

# **SUMMARY OF PRODUCT CHARACTERISTICS**

## **1 NAME OF THE MEDICINAL PRODUCT**

SMOFlipid 200 mg/ml emulsion for infusion

## **2 QUALITATIVE AND QUANTITATIVE COMPOSITION**

1000 ml of emulsion for infusion contain:

Soya-bean oil, refined 60.0 g

Triglycerides, medium-chain 60.0 g

Olive oil, refined 50.0 g

Fish oil, rich in omega-3-acids 30.0 g

Total energy: 8.4 MJ/l (= 2000kcal/l)

pH-value: approx. 8

Osmolality approx. 380 mosm/kg

Excipients with known effect:

1000 ml emulsion contains up to 5 mmol sodium (as sodium hydroxide and sodium oleate).

For the full list of excipients, see section 6.1.

## **3 PHARMACEUTICAL FORM**

Emulsion for infusion

White homogenous emulsion.

## **4 CLINICAL PARTICULARS**

### **4.1 Therapeutic indications**

Supply of energy and essential fatty acids and omega-3 fatty acids to patients, as part of a parenteral nutrition regimen, when oral or enteral nutrition is impossible, insufficient or contra-indicated.

## 4.2 Posology and method of administration

### Posology

The patient's ability to eliminate the fat infused, should govern the dosage and infusion rate, see section 4.4.

### Adults

The standard dose is 1.0 – 2.0 g fat/kg body weight (b.w.)/day, corresponding to 5 – 10 ml/kg b.w./day.

The recommended infusion rate is 0.125 g fat/kg b.w./hour, corresponding to 0.63 ml Smoflipid/kg b.w./hour, and should not exceed 0.15 g fat/kg b.w./hour, corresponding to 0.75 ml Smoflipid/kg b.w./hour.

### *Paediatric population*

#### Neonates and infants

The initial dose should be 0.5 – 1.0 g fat/kg b.w./day followed by a successive increase by 0.5 – 1.0 g fat/kg b.w./day up to 3.0 g fat/kg b.w./day.

It is recommended not to exceed a daily dose of 3 g fat/kg b.w./d, corresponding to 15 ml Smoflipid/kg b.w./day.

The rate of infusion should not exceed 0.125 g fat/kg b.w./hour.

In premature and low birthweight neonates, Smoflipid should be infused continuously over about 24 hours.

#### Children

It is recommended not to exceed a daily dose of 3 g fat/kg b.w./d, corresponding to 15 ml Smoflipid/kg b.w./day.

The daily dose should be increased gradually during the first week of administration.

The infusion rate should not exceed 0.15 g fat/kg b.w./hour.

#### Method of administration

Intravenous infusion into a peripheral or central vein.

When used in neonates and children below 2 years, the solution (in bags and administration sets) should be protected from light exposure until administration is completed (see section 4.4, 6.3 and 6.6).

## 4.3 Contraindications

- Hypersensitivity to fish-, egg-, soya- or peanut protein or to any of the active substances or excipients listed in section 6.1.
- Severe hyperlipidemia.
- Severe liver insufficiency.
- Severe blood coagulation disorders.
- Severe renal insufficiency without access to hemofiltration or dialysis.

- Acute shock.
- General contraindications to infusion therapy: acute pulmonary oedema, hyperhydration, decompensated cardiac insufficiency.
- Unstable conditions (e.g. severe post-traumatic conditions, uncompensated diabetes mellitus, acute myocardial infarction, stroke, embolism, metabolic acidosis and severe sepsis and hypotonic dehydration).

#### **4.4 Special warnings and precautions for use**

The capacity to eliminate fat is individual and should therefore be monitored according to the routines of the clinician. This is in general done by checking the triglyceride levels. Special caution should be taken in patients with a marked risk for hyperlipidemia (e.g. patients with high lipid dosage, severe sepsis and extremely low birth weight infants). The concentration of triglycerides in serum should in general not exceed 3 mmol/l during infusion. Reduction of the dosage or cessation of the lipid emulsion should be considered if serum or plasma triglyceride concentrations during or after infusion exceed 3 mmol/L. An overdose may lead to fat overload syndrome, see section 4.8.

This medicinal product contains soya-bean oil, fish oil and egg phospholipids, which may rarely cause allergic reactions. Cross allergic reaction has been observed between soya-bean and peanut.

Smoflipid should be given with caution in conditions of impaired lipid metabolism, which may occur in patients with renal failure, diabetes mellitus, pancreatitis, impaired liver function, hypothyroidism, and sepsis.

Clinical data in patients with diabetes mellitus or renal failure are limited.

Administration of medium-chain fatty acids alone can result in metabolic acidosis. This risk is to a great extent eliminated by the simultaneous infusion of the long chain fatty acids included in Smoflipid. Concomitant administration of carbohydrates will further eliminate this risk. Hence, simultaneous infusion of carbohydrate or a carbohydrate-containing amino acid solution is recommended. Laboratory test generally associated with monitoring of intravenous nutrition should be checked regularly. These include blood glucose levels, liver functions tests, acid base metabolism, fluid balance, full blood count and electrolytes.

Any sign or symptom of anaphylactic reaction (such as fever, shivering, rash or dyspnoea) should lead to immediate interruption of the infusion.

Smoflipid should be given with caution to neonates and premature neonates with hyperbilirubinemia and cases with pulmonary hypertension. In neonates, particularly premature neonates on long term parenteral nutrition, blood platelet counts, liver function tests and serum triglycerides should be monitored.

Light exposure of solutions for intravenous parenteral nutrition, especially after admixture with trace elements and/or vitamins, may have adverse effects on clinical outcome in neonates, due to generation of peroxides and other degradation products. When used in neonates and children below 2 years, Smoflipid should be protected from ambient light until administration is completed (see section 4.2, 6.3 and 6.6).

High levels of lipids in plasma may interfere with some laboratory blood tests, e.g. haemoglobin.

Smoflipid contains up to 5 mmol sodium per 1000 ml. To be taken into consideration by patients on a controlled sodium diet.

The addition of other medicaments or substances to Smoflipid should generally be avoided unless compatibility is known (see 6.2 and 6.6).

#### 4.5 Interaction with other medicinal products and other forms of interaction

Heparin given in clinical doses causes a transient increase in lipoprotein lipase release into the circulation. This may initially result in increased plasma lipolysis, followed by a transient decrease in triglyceride clearance.

Soya-bean oil has a natural content of vitamin K<sub>1</sub>. The content is however so low in Smoflipid that it is not expected to significantly influence the coagulation process in patients treated with coumarin derivatives.

#### 4.6 Fertility, pregnancy and lactation

There are no data available on exposure of Smoflipid in pregnant or breast-feeding women. There are no studies available on reproductive toxicity in animals. Parenteral nutrition may become necessary during pregnancy and lactation. Smoflipid should only be given to pregnant and breast-feeding women after careful consideration.

#### 4.7 Effects on ability to drive and use machines

Not relevant.

#### 4.8 Undesirable effects

Undesirable effects observed during the administration of fat emulsions:

	<i>Common</i> (≥1/100 to <1/10)	<i>Uncommon</i> (≥1/1000 to <1/100)	<i>Rare</i> (≥1/10,000 to <1/1000)	<i>Very rare</i> (<1/10,000)
<i>Vascular disorders</i>			Hypotension, hypertension	
<i>Respiratory, thoracic and mediastinal disorders</i>			Dyspnoea	
<i>Gastrointestinal disorders</i>		Lack of appetite, nausea, vomiting		
<i>Reproductive system and breast disorders</i>				Priapism

<i>General disorders and administration site conditions</i>	Slight increase in body temperature	Chills	Hypersensitivity-reactions (e.g. anaphylactic or anaphylactoid reactions, skin rash, urticaria, flush, headache), heat or cold sensation, paleness, cyanosis, pain in the neck, back, bones, chest and loins	
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Should these side-effects occur or should the triglyceride level during infusion rise above 3 mmol/l, the infusion of Smoflipid should be stopped or, if necessary, continued at a reduced dosage.

Smoflipid should always be a part of a complete parenteral nutritional treatment including amino acids and glucose. Nausea, vomiting and hyperglycemia are symptoms related to conditions indicating parenteral nutrition and may sometimes be associated with parenteral nutrition.

Monitoring of triglycerides and blood glucose levels are recommended to avoid elevated levels, which may be harmful.

Fat overload syndrome

Impaired capacity to eliminate triglycerides can lead to “Fat overload syndrome” which may be caused by overdose. Possible signs of metabolic overload must be observed. The cause may be genetic (individually different metabolism) or the fat metabolism may be affected by ongoing or previous illnesses. This syndrome may also appear during severe hypertriglyceridemia, even at the recommended infusion rate, and in association with a sudden change in the patient’s clinical condition, such as renal function impairment or infection. The fat overload syndrome is characterised by hyperlipemia, fever, fat infiltration, hepatomegaly with or without icterus, splenomegaly, anemia, leukopenia, thrombocytopenia, coagulation disorder, hemolysis and reticulocytosis, abnormal liver function tests and coma. The symptoms are usually reversible if the infusion of the fat emulsion is discontinued.

Should signs of a fat overload syndrome occur, the infusion of Smoflipid should be discontinued.

### Reporting of suspected adverse reactions

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via the national reporting system.

For UK: you can report side effects directly via the Yellow Card Scheme at: [www.mhra.gov.uk/yellowcard](http://www.mhra.gov.uk/yellowcard)

## **4.9 Overdose**

Overdose leading to fat overload syndrome may occur as a result of a too rapid infusion rate, or chronically at recommended rates of infusion in association with a change in the patients clinical conditions e.g. renal function impairment or infection.

Overdosage may lead to side-effects (see section 4.8). In these cases the lipid infusion should be stopped or, if necessary, continued at a reduced dosage.

# **5 PHARMACOLOGICAL PROPERTIES**

## **5.1 Pharmacodynamic properties**

Pharmacotherapeutic group: Solutions for parenteral nutrition, fat emulsions  
ATC-code: B05BA02

The fat emulsion has a particle size and biological properties similar to those of endogenous chylomicrons. The constituents of Smoflipid; soya-bean oil, medium-chain triglycerides, olive oil and fish oil have except for their energy contents, their own pharmacodynamic properties.

Soya-bean oil has a high content of essential fatty acids. The omega-6 fatty acid linoleic acid is the most abundant (approx. 55-60%). Alpha-linolenic acid, an omega-3 fatty acid, constitutes about 8 %. This part of Smoflipid provides the necessary amount of essential fatty acids.

Medium-chain fatty acids are rapidly oxidised and provide the body with a form of immediately available energy.

Olive oil mainly provides energy in the form of mono-unsaturated fatty acids, which are much less prone to peroxidation than the corresponding amount of poly-unsaturated fatty acids.

Fish oil is characterised by a high content of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). DHA is an important structural component of cell membranes, whereas EPA is a precursor of eicosanoids as prostaglandines, tromboxanes and leucotrienes.

Vitamin E protects unsaturated fatty acids against lipid peroxidation.

Two studies providing home parenteral nutrition in patients in need of long-term nutrition support have been performed. The primary objective in both studies was to show safety. Efficacy was the secondary objective in one of the studies, which was done in paediatric patients. This study was stratified by age groups (1 month - <2 years, and 2 – 11 years respectively). Both studies showed that Smoflipid has the same safety profile as the comparator (Intralipid 20%). Efficacy in the paediatric study was measured by weight gain, height, body mass index, pre-albumin, retinol binding protein and fatty acid profile. There was no difference between the groups in any of the parameters except the fatty acid profile after 4 weeks treatment. The fatty acid profile in the Smoflipid patients revealed an increase in omega-3 fatty acids in plasma lipoproteins and red blood cells phospholipids and hence reflects the composition of the infused lipid emulsion.

## **5.2 Pharmacokinetic properties**

The individual triglycerides have different clearance rate but Smoflipid as a mixture is eliminated faster than long chain triglycerides (LCT) with lower triglyceride levels during infusion. Olive oil has the slowest clearance rate of the components (somewhat slower than LCT) and medium chain triglycerides (MCT) the fastest. Fish oil in a mixture with LCT has the same clearance rate as LCT alone.

## **5.3 Preclinical safety data**

In pre-clinical studies no other effects than those expected after high doses of lipids were observed, based on single dose and repeat dose toxicity and genotoxicity studies performed with the Smoflipid emulsion. In a local tolerance study in rabbits a slight, transient inflammation after intra-arterial, paravenous or subcutaneous administration was observed. After intra-muscular administration a moderate transient inflammation and tissue necrosis were seen in some animals.

In a test in guinea pigs (Maximisation test) fish oil showed moderate dermal sensitisation. A systemic antigenicity test gave no indication of evidence of anaphylactic potential of fish oil.

# **6 PHARMACEUTICAL PARTICULARS**

## **6.1 List of excipients**

Glycerol

Egg lecithin

all-*rac*- $\alpha$ -Tocopherol

Water for injections  
Sodium hydroxide for pH adjustment  
Sodium oleate

## **6.2 Incompatibilities**

This medicinal product must not be mixed with other medicinal products except those mentioned in section 6.6.

## **6.3 Shelf life**

2 years

### Shelf life after first opening the container

Chemical and physical in-use stability has been demonstrated for 24 hours at 25°C. From a microbiological point of view the emulsion should be used immediately. If not used immediately, in-use storage times and conditions prior to use are the responsibility of the user and would normally not be longer than 24 hours at 2-8°C.

When used in neonates and children below 2 years, the solution (in bags and administration sets) should be protected from light exposure until administration is completed (see section 4.2, 4.4 and 6.6).

## **6.5 Nature and contents of container**

### Glass bottles

Type II glass, colourless, with butyl rubber stopper.

### Excel Infusion bag

The container consist of an inner bag (primary package) with an overpouch. An oxygen absorber and an integrity indicator (Oxalert™) are placed between the inner bag and the overpouch.

- The inner bag is made of a multilayer polymer film, alternatively Excel or Biofine.
- The excel inner bag consists of a poly(propylene/ethylene) copolymer, a thermoplastic elastomer and a copolyester.
- The Biofine inner bag film consists of poly(propylene/ethylene) copolymer and thermoplastic elastomers (SEBS and SIS). The infusion and additive ports are made of polypropylene and a thermoplastic elastomer (SEBS) equipped with synthetic polyisoprene stoppers.
- The oxygen barrier overpouch consists of polyethylene terephthalate and polyolefin or polyethylene terephthalate, polyolefin and ethylene-vinyl alcohol copolymer (EVOH).

-The oxygen absorber consists of iron powder in a polymer sachet.

-The integrity indicator consists of oxygen sensitive solution in a polymer sachet.

The overpouch, the oxygen absorber and the integrity indicator should be discarded after opening of the overpouch. The integrity indicator (Oxalert™) will react with free oxygen and change colour from clear to black in case of damage in the overpouch.

Package sizes:

Glass bottle Excel Plastic bag

100 ml 100 ml 10x100 ml  
10x100 ml 250 ml 250 ml  
10x250 ml 10x250 ml 500 ml  
500 ml 10x500 ml 12x500 ml

Not all pack sizes may be marketed

## 6.5 Nature and content of container

Glass bottle

Type II glass, colourless, with butyl rubber stopper.

Infusion bag

The container consist of an inner bag (primary package) with an overpouch. An oxygen absorber and an integrity indicator (Oxalert™) are placed between the inner bag and the overpouch.

- The inner bag is made of a multilayer polymer film, Biofine.
- The Biofine inner bag film consists of poly(propylene/ethylene) copolymer and thermoplastic elastomers (SEBS and SIS). The infusion and additive ports are made of polypropylene and a thermoplastic elastomer (SEBS) equipped with synthetic polyisoprene stoppers.
- The oxygen barrier overpouch consists of polyethylene terephthalate and polyolefin or polyethylene terephthalate, polyolefin and ethylene-vinyl alcohol copolymer (EVOH).
- The oxygen absorber consists of iron powder in a polymer sachet.
- The integrity indicator consists of oxygen sensitive solution in a polymer sachet.

The overpouch, the oxygen absorber and the integrity indicator should be discarded after opening of the overpouch. The integrity indicator (Oxalert™) will react with free oxygen and change colour from clear to black in case of damage in the overpouch.

Package sizes:

Glass bottle

100 ml  
10x100 ml  
250 ml

Plastic bag

100 ml  
10x100 ml, 20x100 ml  
250 ml

10x250 ml	10x250 ml
500 ml	500 ml
10x500 ml	12x500 ml
	1000 ml
	6x1000 ml

Not all pack sizes may be marketed.

## 6.6 Special precautions for disposal

Use only if the emulsion is homogeneous.

When used in neonates and children below 2 years, protect from light exposure, until administration is completed. Exposure of Smoflipid to ambient light, especially after admixture with trace elements and/ or vitamins, generates peroxides and other degradation products that can be reduced by protection from light exposure (see section 4.2, 4.4 and 6.3).

Infusion bag: The integrity indicator (Oxalert) should be inspected before removing the overpouch. If the indicator is black, oxygen has penetrated the overpouch and the product should be discarded.

Inspect the emulsion visually for phase separation prior to administration. Ensure that the final emulsion for infusion does not show any evidence of phase separation.

For single use only. Any unused emulsion should be discarded.

### Additives

Smoflipid may be aseptically admixed with amino acid, glucose, and electrolyte solutions to produce "All-In-One" Total Parenteral Nutrition (TPN) admixtures.

Compatibility for different additives and the storage time of the different admixtures will be available upon request from the marketing authorisation holder.

Additions should be made aseptically.

Any unused medicinal product or waste material should be disposed of in accordance with local requirements.

## 7 **MARKETING AUTHORISATION HOLDER**

Fresenius Kabi Limited  
Cestrian Court  
Eastgate Way  
Manor Park  
Runcorn  
Cheshire  
WA7 1NT  
United Kingdom

**8      MARKETING AUTHORISATION NUMBER(S)**

PL 08828/0166

**9      DATE OF FIRST AUTHORISATION/RENEWAL OF THE  
AUTHORISATION**

Date of first authorisation: 08 April 2005

Date of first renewal: 05 November 2008

**10     DATE OF REVISION OF THE TEXT**

06/03/2020