IMWITOR® 375 A SUNFLOWER BASED VERSATILE O/W EMULSIFIER



IOI Oleo GmbH PERSONAL CARE

IMWITOR[®] 375

The sunflower-based O/W emulsifier for a holistic approach to sustainability

The sustainability concept is based on different building blocks, but sometimes only perceived as environmental friendliness. The concept of IMWITOR[®] 375 embraces the different aspects of sustainability:



- The vegetable feedstock used for the production of IMWITOR[®]
 375 originates from central Europe, transportation to our manufacturing plant and carbon footprint is reduced to a minimum
- While for many products palm oil remains the number one source because of its cost effectiveness, IMWITOR[®] 375 is solely produced from sunflower oil and sugar beet root
- Since IMWITOR[®] 375 can be used in various low-energy processes, including cold-cold-emulsification, time and energy is saved in production, resulting in a very economic process
- With a typical use concentration of only 0,5–2%, IMWITOR[®]
 375 is a very cost-effective emulsifier

Characteristics

INCI: Glyceryl Citrate/Lactate/Linoleate/Oleate

- 100% natural
- Appearance: pale yellow viscous liquid
- Recommended dosage: 0.5–2%

Properties

- Food-approved O/W emulsifier
- Long-lasting, rich but non-sticky skin feel
- Cold/cold, cold/hot, and hot/hot processable

Sustainability aspects in product development and production

Establishing cold/cold emulsification processes with the aim to reduce energy consumption during the manufacturing process comes along with some restraints in the selection of raw materials. Substances with high melting points, which give the emulsion a certain viscosity and body, can hardly be used. Besides its application in conventional (hot/hot) emulsification processes, IMWITOR[®] 375 is a key material for novel, energy-saving technologies such as pre-emulsion technique and hot/cold/cold process.

Pre-emulsion technique

For this technique, the oil phase and part of the water phase (in total max. 50% of the formulation) are heated up and emulsified. This allows the use of products with high melting points and co-emulsifiers. The remaining cold water phase is then added to cool down the system. Changes in particle size distribution or viscosity compared to conventional processes cannot be observed, as the emulsification process takes place at elevated temperatures. The technique leads to the following advantages:

- Use of high-melting raw materials
- No change in viscosity
- Particle size distribution similar to that of conventional processes
- Reduced energy consumption
- Optimized production time

Comparison of time consumption: hot/hot to pre-emulsion technique



Timeline of Hot/Hot Process

Hot/cold/cold process

In cold/cold processes, IMWITOR® 375 can be used at concentrations below 1% to create stable formulations. However, to achieve the best stability results, narrow and homogeneous particle size distributions are needed and obtained by prolonging the homogenization step. This will of course increase the energy consumption and processing time rather than save energy by dispensing through the heating step. The hot/ cold/cold process can be an appropriate alternative. In this process, only parts of the oil phase are heated e.g. for the solubilisation of UV filters. The remaining cold oil phase is added to the hot oil phase, resulting in a mixture of 35-40 °C. Now the water phase can be added and the homogenization process is started. Additionally, this approach is not limited to the use of liquid raw materials only. The hot/cold/cold process leads to the following advantages:

- Short production time
- Not limited to liquid raw materials
- Optimized homogenization step leads to small particle size distribution



Starting point (Oil phase added to water only by stirring)



Particle size of cold/cold process with IMWITOR® 375. Prepared with IKA UT 25, 2 minutes at 15,000 rpm.



Particle size of hot/cold/cold process with IMWITOR® 375. Prepared with IKA UT 25, 2 minutes at 15,000 rpm.

FORMULATIONS

Face and Body Cream No. 793

Phase	Tradename	INCI	%
А	IMWITOR [®] 375	Glyceryl Citrate/Lactate/ Oleate/Linoleate	3.0
А	IMWITOR® 900 K	Glyceryl Stearate	3.0
А	Nafol® 1618	Cetearyl Alcohol	2.0
А	WITARIX® MCT 60/40	Caprylic/Capric Triglyceride	7.0
А	MIGLYOL® PPG 810	Propylene Glycol Dicaprylate/Dicaprate	6.0
А	Apricots Kernel Oil	Apricots Kernel Oil	1.0
А	Sweet Almond Oil	Sweet Almond Oil	1.0
А	Calendula Oil	Calendula Officialis Flower Oil	1.0
А	Tocopherol	Tocopherol	0.2
В	Glycerin 99,5	Glycerin	5.0
В	Preservative	Preservative	q.s.
В	Aqua dem.	Aqua	20.0
В	Keltrol [®] CG-RD	Xanthan Gum	0.2
С	Aqua dem.	Aqua	50.6
D	Fragrance	Parfum (EU) /Fragrance (US)	q.s.
Е	Sodium Hydroxide 10% in water	Sodium Hydroxide	q.s.

Preparation

- 1. Disperse Keltrol[®] CG-RD in phase B
- 2. Heat phase A and B separately to approx. 70–75 °C.
- 3. Add phase A with homogenistaion to phase B
- 4. Homogenize and start to add cold (~20°C) phase C after half of the homogeisation time in small in small portions.
- 5. At $55-50^{\circ}$ C hogeniszation is stoped and the rest of phase C is added with stirring.
- 6. Add phase D to the emulsion and adjust pH value to 6-6,5 .

Suppliers

IOI Oleo GmbH: IMWITOR[®], MIGLYOL[®], WITARIX[®] CP Kelco: Keltrol[®] Sasol: Nafol[®]

After Sun Yoghurt for Thirsty Skin No. 780

Cold/cold processed

Phase	Tradename	INCI	%
А	IMWITOR [®] 375	Glyceryl Citrate/Lactate/ Oleate/Linoleate	0.5
А	MIGLYOL® Coco 810	Coco-Caprylate/Caprate	5.0
А	MIGLYOL® PPG 810	Propylene Glycol Dicaprylate/Dicaprate	6.0
А	WITARIX® MCT 60/40	Caprylic/Capric Triglyceride	2.0
А	Tocopherol	Tocopherol	0.5
В	Cosphaderm® Magnolia Extract 98	Magnolia Officinalis Bark Extract	0.7
В	Glycerin 99.5	Glycerin	3.0
В	Aqua dem.	Aqua	ad.100.0
В	Carbopol [®] Ultrez-20	Acrylates/C10-30 Alkyl Acrylate Crosspolymer	0.4
С	Fragrance	Parfum (EU)/Fragrance (US)	q.s.
С	Color	Product Products	q.s.
D	Sodium Hydroxide 40%	Sodium Hydroxide	q.s.

Preparation

Prepare this formulation at room temperature

- 1. Homogenise phase A. (30 s/8000 rpm)
- 2. Incorporate the Carbopol Ultrez-20 in phase B separately under stirring
- 3. Stir phase B into phase A and homogenise until an even distribution of small particle size is achieved (3 min/20.000 rpm).
- 4. Add phase C and homogenise for a short time. (30 s/8000 rpm)
- 5. Adjust with phase D to a pH value of 6.5

Suppliers

IOI Oleo GmbH: IMWITOR[®], MIGLYOL[®], WITARIX[®] The Lubrizol Corporation: Carbopol[®] Cosphatec: Cosphaderm[®]

Raw material approved by ECOCERT GREENLIFE, compliant with the COSMOS standard.

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