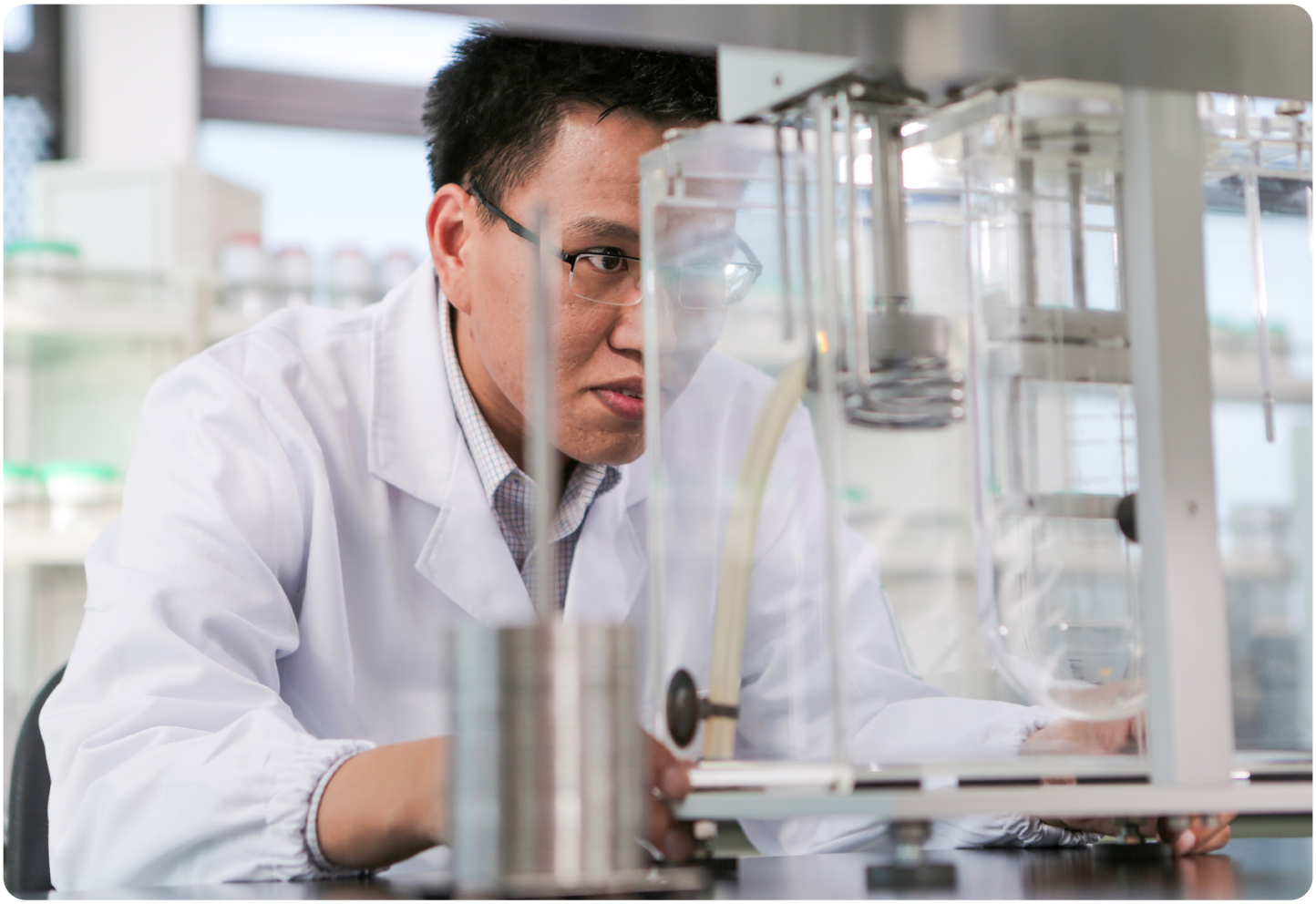
GATTEFOSSÉ

• PHARMACEUTICALS

# Selecting the best excipients

## to optimize drug delivery



# About our company

The Gattefossé Group is a community of employees, all driven by a dual mission: the performance of its products and the personalized support to its customers. Gattefossé develops, manufactures and sells cosmetic ingredients and pharmaceutical excipients of natural origin for the beauty and health industries worldwide, through its 12 affiliated companies and network of global agents and distributors in 80 countries.

Environmental and social issues have always been part of the culture of this French and independent family business, founded in Lyon in 1880. Today, Gattefossé relies on a purposeful Corporate Social Responsibility (CSR) approach to build its innovation and development strategy.

# Contents.

# Partnering with Gattefossé

## Providing high-quality functional excipients

Our lipid excipients are manufactured using vegetable oils (including corn, apricot kernel or coconut oil), a wide array of plant-derived fatty acids, and alcohols such as polyglycerol, fatty alcohols, polyethylene glycol and propylene glycol.

Depending on the raw materials used, the esterification reaction leads to solid, semi-solid, or liquid excipients. The fatty acid chain length, the composition in terms of mono-, di- and triglycerides and alcohol-esters impact the end-product physico-chemical and functional properties.

Our oleochemists are able to develop high-quality, functional pharmaceutical excipients having targeted properties through the selection of raw materials, the design and the control of the synthesis reaction.

Our manufacturing sites are ISO certified by SGS (9001 version 2015) and follow IPEC Good Manufacturing Practices (GMP) guidelines. Production processes comply to international standards and follow a rigorous Quality Management System. We have obtained the GMP certificate of inspection from ANSM (Agence nationale de sécurité du médicament et des produits de Santé - the French health authority).

# Assuring worldwide support

**Gattefossé has built a solid scientific reputation with its functional excipients and their drug development applications. Continuous R&D investment and employment of highly qualified scientists demonstrate our commitment to providing customers worldwide with quality technical and regulatory support.**

In 1960, we established our first R&D and Applications laboratories at our French headquarters. Since then, we have opened three new Technical Centers of Excellence worldwide: at Shanghai, China (2007), Mumbai, India (2008) and Paramus, New Jersey, USA (2017).

## The main aims of these centers are to:

PROVIDE CUSTOMER TECHNICAL SUPPORT

CHARACTERIZE AND OPTIMIZE THE PERFORMANCE OF EXCIPIENTS IN DRUG DELIVERY SYSTEMS AND PROCESSES

SHARE KNOWLEDGE THROUGH EDUCATION AND TRAINING

## Contributing to one health

**Gattefossé is providing the pharmaceutical industry with innovative excipients for all routes of administration, and serving the human, veterinary and nutraceutical markets.**

Our functional excipients are used worldwide to optimize drug delivery and enhance patient adherence.

Gattefossé is committed to accompanying its customers develop safe and efficient medicines, from the early stages of development to the market.

The following pages focus on excipients for human medicines in oral, topical, rectal and vaginal routes of administration.

Contact us for more information on other routes of administration or for veterinary and nutraceutical uses.

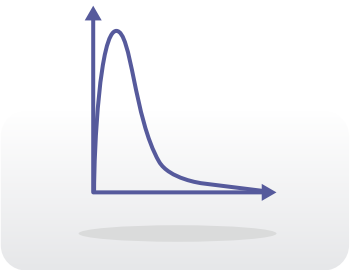
# Oral drug delivery

## Enhancing oral bioavailability

Poor solubility, poor permeability, and pre-systemic elimination are factors that can limit absorption of drugs. Our excipients have the capability to enhance oral bioavailability of small molecules, peptides and macromolecules by:

- Maintaining drug in a solubilized state throughout the gastro-intestinal tract
- Transiently increasing intestinal permeation
- Promoting lymphatic uptake

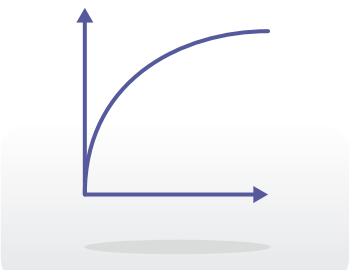
Our range of functional excipients includes oils, co-surfactants, surfactants and solvents. They are easily combined to formulate all types of lipid-based formulations and self-emulsifying drug delivery systems.



## Sustaining drug release

The development of lipid sustained-release matrices is straightforward and provides the following biopharmaceutical and manufacturing advantages:

- Effective modulation of drug release profile for highly water soluble, short half-life drugs
- Reduced risk of alcohol dose dumping and misuses
- Non-hygroscopic matrix for improved stability on storage
- Solvent-free processing for cleaner and greener manufacturing
- Suitable for cold and hot manufacturing processes: direct compression, granulation, 3D printing, hot melt extrusion



## Lubricating tablets and capsules

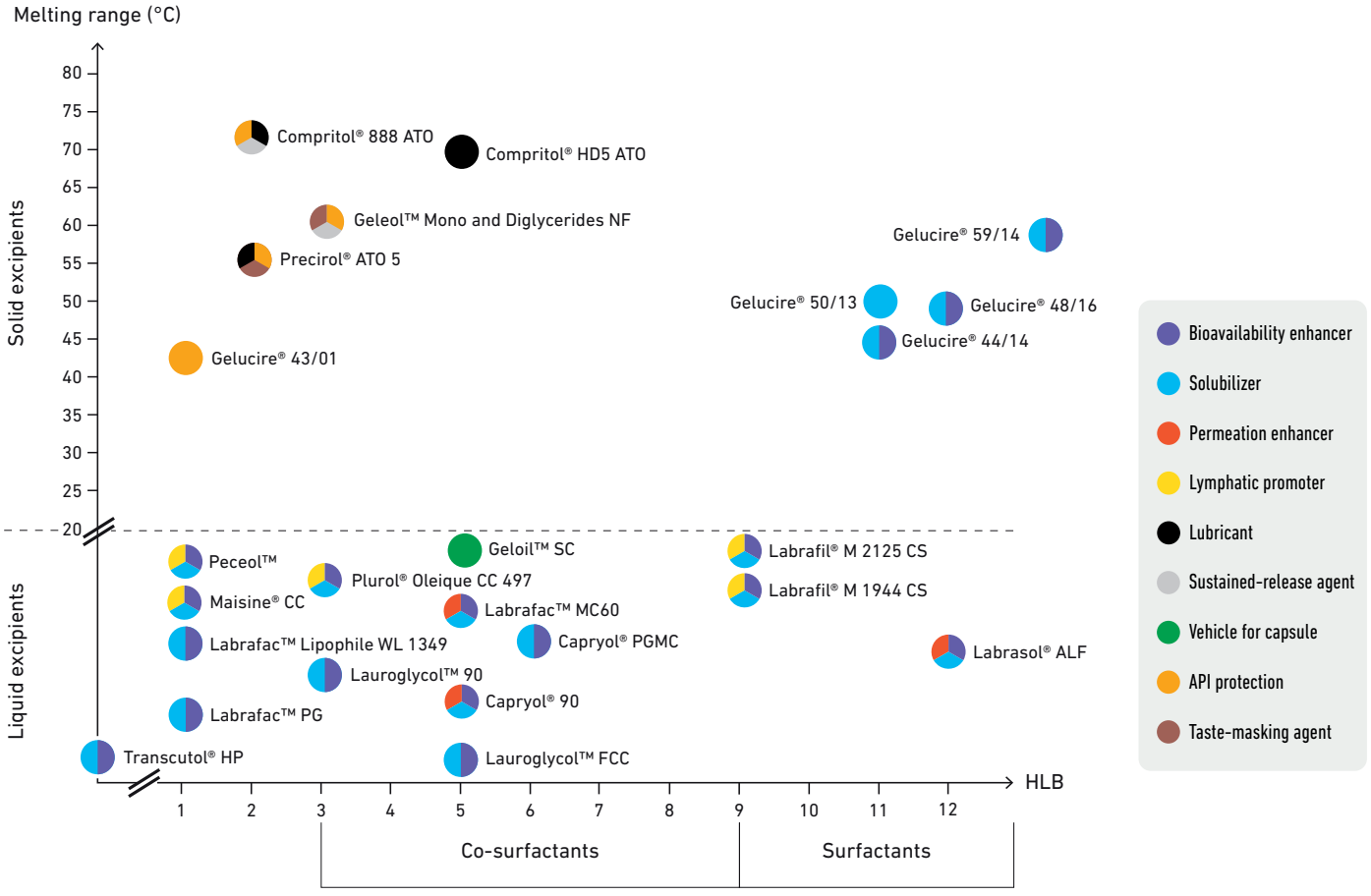
Effective lubrication in tablet and capsule production has a major impact on the manufacture and the quality of the final dosage forms. Our lubricants provide valuable formulation and process advantages:

- Chemical inertness, for high compatibility with a wide range of molecules
- Insensitive to mixing conditions, for highly robust process and formulation
- Efficient, while maintaining tablet properties such as hardness and drug release

## Taste masking and API protection

A continuous lipid film coating around the drug particles or tablets enables to isolate the bad tasting drug from the taste buds, or to protect the sensitive drug from environment conditions such as light, moisture, oxidation or temperature, and prevent its degradation.

Lipid excipients can be processed with a variety of techniques, such as high shear coating, hot melt coating, fluid bed coating or melt granulation to provide a robust lipid film coating.



# Skin drug delivery

## Enhancing skin delivery

Our excipients solubilize a wide range of molecules. Lipid excipients have amphiphilic properties, and can modulate the penetration of drugs into the stratum corneum and drive its flux.

Our penetration enhancers have different modes of action involving interactions at different levels with the skin:

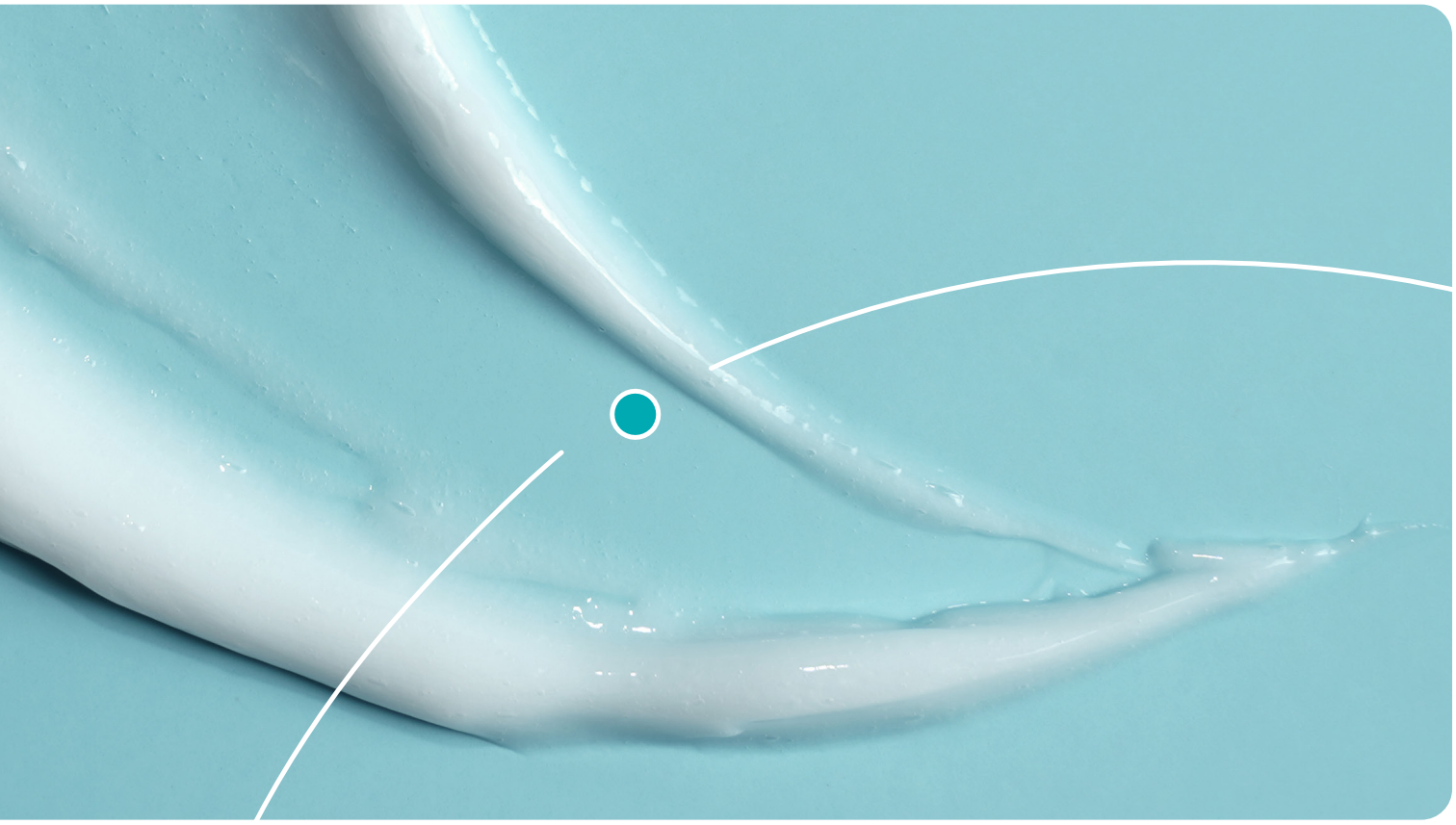
- Interaction with the protein or lipid domains
- Transiently opening of the tight junctions between cells
- Membrane fluidization

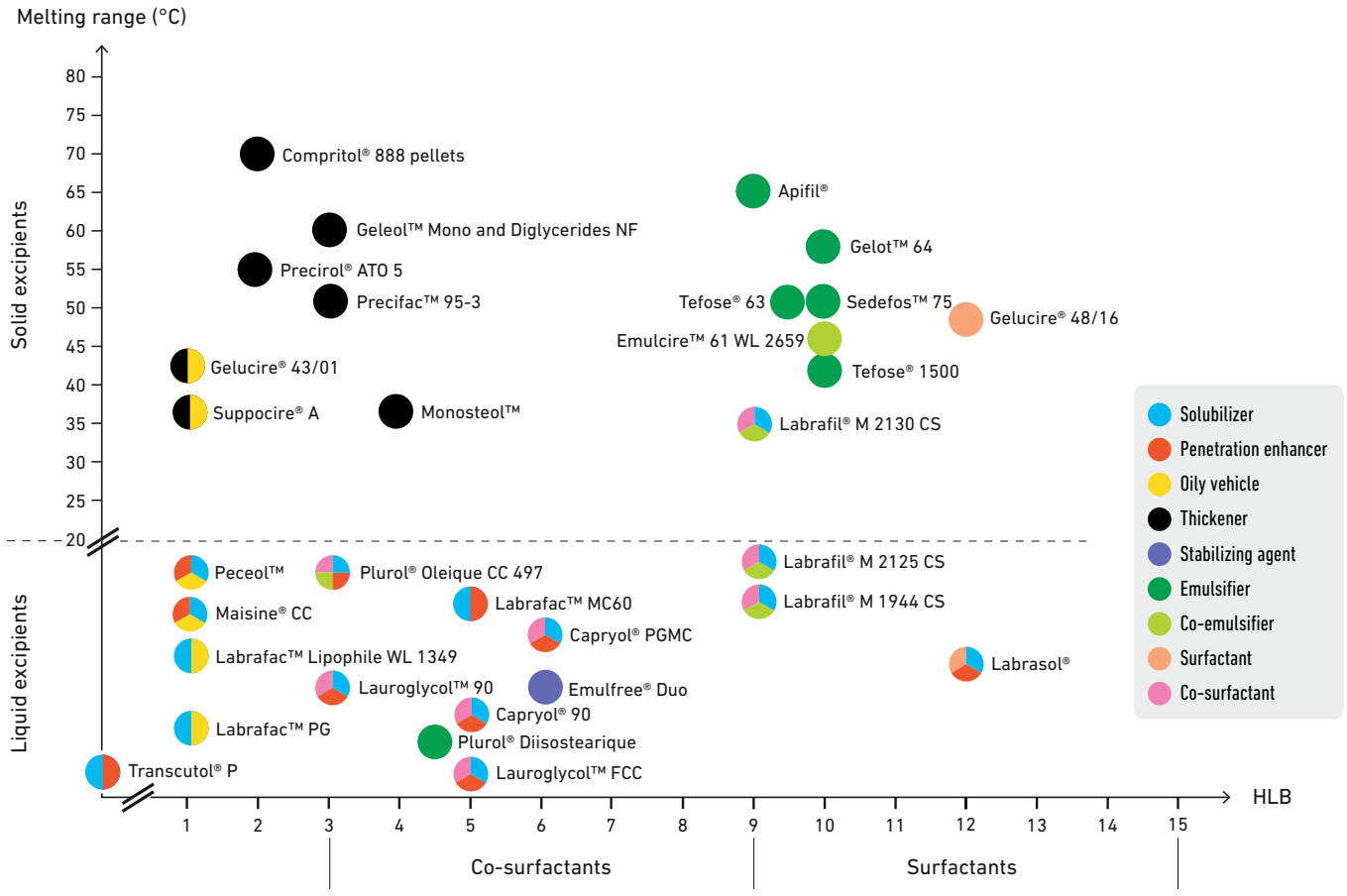
A combination of penetration enhancers with different mechanisms provides interesting synergies and contribute to the push and pull effect, to optimize topical or transdermal drug delivery.

## Developing patient-friendly textures

Our excipients enable the formulation of all topical and transdermal dosage forms, with attractive textures aiming at improving patient adherence, while ensuring safe and efficient topical or transdermal drug delivery.

Our range includes solvents, penetration enhancers, emulsifiers, co-emulsifiers, surfactants, co-surfactants, thickeners, emollients and oily vehicles.




Melting range (°C)
Solid excipients
Liquid excipients
80
75
70
65
60
55
50
45
40
35
30
25
20
Compritol® 888 pellets
Geleol™ Mono and Diglycerides NF
Precirol® ATO 5
Precifac™ 95-3
Gelucire® 43/01
Suppocire® A
Monosteol™
Apifil®
Gelot™ 64
Tefose® 63
Sedefos™ 75
Gelucire® 48/16
Emulcire™ 61 WL 2659
Tefose® 1500
Labrafil® M 2130 CS
Peceol™
Plurol® Oleique CC 497
Maisine® CC
Labrafac™ MC60
Capryol® PGMC
Labrafac™ Lipophile WL 1349
Lauroglycol™ 90
Emulfree® Duo
Capryol® 90
Labrafac™ PG
Plurol® Diisostearique
Transcutol® P
Lauroglycol™ FCC
Labrafil® M 2125 CS
Labrafil® M 1944 CS
Labrasol®
Solubilizer
Penetration enhancer
Oily vehicle
Thickener
Stabilizing agent
Emulsifier
Co-emulsifier
Surfactant
Co-surfactant
HLB
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15
Co-surfactants
Surfactants

# Rectal and vaginal drug delivery

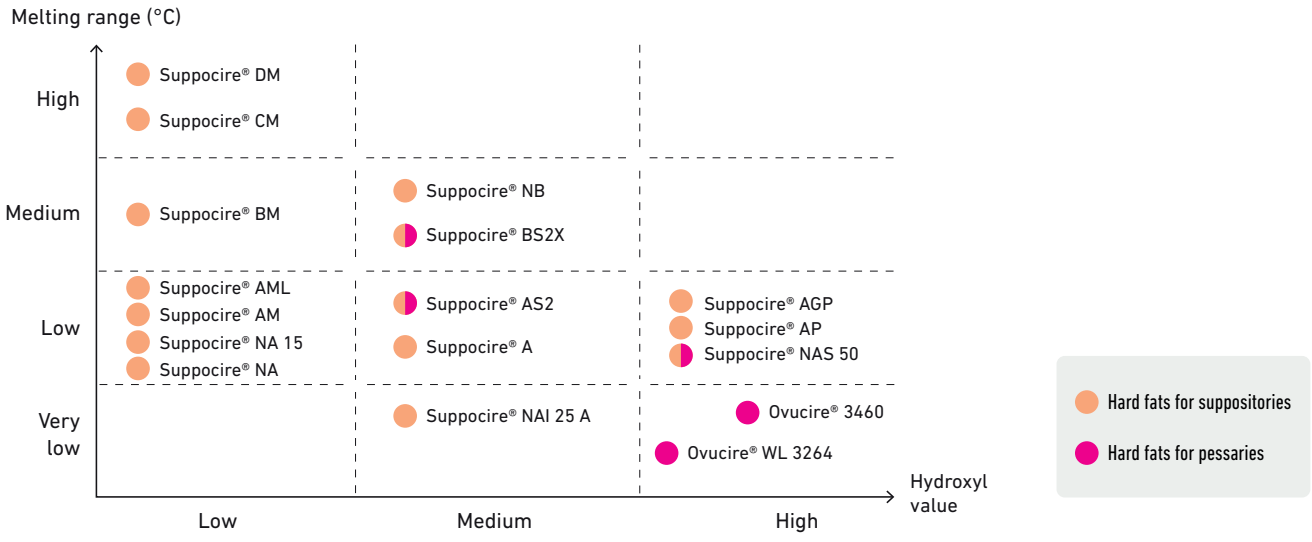
## Suppositories and pessaries

**Our hard fat bases Suppocire® and Ovucire® provide:**

- Proven safety and mucosal tolerance
- Excellent drug dispersion and physico-chemical stability
- Narrow melting range for high performance in vivo
- Solidification behavior adapted to a wide range of manufacturing equipments

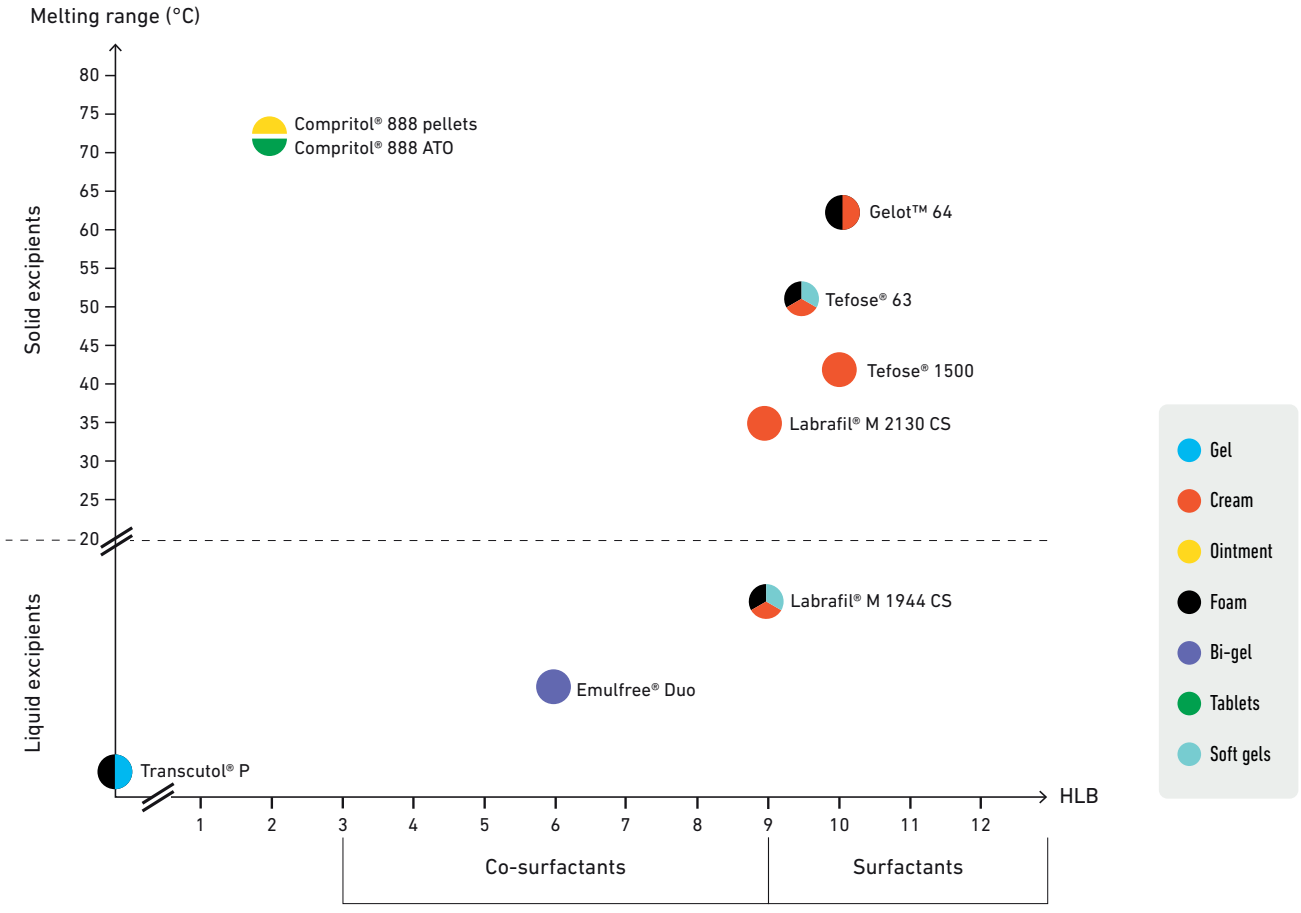
**Our bases and formulation expertise enable to:**

- Simplify existing formulations by reducing the number of excipients
- Optimize the manufacturing process and reduce quality issues
- Obtain excellent product quality attributes including drug dissolution, i.e. efficacy



## Alternative dosage forms

If solid dosage units, i.e. suppositories and pessaries, are very frequent for rectal and vaginal drug delivery, other dosage forms for local application are also used: creams, gels, bi-gels, foams, ointments, tablets... to achieve a local or systemic effect.



# Regulatory information and precedence of use

| Name | Description | NF Pharmacopoeia | EP Pharmacopoeia | JPE Pharmacopoeia | Chinese Pharmacopoeia | US Drug Master File | Chinese Bundling Review | Handbook of Pharmaceutical Excipients | GRAS Status | FDA IID | Precedence of use |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Apifil®** | PEG-8 beeswax | | | | | | | | | | ● |
| **Capryol® 90** | Propylene glycol monocaprylate (Type II) EP<br>Propylene glycol monocaprylate NF [1] | ● | ● | | | ● | ● | ● | | ● | ● |
| **Capryol® PGMC** | Propylene glycol monocaprylate (Type I) EP<br>Propylene glycol mono and dicaprylate NF [2] | ● | ● | | | ● | | ● | | | ● |
| **Compritol® 888 ATO** | Glycerol dibehenate EP / Glyceryl dibehenate NF / Glyceryl dibehenate Ch.P. | ● | ● | | ● | ● | ● | ● | ● | ● | ● |
| **Compritol® 888 Pellets** | Glycerol dibehenate EP / Glyceryl dibehenate NF / Glyceryl dibehenate Ch.P. | ● | ● | | ● | ● | ● | ● | ● | ● | ● |
| **Compritol® HD5 ATO** | Behenoyl polyoxyl-8 glycerides NF | ● | | | | | | | | | |
| **Emulcire™ 61 WL 2659** | Mixture of Cetyl alcohol EP / NF and Ceteth-20/Steareth-20 EP / NF | ● | ● | | | | | | | ● | ● |
| **Emulfree® Duo** | Mixture of Propylene glycol monolaurate (type I) EP / NF, Ethylcellulose EP / NF and Propylene glycol isostearate | | | | | | | | | | ● |
| **Geleol™ Mono and Diglycerides NF** | Glycerol monostearate 40-55 (type I) EP / Mono and diglycerides NF<br>Glyceryl mono- and distearate Ch.P. | ● | ● | | ● | | ● | ● | ● | ● | ● |
| **Geloil™ SC** | Mixture of refined soybean oil EP / NF, glyceryl distearate EP / NF and polyglyceryl-3 dioleate NF | ● | | | | | | | | ● | ● |
| **Gelot™ 64** | Mixture of glycerol monostearate EP / NF and PEG-75 stearate (type I) NF | ● | | | | | | ● | | ● | ● |
| **Gelucire® 43/01** | Hard fat NF / EP / JPE | ● | ● | ● | | ● | | ● | | ● | ● |
| **Gelucire® 44/14** | Lauroyl macrogol-32 glycerides EP / Lauroyl polyoxyl-32 glycerides NF / Lauroyl macrogolglycerides (32) Ch.P. | ● | ● | | ● | ● | ● | ● | | ● | ● |
| **Gelucire® 48/16** | Macrogol-32 stearate (type I) EP / Polyoxyl-32 stearate (type I) NF | ● | ● | | | | ●[4] | ● | | | ● |
| **Gelucire® 50/13** | Stearoyl macrogol-32 glycerides EP / Stearoyl polyoxyl-32 glycerides NF | ● | ● | | | ● | | ● | | ● | ● |
| **Gelucire® 59/14** | Mixture of Lauroyl Polyoxyl-32 glycerides EP / NF and PEG 6000 EP / NF | ● | ● | | | | | | | | |
| **Labrafac™ Lipophile WL 1349** | Triglycerides medium-chain EP / Medium-chain triglycerides NF / Medium-chain fatty acid triglyceride JPE | ● | ● | ● | | | | ● | | ● | ● |
| **Labrafac™ MC60** | Glycerol monocaprylocaprate (type I) EP<br>Glyceryl Mono and Dicaprylocaprate NF[3] | ● | ● | | | | | | ● | ● | ● |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **Labrafac™ PG** | Propylene glycol dicaprylocaprate EP<br>Propylene glycol dicaprylate/dicaprate NF | ● | ● | | | | | ● | | | ● |
| **Labrafil® M 1944 CS** | Oleoyl macrogol-6 glycerides EP<br>Oleoyl polyoxyl-6 glycerides NF | ● | ● | | | ● | ● | ● | | ● | ● |
| **Labrafil® M 2125 CS** | Linoleoyl macrogol-6 glycerides EP<br>Linoleoyl polyoxyl-6 glycerides NF | ● | ● | | | ● | | ● | | | ● |
| **Labrafil® M 2130 CS** | Lauroyl macrogol-6 glycerides EP<br>Lauroyl polyoxyl-6 glycerides NF | ● | ● | | | ● | | ● | | | ● |
| **Labrasol®** | Caprylocaproyl macrogol-8 glycerides EP<br>Caprylocaproyl polyoxyl-8 glycerides NF | ● | ● | | | ● | ● | ● | | ● | ● |
| **Labrasol® ALF** | Caprylocaproyl macrogol-8 glycerides EP<br>Caprylocaproyl polyoxyl-8 glycerides NF | ● | ● | | | ● | ● | ● | | ● | ● |
| **Lauroglycol™ 90** | Propylene glycol monolaurate (Type II) EP / NF | ● | ● | | | ● | ● | ● | | ● | ● |
| **Lauroglycol™ FCC** | Propylene glycol monolaurate (Type I) EP / NF | ● | ● | | | ● | ● | ● | | | ● |
| **Maisine® CC** | Glycerol monolinoleate EP / Glyceryl monolinoleate NF<br>Glyceryl monolinoleate ChP. | ● | ● | | ● | ● | ● | ● | | ● | ● |
| **Monosteol™** | Propylene glycol monopalmitostearate EP | | ● | | | | | | ● | ● | ● |
| **Ovucire® WL 3264** | Mixture of Hard fat EP / NF / JPE with additives | ● | ● | ● | | | | ● | | ● | ● |
| **Ovucire® 3460** | Mixture of Hard fat EP / NF / JPE with additives | ● | ● | ● | | | | | | ● | ● |
| **Peceol™** | Glycerol mono-oleate (type 40) EP / Glyceryl monooleate (type 40) NF | ● | ● | | | ● | ● | ● | ● | ● | ● |
| **Plurol® Diisostearique** | Triglycerol diisostearate EP / Polyglyceryl-3 diisostearate NF | ● | ● | | | | | | | | ● |
| **Plurol® Oleique CC 497** | Polyglyceryl-3 dioleate NF | ● | | | | ● | ● | | | | ● |
| **Precifac™ 95-3** | Cetyl alcohol EP / NF | ● | ● | | | | | ● | | ● | ● |
| **Precirol® ATO 5** | Glycerol distearate (type I) EP / Glyceryl distearate NF | ● | ● | | | ● | ●[4] | | ● | ● | ● |
| **Sedefos™ 75** | Mixture of tricetheareth-4 phosphate and ethylene glycol stearate EP / NF / JPE (and) diethylene glycol stearate EP / NF / JPE | | | | | | | | | | ● |
| **Suppocire® A** | Hard fat EP / NF / JPE / Ch.P | ● | ● | ● | | ● | ● | ● | | ● | ● |
| **Suppocire® AGP** | Hard fat EP / NF / JPE with glycerol monostearate EP / NF and PEG -75 stearate NF | ● | | | | | ● | ● | | ● | ● |
| **Suppocire® AM** | Hard fat EP / NF / JPE / Ch.P | ● | ● | ● | | ● | ● | ● | | ● | ● |
| **Suppocire® AML** | Hard fat NF/JPE / Ch.P with additive (lecithin)<br>Hard fat with additive EP | ● | ● | ● | | ● | ● | ● | | ● | ● |
| **Suppocire® AP** | Saturated polyglycolyzed glycerides | | | | | | ● | ● | | ● | ● |
| **Suppocire® AS2** | Hard fat EP / NF / JPE / Ch.P | ● | ● | ● | | ● | ● | ● | | ● | ● |
| **Suppocire® BM** | Hard fat EP / NF / JPE / Ch.P | ● | ● | ● | | ● | ● | ● | | ● | ● |
| **Suppocire® BS2X** | Hard fat NF / JPE / Ch.P with additive (polysorbate),<br>Hard fat with additive EP | ● | ● | ● | | ● | ● | ● | | ● | ● |
| **Suppocire® CM** | Hard fat EP / NF / JPE / Ch.P | ● | ● | ● | | ● | ● | ● | | ● | ● |
| **Suppocire® DM** | Hard fat EP / NF / JPE / Ch.P | ● | ● | ● | | ● | ● | ● | | ● | ● |
| **Suppocire® NA** | Hard fat EP / NF / JPE / Ch.P | ● | ● | ● | | ● | ● | ● | | ● | ● |
| **Suppocire® NA 15** | Hard fat EP / NF / JPE / Ch.P | ● | ● | ● | | ● | ● | ● | | ● | ● |
| **Suppocire® NAI 25 A** | Hard fat EP / NF / JPE / Ch.P | ● | ● | ● | | ● | ● | ● | | ● | ● |
| **Suppocire® NAS 50** | Hard fat EP / NF / JPE / Ch.P | ● | ● | ● | | ● | ● | ● | | ● | ● |
| **Suppocire® NB** | Hard fat EP / NF / JPE / Ch.P | ● | ● | ● | | ● | ● | ● | | ● | ● |
| **Tefose® 1500** | Mixture of PEG-6 stearate (type I) NF and PEG-32 stearate (type I) NF | ● | | | | ● | | ● | | ● | ● |
| **Tefose® 63** | Mixture of PEG-6 stearate (type I) NF and<br>Ethylene glycol palmitostearate EP / NF / JPE and PEG-32 stearate (type I) NF | ● | | | | | ● | ● | | ● | ● |
| **Transcutol® HP** | Highly purified diethylene glycol monoethyl ether EP / NF | ● | ● | | | ● | ● | ● | | ● | ● |
| **Transcutol® P** | Highly purified diethylene glycol monoethyl ether EP / NF | ● | ● | | | ● | ● | ● | | ● | ● |

1 May also be labeled as USP Propylene glycol monocaprylate (Type II) until December 1, 2026
2 May also be labeled as USP Propylene glycol monocaprylate (Type I) until December 1, 2026
3 May also be labeled as USP Glyceryl monocaprylocaprate (Type I) until May 1, 2025
4 Pending

# Committed to knowledge sharing

In Gattefossé tradition of knowledge sharing, we provide comprehensive technical documentation, including brochures, formulation guidelines, prototype formulations and videos. We also host regularly technical webinars to share with our customers the most updated information. All these technical documentation is freely available on our website.

We are also committed to providing training around the world:

- Lipid Schools *(in-house or at customers' premises)*
- Customized training in-house
- Back to the fac program for students

**Stay tuned to Gattefossé and make our website your favorite!**

# GATT' UP &act

## Committed to an elevated level of responsible science

**Gattefossé has always combined science and consciousness to innovate in cosmetic and pharmaceutical ingredients. We take particular care to control our operations to limit any impact on the ecosystems surrounding us and ensure that we respect the living world in all its forms.**

As an example, the use of responsible palm oil is a significant stake in the development of our excipients. In 2023, we initiated a transition of our pharmaceutical excipients toward using certified Roundtable on Sustainable Palm Oil (RSPO) palm oil and palm oil derivatives, which will continue over the coming years.

Several assessments validate Gattefossé's positioning as a responsible company, including the ISO 14001:2015 certification for our leading production site in Saint-Priest (France).

**Find out more about our CSR roadmap here:**

PHARMA PRODUCT CATALOGUE-EN-GB-2189-STG (2027 PC)

**GATTEFOSSÉ** ● CORPORATE HEADQUARTERS

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GATTEFOSSÉ

People make our name