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# GLOBAL PERSONAL CARE

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# LIPOID P 75-3: For naturalness and quality

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Phospholipids number among the body's own building blocks and are an essential part of our cell membranes. Therefore, they are highly biocompatible, completely biodegradable, and irritation-free, making them exceptionally suitable for sophisticated, high-end skin care products. Many of our phospholipids are based on non-GMO soy or on sunflower, and hence perfectly appropriate for COSMOS-approved formulations. In general, whenever a formulation needs more naturalness, tolerability and quality, phospholipids are the right choice.

## Hydrogenated phospholipids

Hydrogenated phospholipids are excellent biomimetic emulsifiers. Ideally, an emulsifier should both enable stable emulsions with a great skin feel and, at the same time, moisturise and protect the skin. In internal tests we demonstrated that hydrogenated phospholipids are exceptionally capable of stabilising o/w emulsions and are suitable for cosmetic formulations of different viscosities like serums, lotions and creams.

Additionally, the use of only small amounts of hydrogenated phospholipids in a formulation will result in a significant improvement of skin feel.

Hydrogenated phospholipids allow the creation of both rich, luxurious skin care products as well as cost efficient formulations with a premium touch. Due to their unparalleled tolerability and mildness, hydrogenated phospholipids are outstandingly suitable as ingredient in dermocosmetics, products for sensitive or damaged skin, baby care and intimate care.

## LIPOID P 75-3

LIPOID P 75-3 is a 100 % natural, COSMOS-approved, easy to process and versatile o/w emulsifier with a perfect skin compatibility and high-sensory skin feel benefits. Because of its superior skin sensation, LIPOID P 75-3 is the all-natural alternative to silicone oils. The hydrogenated phospholipids from non-GMO soybean mimic the lamellar bilayers of natural skin lipids, combining excellent emulsification


power with a perfect skin feel and unique moisturising properties.

### Application tests

The properties of LIPOID P 75-3 were worked out in several application-technical test series. In order to be able to exclude interactions with other raw materials, a simplified formulation with only a few components was used here (Formulation 1).

### Use level

In the first step, 4 different oils were tested to find out whether LIPOID P 75-3 is compatible with a wide range of oils of varying HLB-values and polarities. For this purpose, MCT, squalane, sunflower oil and jojoba oil were used.

All test batches with 3 % LIPOID P 75-3 and 25 % oil were stable in our stability tests. In a next step, tests were carried out with an application concentration of only 1 % LIPOID P 75-3 and 25 % oil.

**FORMULATION 1**

| Ingredients | % w/w |
|---|---|
| Oil | X |
| LIPOID P 75-3 | X |
| | |
| Water | Ad 100 |
| Glycerin (86 %) | 6.00 |
| Preservative | 4.00 |
| Xanthan Gum | 0.20 |
| Dihydroxanthan Gum | 0.80 |
| Sodium Hydroxide/Citric Acid | q.s. |

Viscosity: Ca. 5500 mPas

Again, all formulations were stable.

Then, the limits of the emulsifying performance of LIPOID P 75-3 were tested. For this purpose, tests were carried out with a 40 % oil phase. The stability results again were very good. With the exception of the formulation containing MCT (which separated at changing temperature), none of the batches showed any abnormalities after testing.

Even emulsions with a low oil concentration of 5 % can be produced with LIPOID P 75-3 without any problems. No special conditions or equipment was used.

### Compatibility: pH

Besides the amount of oil absorbed, other factors are also important in order to cover a wide range of applicability. An important factor for formulations is the pH value, which plays an enormous role in many aspects such as the effectiveness of preservatives. We have therefore carried out tests here in a slightly acidic pH range down to pH 4.0 in order to be able to assess the performance of LIPOID P 75-3 in these ranges.

In order to be able to cover as many aspects as possible and thus realistically assess the performance at pH 4.0, not only the

| Oil | MCT | Squalane | | Sunflower Oil | | Jojoba Oil | |
|---|---|---|---|---|---|---|---|
| HLB | 4 | 11 | | 7 | | 6 | |
| Oil Loading (%) | 25 | 25 | 40 | 25 | 40 | 25 | 40 |
| LIPOID P 75-3 Concentration (%) | 1 | 1 | 3 | 1 | 3 | 1 | 3 |
| 45C/ 6 Weeks | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 20C/ 12 Months | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Cycle Test | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

**Figure 2:** Powdered LIPOID P 75-3 product.

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aforementioned Formulation 1 was tested: we added a further formulation with a significantly lower viscosity to the screening (Formulation 2).

LIPOID P 75-3 was also able to score points in these tests – there were no abnormalities in any of the stability parameters and no significant deviations could be found in the pH values either.

**Compatibility: thickeners**

In addition to emulsifiers, thickeners are another essential basic ingredient for the stability of emulsions. In our work so far, no significant incompatibilities could be noticed. In our opinion, LIPOID P 75-3 can be combined with all common thickeners. Furthermore, LIPOID P 75-3 is ideally suited for consistencies from fluid serums to viscous creams.

**Compatibility: co-emulsifiers**

LIPOID P 75-3 can be used in large variations not only as an emulsifier but also as a co-emulsifier. Compatibility with various commercially available emulsifiers (glyceryl stearate citrate, polyglyceryl-3 methylglucose distearate, sodium cetearyl sulfate, sodium stearoyl glutamate, potassium cetyl phosphate, ceteareth-20) was tested. For this purpose, test-formulations were produced with the respective recommended concentrations of a selection of popular emulsifiers. Then the same formulations were produced with addition of 0.5 and 1 % use concentration of LIPOID P 75-3, respectively. In this test series, too, there were no abnormalities in the stability results. LIPOID P 75-3 can therefore also be used as a co-emulsifier with a wide range of commercially available emulsifiers.

**Manufacturing processes**

LIPOID P 75-3 can be used in the conventional hot-hot process, but it is also possible to produce formulations with other processes, Formulation 1 was produced using the following processes:

- Hot-hot process
- Hot-cold process
- Hot-hot-cold process
- One pot process

The formulations were examined microscopically after production and after completion of the stability tests. Here it could be shown that the droplet distribution is most homogeneous in the hot-hot process; the distributions with the hot-cold- and the one-pot-process were slightly worse; the distribution in the hot-hot-cold process was significantly worse. Despite these differences, however, no deviations could be found in the stability tests. If required, formulations with LIPOID P 75-3 can be manufactured using all of the tested processes, but we recommend the hot-hot process.

**Skin-feel study**

When looking for a smooth and silky skin feel, manufacturers of cosmetic products often choose to formulate with silicones. Still, there is ongoing interest in natural, biomimetic, non-occlusive skin texture modifiers. Hydrogenated phospholipids have the ability to generate an exceptionally smooth and silky skin feel, without covering the skin with an occlusive film. To demonstrate these skin feel benefits, LIPOID P 75-3 was compared to a widely used silicone oil.

In the study a sensory assessment of two topically applied formulations was performed by a selected female panel (20 female volunteers with healthy skin, aged between 18 – 60 years) trained in the sensory perception of cream products. One of the products was formulated with 1 % of LIPOID P 75-3, the other contained 4 % of silicone oil.

The results of the study showed that the use of LIPOID P 75-3 results in an equally smooth and silky skin sensation as the use of the silicone oil, even at significantly lower use level.

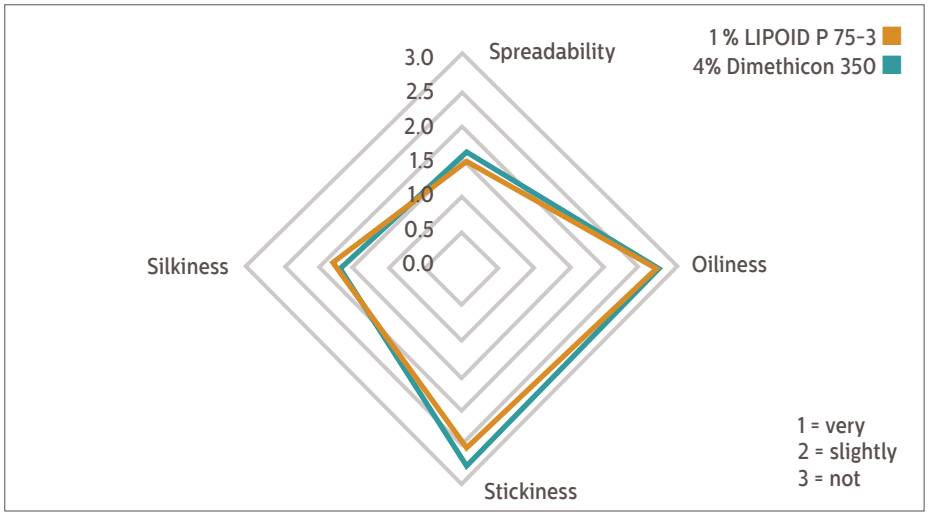


**Figure 3:** Skin feel of LIPOID P 75-3 vs. silicone oil.

**FORMULATION 2**

| Ingredients | % w/w |
|---|---|
| Water | 55.20 |
| Microcrystalline Cellulose, Cellulose Gum, Xanthan Gum | 0.75 |
| Glycerin | 2.00 |
| LIPOID P 75-3 | 1.00 |
| Preservative | 2.80 |
| Pentylene Glycol | 3.75 |
| | |
| Cetearyl Alcohol | 0.50 |
| Almond Oil | 10.00 |
| Jojoba Oil | 5.00 |
| Shea Butter | 4.00 |
| | |
| Natipide Eco | 4.00 |
| Ectoin | 1.00 |
| Water | 10.00 |
| Citric Acid | q.s. |

Viscosity: Ca. 210 mPas

## Summary

LIPOID P 75-3 is an easy to process and versatile biomimetic o/w emulsifier that mimics the lamellar bilayers of natural skin lipids and gives a unique smooth and silky skin feel.

LIPOID P 75-3 as sole emulsifier will tolerate oil loading levels up to 40 % at a use level of 3 %, at a use level of 1 % it will still allow up to 25 % oil loading. It is easy to use in various formulations, no special conditions (temperature or shear power) or equipment is needed. LIPOID P 75-3 will give stable emulsions in a pH-ratio from 4 to 8 and is perfectly combinable with a broad range of co-emulsifiers, thickeners, emollients, preservatives and actives. LIPOID P 75-3 can be incorporated in the water phase as well as in the fat phase, however, dispersion in the water phase is recommended. The phases must be heated to 60-80° C (depending on the medium used), the formulation should then be produced in the usual hot-hot process. Other production methods are also possible.

Additionally, the use even of small amounts of LIPOID P 75-3 in a formulation will result in significant improvement of skin feel. **PC**

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