highest quality of vegetable-based esters, which act as multifunctional ingredients from emollients to emulsifiers, and in turn the quality of medicine in our ethical environment. Our dedication and strict adherence to maximum product purity and safety are reflected in our regulatory set-up and our experience – quality you can rely on “Made in Germany”.

Our products are made from up to 100% vegetable, renewable raw materials. Sustainability is part of our daily activities as the entire IOI Group is not only RSPO (Round Table of Sustainable Palm Oil) certified but also one of the co-founders of this organization.

We operate the production facility of IOI Oleo GmbH in Witten under GMP guidelines, which is regularly checked by the German Health Authority. Since some of our excipients are used in interdisciplinary areas such as cosmeceuticals or nutraceuticals, and in view of our worldwide presence, we also follow other regulations and standards:

- ✓ **ISO 9001 & ISO 45001**
- ✓ **EMAS**
- ✓ **RSPO SCCS**
- ✓ **EU GMP certified**
- ✓ **US FDA cGMP inspected**
- ✓ **HACCP**
- ✓ **Halal/Kosher**
- ✓ **Cosmos/Ecocert**

¹ Topical drug delivery systems in dermatology: a review of patient adherence issues, 2012



Emollients

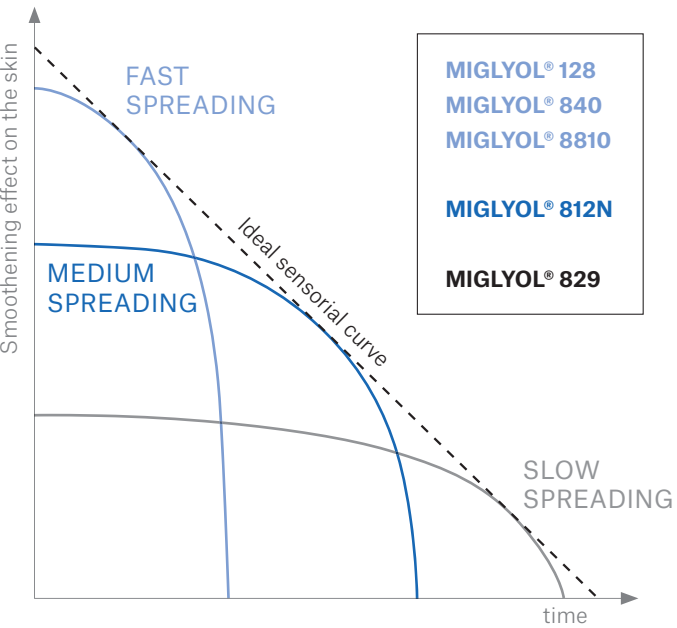
The MIGLYOL® Emollients are widely used in the pharma industry as drug carriers; they possess superior solvent characteristics for lipophilic actives and high stability against stress factors and ageing.

IDEAL SENSORIAL CURVE

The MIGLYOL® emollient range offers formulators the possibility of creating the ideal sensory experience thanks to the spectrum of spreading behaviour provided.

These vegetable-based emollients are neutral oils that offer a wide range of different sensory profiles from light silicone-like to rich and caring. Refatting, even superfatting and improvement of skin moisturization are achieved without occlusion and risk for maceration.

- CONSUMER BENEFITS:
- ✓ Sensory profile according to consumer needs
 - ✓ Silicone-like skin feel possible
 - ✓ Light skin feel possible
 - ✓ Caring and rich skin feel possible



MIGLYOL® 128

Chemical description/monograph name:

Cocoyl Caprylocaprate

Listed in: Ph. Eur.

Additional quality information: NON-GMP

Appearance: Slightly yellowish oily liquid

Viscosity mPa·s 20 °C: ~ 11

This low-viscosity, non-polar emollient and refatting agent can be considered a true vegetable alternative for light petrochemical emollients or silicones (e.g. D5)

It provides an extremely light skin feel due to its fast spreading, is non-oxidizable and odorless.

MIGLYOL® 810 N (C8/C10 ratio ~ 70:30%)

MIGLYOL® 812 N (C8/C10 ratio ~ 60:40%)

Chemical description/monograph name:

Medium-Chain Triglyceride

Listed in: Ph. Eur., USP–NF, JPE, US DMF Type IV

Appearance: Almost colorless and odorless oily liquid

Viscosity mPa·s 20 °C: ~ 30

Neutral oils, stable, used as penetration enhancers, drug carriers and emollients as well as solvents for dermal application.

Made from renewable, vegetable raw materials, they offer at the same time excellent stability against thermal and oxidative stress.

Low impurity profile for improved drug quality

IOI is the holder of the first CEP (Certificate of Suitability) ever granted for a Medium Chain Triglyceride and has filed US-DMF Type II.

MIGLYOL® 829

Chemical description/monograph name:

Caprylic/Capric/Succinic Triglyceride

Appearance: Light yellowish oily liquid

Viscosity mPa·s 20 °C: ~ 260

Neutral, stable oil of high viscosity, low-spreading superfatting agent which gives formulations a long-lasting, rich skin feel.

With a density of ~ 1,01 g/ml, it acts as an emulsion stabilizer and allows inverted emulsions.

MIGLYOL® 840

Chemical description/monograph name:

Propylene Glycol Dicaprylocaprate

Listed in: Ph. Eur., USP–NF

Appearance: Almost colorless and odorless oily liquid

Viscosity mPa·s 20 °C: ~ 11

A polar, high spreading emollient with low viscosity. It leaves a light, non-oily, smooth and velvety skin sensation similar to low molecular weight silicone oils. Furthermore, it shows excellent dispersing and solvent properties.

Very high stability against thermal and oxidative stress, low impurity profile for improved drug quality.

MIGLYOL® 8810

Chemical description/monograph name:

Butylene Glycol Dicaprylate/Dicaprate

Appearance: Colorless Oily liquid

Viscosity mPa·s 20 °C: ~ 13

Polar, fast-spreading light emollient with excellent solvent characteristics.

It is a completely saturated, non-oxidizing neutral oil, exhibiting a low allergenic potential and is non-sensitizing.

Skin Care applications: as a skin conditioning agent protecting the skin from external stress.

Special Cream Bases

SOFTISAN® 378

Chemical description/monograph name:

Hard Fat, Adeps solidus

Listed in: Ph. Eur., USP–NF

Appearance: White to ebony colored solid fat

Melting Point °C: ~ 38

A refatting, nourishing emollient, drug carrier and consistency regulator that is ideal for all topical application forms, e.g. ointments, creams, lotions and pastes.

It imparts structure and is therefore recommended for formulations that require a more solid but still soft API-carrier. Particularly for semi-solid dosage forms the use of SOFTISAN® 378 offers numerous advantages as it melts quickly on the skin and has a spreading cascade comparable to that of a mixture of different oils. Its film-forming properties ensure a light, non-tacky caring effect.

While the typical dosage in emulsion formulations is 15%, already the use of 2% SOFTISAN® 378 can change the sensorial properties significantly.

Based on saturated even-numbered, unbranched natural fatty acids of vegetable origin, the superior oxidation stability and product uniformity can be guaranteed.

SOFTISAN® 601

Chemical description/monograph name:

Glycerides, C12-C18 Mono- and Di-, Glyceryl Stearate, PEG-4, Polyoxyethylene (25) Cetyl Stearyl Ether, PEG-32, PEG-6, Medium-Chain Triglycerides, Glyceryl Ricinoleate (stabilized)

Appearance: Off-white soft pastilles

Melting Point °C: 40 – 45

- Ready-to-use water-free O/W cream base
- Non-sensitive to ion-active APIs like ketoprofene, paracetamol, heparine, miconazol, etc.
- Forms stable emulsions e.g. for heparin and steroidal creams, wound care applications.

Suitable for the preparation of skin-compatible, wash-off O/W creams exhibiting a water content of up to 65%.

SOFTISAN® 649

Chemical description/monograph name:

Bis-Diglyceryl Polyacyladipate-2

Appearance: Off-white opaque mass

Melting Point °C: ~ 35

This compliant and modern alternative to lanolin is used in wound dressings and wound care products like creams and ointments due to its high water uptake of more than 200% and exceptional adhesion to skin and mucous membranes.

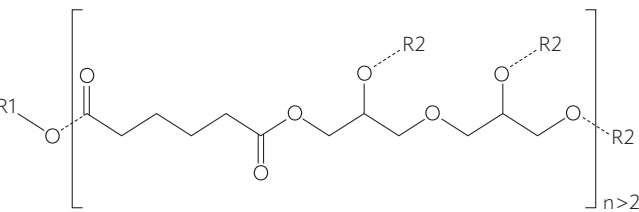
Film former that helps to improve the skin barrier by reducing transepidermal water loss. Especially suitable for wound dressing systems and irritated skin.

SOFTISAN® 649 shows the same properties as Lanolin, without affecting the color and the smell of a formulation in a negative way. Applicable for hot and cold processes and is miscible with all fats and oils.

RECOMMENDED CONCENTRATION:

0.5 - 5%

CHEMICAL STRUCTURE:



R1 = diglycerol

R2 = adipic acid, 12-hydroxystearic acid, isostearic acid, caprylic acid, capric acid, stearic acid



Water-free Formulations – In-vivo Studies

The majority of API candidates under clinical development are poorly water-soluble, and they can be sensitive to hydrolysis or adverse reactions-triggered by impurities. Thus, water-free formulating may be an idea that derives from technical needs, but offers a multitude of possibilities. For example, depending on product presentation, a water-free system may not require preservation or other stabilizers.

Petrol-based formulations have been and will remain a staple in the toolbox of topical formulation development. However, an occlusive nature, formulation aesthetics or skin feeling may not be beneficial to the targeted mode of action and patient compliance in chronic application regimes.

By combining tried and trusted vegetable-based excipients from IOI Oleo, you can create water-free formulations with a familiar petrolatum appearance, an appealing sensory profile and non-pharmacological benefits for certain skin conditions. IOI Oleo's range of emollients, solubilizers, emulsifiers, viscosity regulators and film formers enables a variety of textures, viscosities, skin feelings and melting characteristics.

In order to be able to offer you product combinations with a perfect fit, we have commissioned a series of short-term in-vivo studies. Our well-known SOFTISAN® 378 was mixed with a selection of complementary emollients from our range and tested for the ability to produce water-free formulation concepts.

The results of the studies are convincing:

- Formulations based on SOFTISAN® 378 increased skin moisturization in a range of 40-60% according to Corneometer measurement.
- The scoring for skin softness of treated areas significantly increased from 1.7 to 2.8-3.5 on a clinical scale. Scoring was done by a dermatological expert.
- The formulations did not show a significant influence of transepidermal water loss and therefore will not contribute to skin occlusion or increase the risk of maceration.
- Majority of study participants positively assessed the skin feel and formulation experience on the skin during self-assessment.



Emulsifiers

EMULSIFIER O/W

IMWITOR® 372 P

Chemical description/monograph name:
Glyceryl Stearate Citrate

Appearance: Light brownish flakes

HLB value: 10 – 12

Melting Point °C: ~ 62

Oil-soluble O/W emulsifier, partly neutralized and anionic. Viscosity enhancing, builds structures similar to lecithin, stable emulsions at pH range 4 to 7. 100% natural, leaving a smooth and silky skin feel. This hot processable emulsifier can be combined with a large number of co-emulsifiers.

RECOMMENDED CONCENTRATION:
2 – 4% as main emulsifier
0.5 – 2.0% as co-emulsifier

IMWITOR® 375

Chemical description/monograph name:
Glyceryl Citrate/Lactate/Linoleate/Oleate

Appearance: Yellow to brownish sticky liquid

HLB value: 10 – 12

Oil-soluble O/W emulsifier, partly neutralized and anionic. Similar to lecithin for stable emulsions at pH range 4 to 7. 100% natural, sunflower-based. It is cold-processable and can emulsify up to 30% of oil phase. Already at 1% it forms thin and light emulsions with a soft, velvety touch and creams just by adding co-emulsifier, fatty alcohol and a thickening agent. Excellent compatibility with skin and mucosa, suitable for preparation of SMEDDS.

RECOMMENDED CONCENTRATION:
1 – 3% as main emulsifier
0.5 – 2% as co-emulsifier or solubilizer in anhydrous systems

IMWITOR® 960 K

Chemical description/monograph name:
Glyceryl Monostearate, Self-Emulsifying

Listed in: BP

Appearance: Flakes

HLB value: 9 – 12

Content of monglycerides: >= 30%

Melting Point °C: 56 – 61

This self-emulsifying glyceryl stearate quality is a classic anionic emulsion stabilizer for rich creams and ointments. Works best at neutral pH, is compatible with a wide range of APIs and therefore an excellent basis for stable formulations.

RECOMMENDED CONCENTRATION:
2 to 7%

IMWITOR® 491

Chemical description/monograph name:
Glyceryl Monostearate

Listed in: USP–NF

Additional quality information: NON-GMP

Appearance: Off-white powder

HLB value: ~ 4

Content of monglycerides: > 90%

Melting Point °C: 66 – 77

O/W co-emulsifier, emulsion stabilizer, stiffening and dispersing agent. IMWITOR® 491 enhances the consistency of O/W emulsions..

RECOMMENDED CONCENTRATION:
1 to 3%





IMWITOR® 900 (F) P

Chemical description/monograph name:

Glycerol Monostearate 40 – 55%, Type I

Listed in: Ph. Eur., USP–NF

Appearance: Off-white powder

HLB value: ~ 3

Content of monglycerides: 40 – 55%

Melting Point °C: 54 – 64

Emulsion stabilizer, dispersing agent and consistency enhancer in O/W emulsions.

RECOMMENDED CONCENTRATION:
1 to 3%

IMWITOR® 900 K

Chemical description/monograph name:

Glycerol Monostearate 40 – 55%, Type II

Listed in: Ph. Eur., USP–NF

Appearance: Off-white powder

HLB value: ~ 3

Content of monglycerides: 40 – 55%

Melting Point °C: 54 – 64

Emulsion stabilizer, dispersing agent and consistency enhancer in O/W emulsions.

RECOMMENDED CONCENTRATION:
1 to 3%

EMULSIFIER W/O

IMWITOR® 600

Chemical description/monograph name:

Polyglyceryl-3 Polyricinoleate

Appearance: Amber colored liquid

HLB value: ~ 4

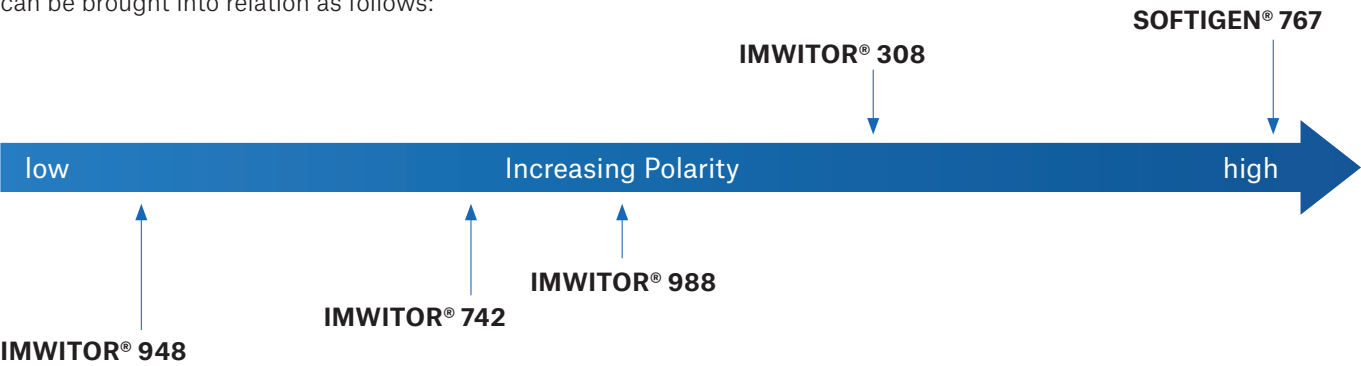
IMWITOR® 600 is a powerful W/O emulsifier with excellent stability even with a high water content.

It is especially suitable for soft or low viscous W/O emulsions with a non-greasy, pleasant skin feel.

RECOMMENDED CONCENTRATION:
2 to 4%

Solubilizers & Penetration Enhancers

The formulation-specific suitability of individual raw materials depends, among other things requirements, on the expected polarity of the ingredients. Our products cover a wide range in polarity and can be brought into relation as follows:



All these products are fully miscible with each other, so that melting point, bioavailability, solubility, polarity or texture can be specifically adjusted.

SOFTIGEN® 767

Chemical description/monograph name:

Macrogol 6 Glycerol Caprylocaprate

Listed in: Ph. Eur.

Appearance: Clear liquid

HLB value: ~ 14

A mild cleansing agent with excellent refatting characteristics and suitable for clear liquid, water-based formulation.

Suitable for use in the preparation of SEDDS. Solubilizer for drugs, wetting and refatting agent. Soluble in water and hydrophilic oils (e.g. MCT oil). Even on eczematous skin its toleration is exceptional, and it is therefore used for psoriasis treatment. SOFTIGEN® 767 is a good solubilizer, e.g. for essential oils and volatile crystalline substances. Skin caring and refatting agent with light skin feel. SOFTIGEN® 767 is also a very popular mild cleansing agent in wet wipes.

RECOMMENDED CONCENTRATION:

Leave-on: 0.5 to 5.0%

Rinse-off: 2 – 10% according to application

IMWITOR® 308

Chemical description/monograph name:

Glycerol Monocaprylate, Type II

Listed in: Ph. Eur., USP–NF

Additional quality information: NON-GMP

Appearance: Crystalline solid

Content of monglycerides: >= 80%

Melting Point °C: 27 – 33

Co-emulsifier and penetration enhancer with bacteriostatic properties. Up to 10% water can be dissolved to clear solution. It can be used in emulsions, surfactant-based or hydro-alcoholic formulations. Its versatile properties including antimicrobial activity, refatting, and wetting performance make it a multifunctional ingredient.

IMWITOR® 308 is known to exhibit bacteriostatic properties and boosts preservative efficacy.





IMWITOR® 742

Chemical description/monograph name:

Glycerol Monocaprylocaprate, Type I

Listed in: Ph. Eur., USP–NF

Appearance: Liquid to pasty/solid

HLB value: ~ 3 – 4

Content of monglycerides: 45 – 75%

Melting Point °C: ~ 25

Co-Emulsifier and solubilizer for poorly water-soluble drugs that fall into class II and IV of the Biopharmaceutical Classification System (BCS).
Defoaming agent
Water-soluble up to 10%

IMWITOR® 948

Chemical description/monograph name:

Glycerol Mono-Oleate 40

Listed in: Ph. Eur., USP–NF

Appearance: Yellowish, liquid to pasty

HLB value: ~ 3

Content of monglycerides: ~ 44%

Suitable for W/O and O/W emulsions.
Improves penetration of emollients into the stratum corneum and has water-binding capacity, forms gels in excess water. Used in rinse-off products, glycerol mono-oleate reduces skin roughness caused by surfactants.

Solubilizer for lipophilic APIs and bioavailability enhancer. Oily vehicle containing long-chain fatty acids (C18:2) for LFCS Type I (oily), Type II (SEDDS), and Type III (SMEDDS), associated with lymphatic absorption. Oily vehicle for topical formulations. Safety of use is inferred from GRAS status and precedence of use in approved pharmaceutical products.

RECOMMENDED CONCENTRATION:
1 to 3%

IMWITOR® 988

Chemical description/monograph name:

Glycerol Monocaprylate, Type I

Listed in: Ph. Eur., USP–NF

Appearance: Clear, oily liquid

Content of monglycerides: 45 – 75%

Melting Point °C: ~ 23

Co-Emulsifier and bioavailability booster for poorly water-soluble drugs.

RECOMMENDED CONCENTRATION:
3 – 15%

Viscosity Regulators

Thickening of oil phases can be necessary to give the finished form the required consistency and skin feel. All recommended products are characterized by their neutral smell and are successfully used in topical forms such as lotions and creams as body-imparting and structure forming ingredients.

DYNASAN® 118

Chemical description/monograph name:
Glyceryl Tristearate

Listed in: USP–NF, GRAS acc. to CFR 21 sec. 172.811

Appearance: Off-white, flakes and microfine powder

Melting Point °C: 69 – 73

DYNASAN® 114

Chemical description/monograph name:
Trimyristin

Appearance: Off-white, flakes

Melting Point °C: 55 – 60

SOFTISAN® 154

Chemical description/monograph name:
Hydrogenated Palm Oil

Appearance: Off-white, flakes

Melting Point °C: 53 – 58

WITEPSOL® E 85

Chemical description/monograph name:
Hard Fat, Adeps solidus

Listed in: Ph. Eur., USP–NF, JPE

Appearance: Pastilles

Melting Point °C: 42 – 44

WITEPSOL® H 15

Chemical description/monograph name:
Hard Fat, Adeps solidus

Listed in: Ph. Eur., USP–NF, JPE

Appearance: Pastilles

Melting Point °C: 33.5 – 35.5



NOTES

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**Leading global expert and innovator
of functionalised ester-based lipids
with added value for pharma solutions.**

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