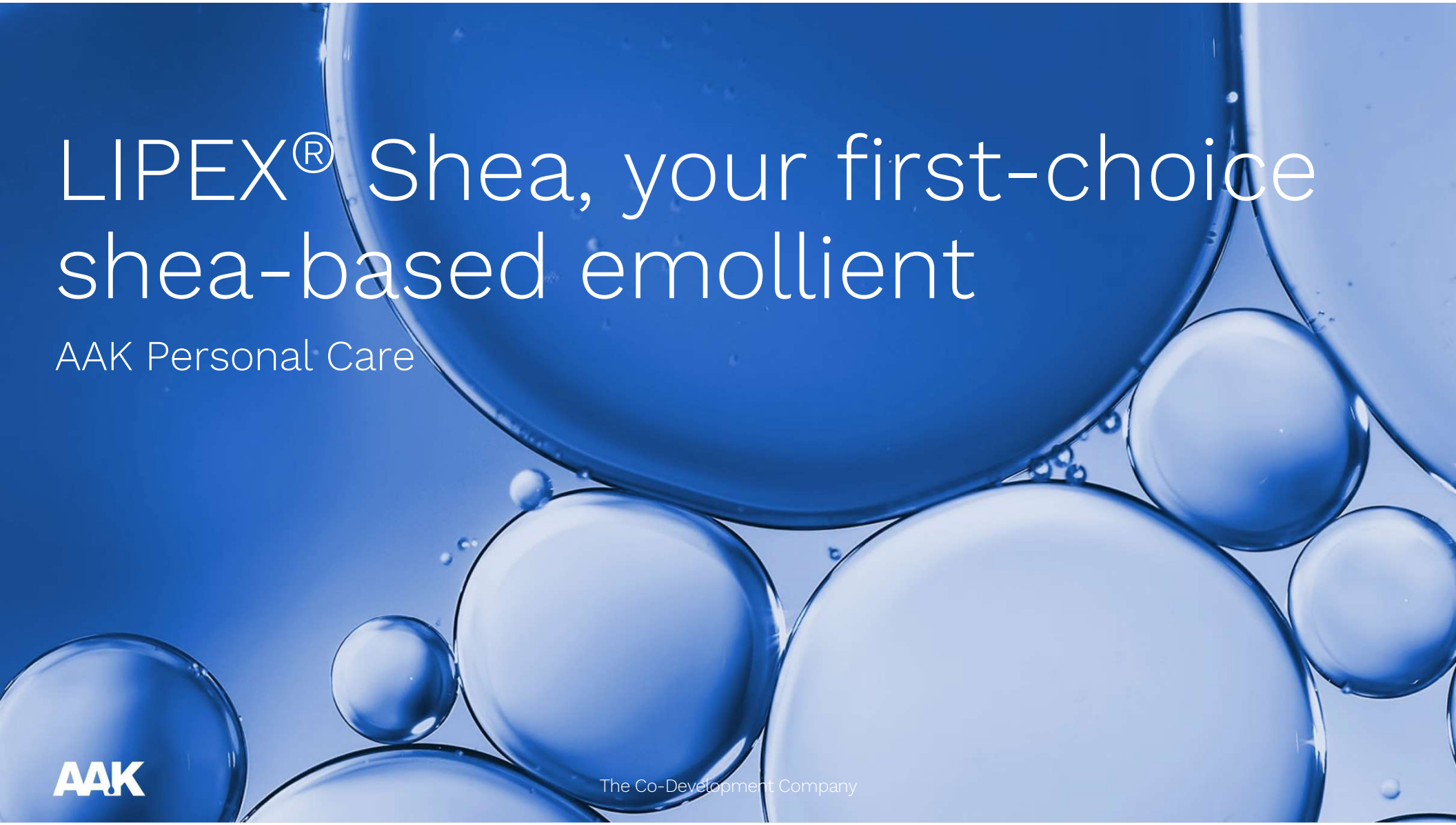
LIPEX® Shea, your first-choice shea-based emollient
AAK Personal Care
AAK
The Co-Development Company

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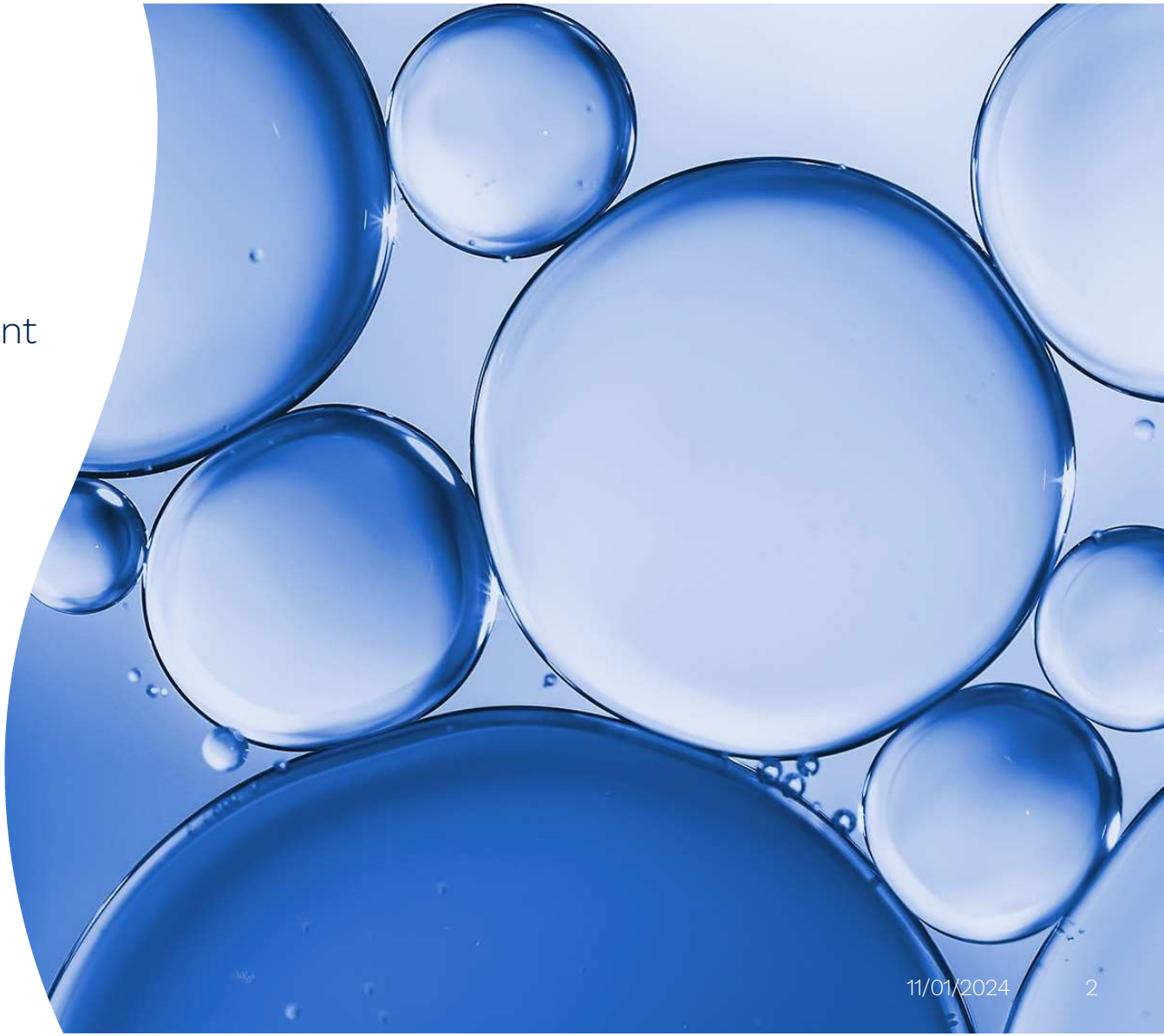


Shea and its benefits: socio-economic, environmental and for use as a cosmetic ingredient

Socio-economic benefits of shea

- In West Africa millions of rural women rely on the seasonal collection and sale of shea kernels to supplement their income and provide for their families.
- The shea industry has experienced exponential growth over the past 20 years, with shea exports estimated to have increased by 600 percent.*
- Increasing demand from cosmetic manufacturers is helping to build a bigger, better shea industry and halt rural-urban migration.
- The AAK shea value chain contributes to 10 UN Sustainable Development Goals:

*Source: Global Shea Alliance

Environmental benefits: Shea is a crop with a positive climate effect

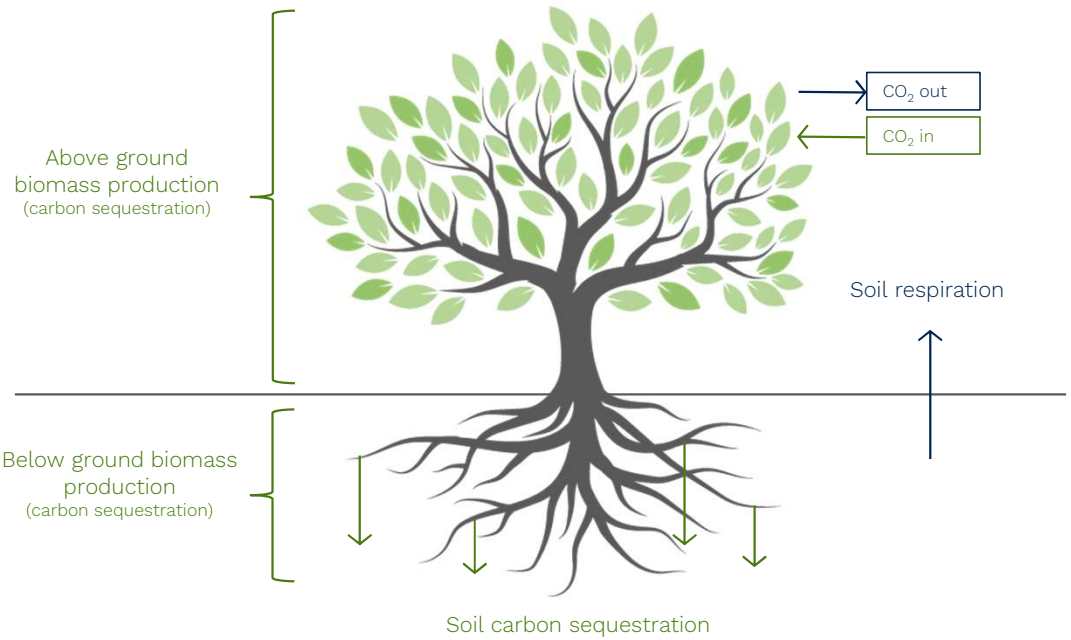
Why?

Every year the shea value chain fixes 1.5 million tons of CO_2 in the soil.

Every ton of shea kernel produced has a negative carbon footprint of 1.04 tons of CO_2*

*Source: Global Shea Alliance and the Food and Agriculture Organization of the United Nations, who are jointly conducting a multi-impact appraisal of the shea value chain in eight countries.

How does it work?



Environmental benefits of shea compared to other crops: How are common natural raw materials used in personal care grown?

PALM

Cultivation system:
Plantation (monoculture)

Risks*

- Deforestation or land conversion.
- Use of fertilizer
- Loss of biodiversity due to monoculture

COCONUT

Cultivation system:
Plantation (intercropping)

Risks*

- Land conversion and potentially deforestation.

COCOA

Cultivation system:
Plantation (intercropping)

Risks*

- Deforestation or land conversion.
- Heavy use of fertilizer and chemicals.

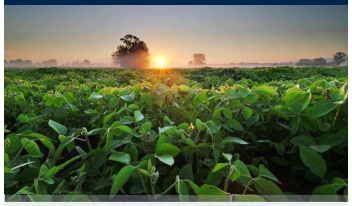
SUNFLOWER

Cultivation system:
Crop rotation system (monoculture)

Risks*

- High fertilizer use
- Loss of biodiversity due to monoculture

SOY



Cultivation system:
Crop rotation system (monoculture)

Risks*

- High fertilizer use
- Loss of biodiversity due to monoculture

*Risks identified by external partners, amongst others Proforest, in the supply chain, unless certification secures otherwise

Environmental benefits: Shea is more environmentally-friendly than other crops typically used in personal care

Environmental benefits of shea

In partnership with the Global Shea Alliance and other stakeholders, AAK runs training projects in West Africa to ensure continued protection of the shea trees and the environment including:

- Tree planting initiatives
- Building and maintenance of safer, more energy efficient rocket stoves:
  - 65% reduction in CO_2 emissions
  - 2.5 times more thermal efficiency*

AAK is instigating the use of shea waste at both ends of the supply chain, promoting shea shells as an alternative to firewood in the bush and using shea meal as an energy source in its processing plant in Aarhus, Denmark.

AAK is committed to planting 150,000 shea trees by season 2024/2025 as part of the Action for Shea Parkland Initiative founded by the Global Shea Alliance.

*Data from 2019 rocket stove impact assessment conducted by NITIDAE

Film on the role of shea and AAK in environmental protection

Shea trees grow wild in sub-Saharan Africa and play an important role in protecting against desertification and climate change. AAK runs training projects in the region to help conserve and regenerate the parklands.

Watch the following video to learn more!

Link to video in Youtube AAK PC channel

Shea and its benefits in cosmetics

Shea's **unique triglyceride composition** provides its characteristic sensory properties and skin feel:

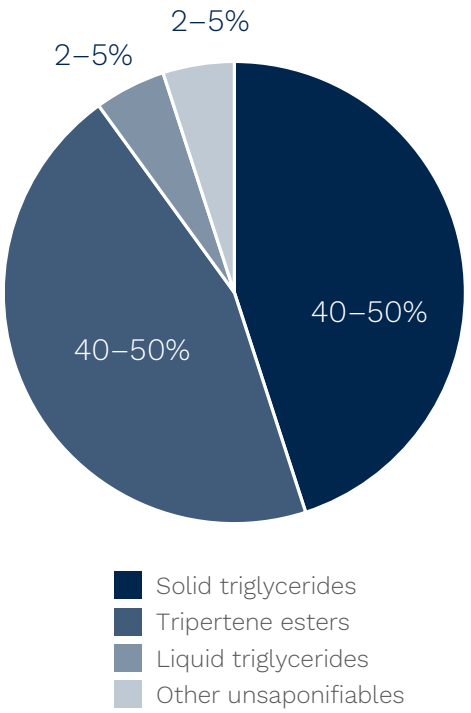
- Beneficial balance of solid and liquid triglycerides
- High content of moisturizing oleic acid (40-70%)
- Sufficiently high level of linoleic acid (6-10%)

High content of unsaponifiable matter with bioactive properties:

- Shea butter contains 4-10% of unsaponifiable matter in contrast to most vegetable oils (generally less than 1%)
- Dominated by bioactive triterpene esters with anti-inflammatory and skin repairing properties

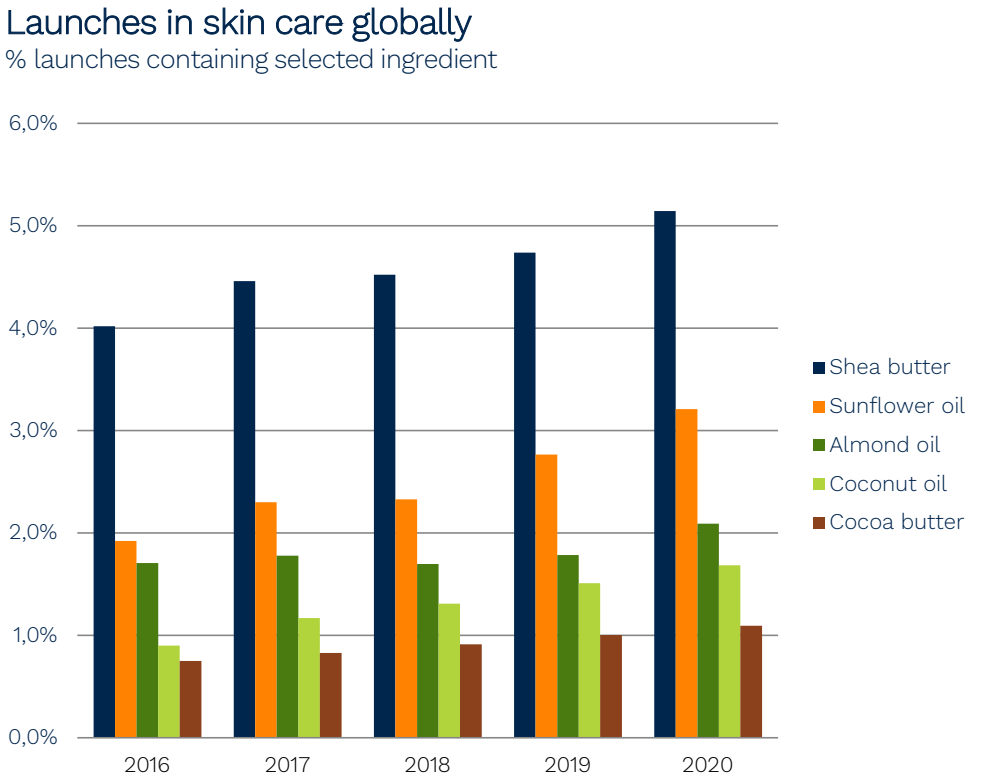
AAK applies its processing expertise to improve the quality and stability of shea butter; and enhancing its functionality for personal care applications.

Typical composition of shea



Shea is the most popular natural emollient in skin care applications

- Shea is the top choice within the natural base emollients and the number of launches is growing
- Shea outperforms even oils that are used in limited amounts and only for marketing claims
- Products using shea carry botanical and moisturizing claims leveraging its main benefits
- It is particularly popular within body care



Source: Mintel GNPD

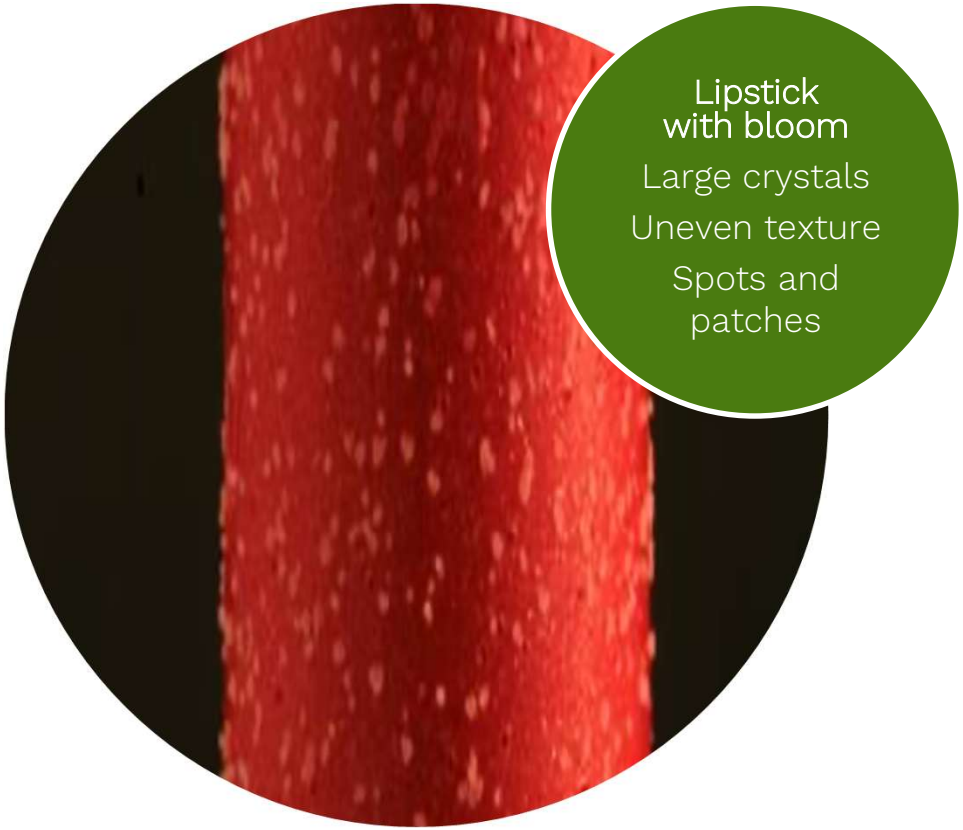
Why choose Lipex Shea?

Why should Lipex Shea be your first-choice shea-based emollient?

Why should Lipex Shea be your first-choice shea-based emollient?

Superior crystallization

Does your formulation sometimes look like this?



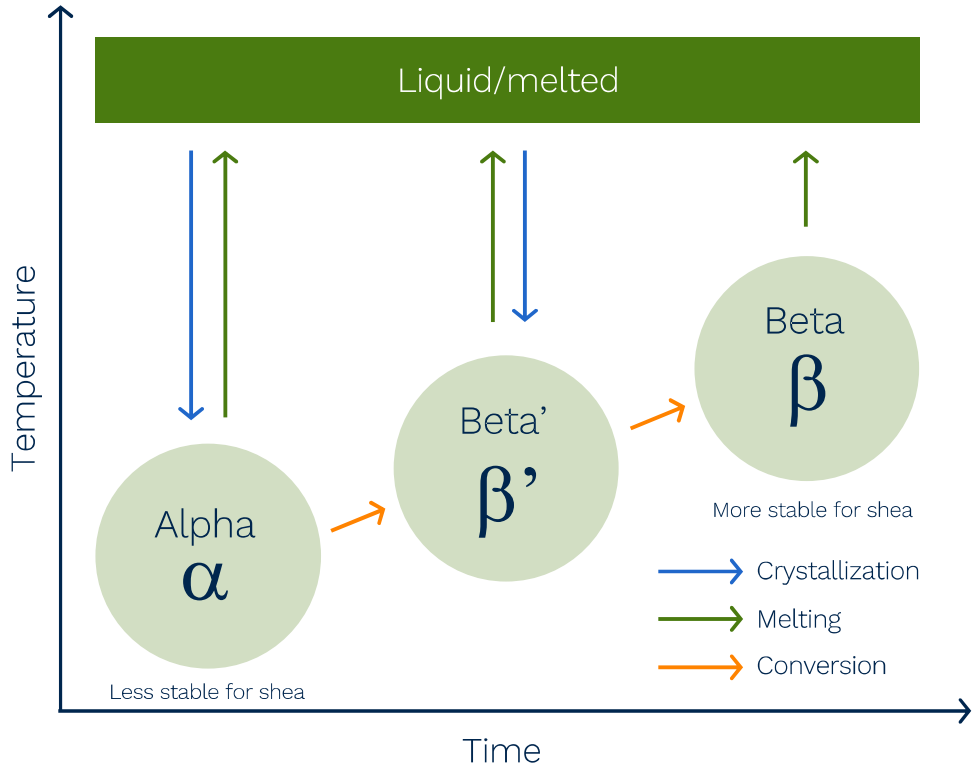
About blooming

- Bloom is the result of crystal growth
- Bloom occurs in lipsticks, balms, body butters and concentrated creams

Important to understand

- How can crystal growth behavior be controlled?
- How can blooming be avoided?

If bloom is the result of uncontrolled crystal growth, which types of crystals are relevant for shea-containing cosmetics?

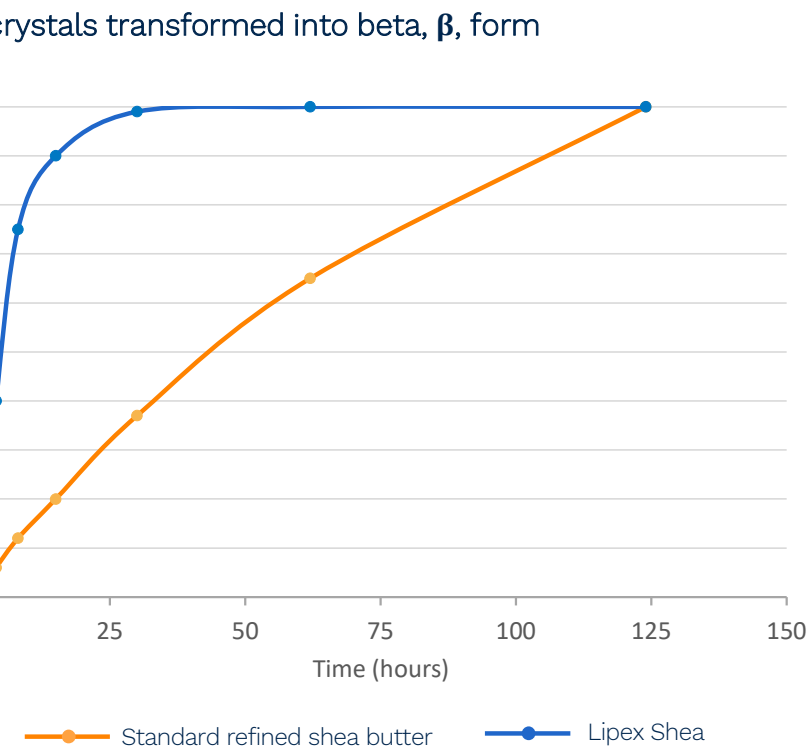


Important to understand

How can crystal growth behavior be controlled?
Crystals will grow due to their transition to different crystal forms during processing; the important aspect is to have a controlled manufacturing process

How can blooming be avoided?
A fast transition to the stable crystal form is key to minimize undesired crystallization (e.g., bloom)

Lipex Shea transitions 4 times faster to stable crystal form than standard refined shea butter



Time to transition to stable crystal form

	90%	100%
Lipex Shea	0.5 day	1.3 days
Standard Refined Shea Butter	4.4 days	5.2 days

Formulations become stable faster with Lipex Shea, however the effect is linked to the concentration

Due to its fast transition to stable crystal form, Lipex Shea forms smaller crystals than standard refined shea butter

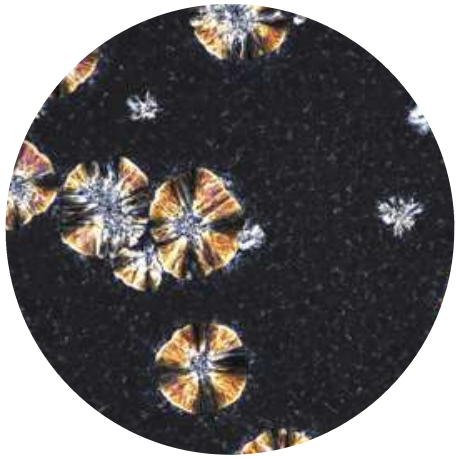
Generally, a fast transition to stable crystal form means that the material forms smaller crystals during its crystallization process.

These pictures show that Lipex Shea's crystals are much smaller and uniform, which reduces significantly the risk of bloom if your formulations

Lipex Shea

Microscopy pictures after 5 days at 20°C

Standard refined shea butter



Microscopy pictures after 5 days at 20°C

Polarized microscopy images with a temperature-controlled Peltier stage. Samples at 80°C were allowed to cool by 1˚C per minute to 20˚C.

Lipex Shea is an excellent alternative to standard refined shea butter as it reduces the risk of bloom significantly

The faster crystallization and transition to stable form of Lipex Shea reduces the risk of bloom typically associated with standard refined shea butters.

Watch the following video to see for yourself!

Link to video in Youtube AAK PC channel

Why should Lipex Shea be your first-choice shea-based emollient?

Superior quality

When formulating with shea butter, reducing its oxidation is key

Oxidation of shea butter should be minimized since it causes:

- Breakdown of products that can be smelly, pro-oxidative, irritant and/or inflammatory

Resistance to oxidation depends on:

- Content on polyunsaturated fatty acids (PUFAs)
- Quality of the emollient (e.g., amount of free fatty acids and contaminants)

There are also external factors affecting the oxidative stability:

- Light, heat and presence of oxygen

AAK has designed Lipex Shea to have more than double resistance to oxidation compared to standard refined shea butter

Specialized AAK processing where free fatty acids and contaminants are minimized, together with our lipid know-how; resulted in a semi-solid butter with an optimized fatty acid profile and high resistance to oxidation

Resistance against oxidation is typically measured by Oxidative Stability Index (OSI). The higher the OSI value, the more oxidative stable the material is

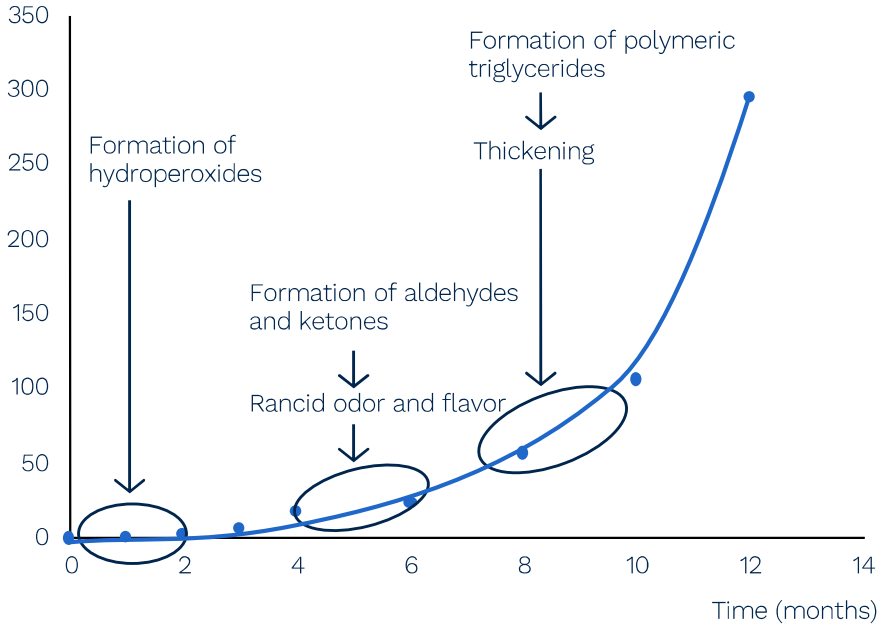
	Standard refined shea butter	Lipex Shea
Polyunsaturated fatty acids, PUFAs (%)	5 – 8	2 – 5
OSI at 110°C (hours)	20	45

Lipex Shea shows more than double resistance to oxidation

Oxidative stability and shelf life is also measured by peroxide value development over time

Example: sunflower oil stored at 22°C

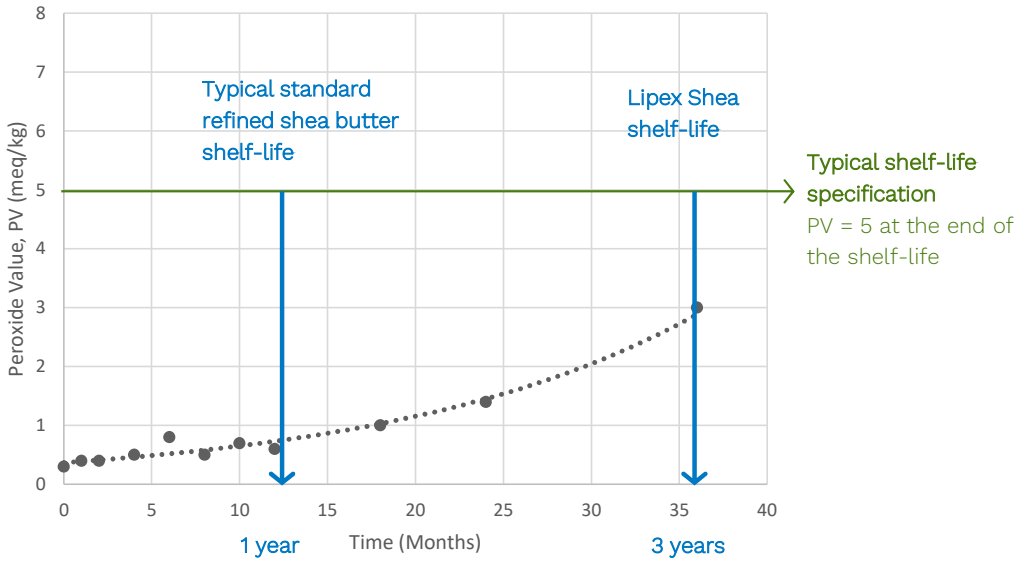
Peroxide Value



The slower the PV development the higher oxidative stability and the longer the shelf life of the ingredient

At AAK, we set high quality standards for our ingredients so you can get most value out of them

Development of peroxide value in Lipex Shea during storage at 20°C



What does that mean?

As shown, the PV development is exponential for most natural emollients. Therefore, to give the longest possible shelf-life, the product shall have a low PV upon dispatch, and the PV development shall be as slow as possible.

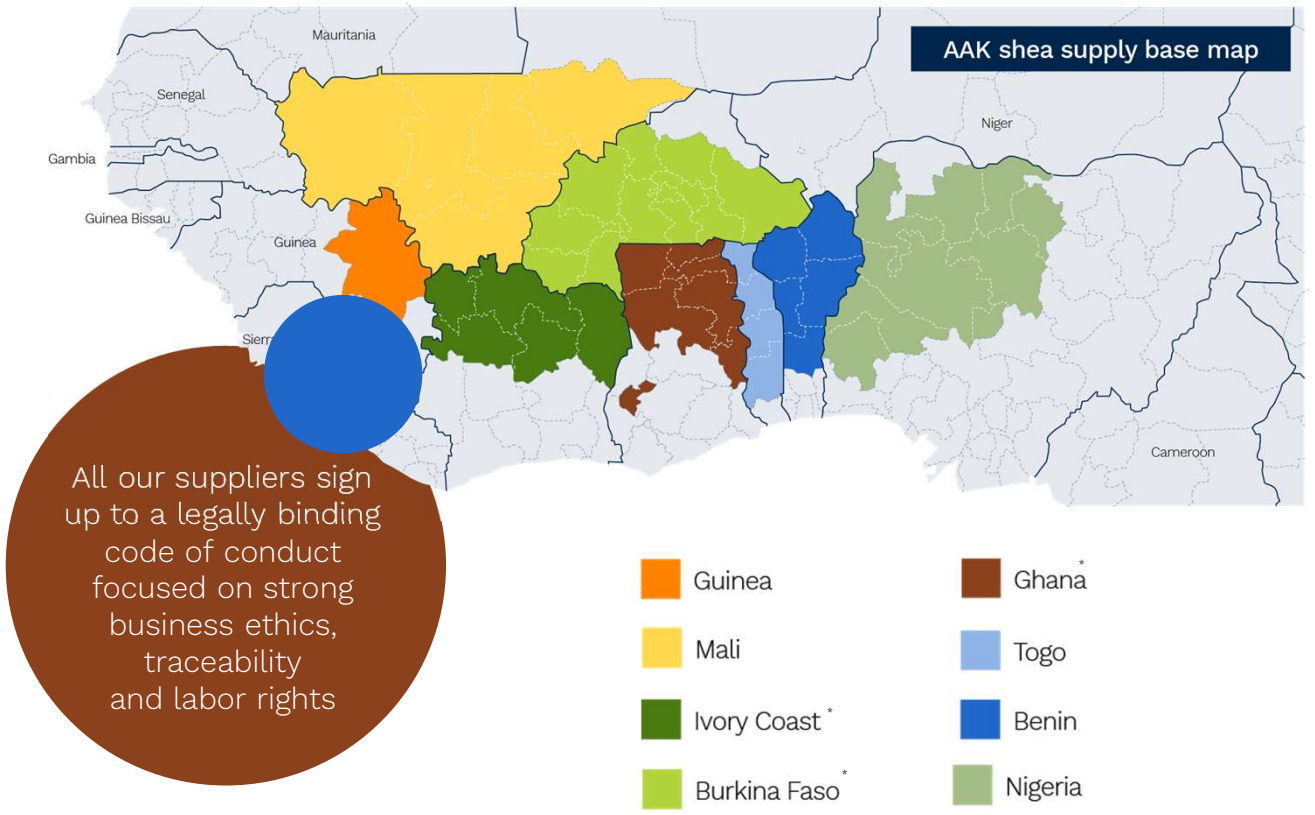
Lipex Shea has a high oxidation stability, which is shown by a slow PV development, ensuring a **3-year shelf life**; compared to the 12-months typically offered by standard refined shea butters.

Why should Lipex Shea be your first-choice shea-based emollient?

Ethically sourced

Ethically sourced shea – two supply chains

Our AAK shea is sourced from eight West African countries using two parallel supply chains to serve our food, confectionery and personal care divisions. We work directly with the women's groups engaged in our AAK Kolo Nafaso program and with conventional shea traders, who play an important logistical function in transporting kernels from remote areas to big towns.



*Countries with Kolo Nafaso program

Ethically sourced shea – our direct sourcing program, Kolo Nafaso

Kolo Nafaso

- Established in 2009 by AAK
- The largest verified shea sustainability program in West Africa focusing on: poverty alleviation and women empowerment
- Through direct trade, interest free micro-credits and training.

Social and economic impact

- 3 countries: Burkina Faso, Ghana, Ivory Coast
- Engaging almost 8% of the 4 million estimated to work in the shea export trade, and improving:
  - Rural livelihoods
  - Health and well-being
  - Resource efficiency
  - Climate change mitigation

Lipex Shea is Kolo Nafaso Mass Balance (slide option 1)

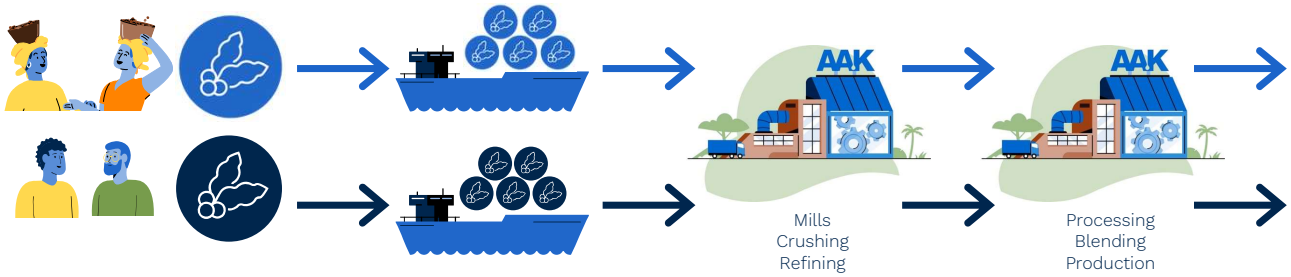
The continued growth of our AAK direct sourcing program and an established, responsible conventional supply chain has enabled AAK to offer Kolo Nafaso segregated (traceable) and mass balance shea-based products to its Personal Care customers.

Watch the following video to learn more!

Link to video in Youtube AAK PC channel

Lipex Shea is Kolo Nafaso Mass Balance (slide option 2)

The continued growth of our AAK direct sourcing program and an established, responsible conventional supply chain has enabled AAK to offer Kolo Nafaso segregated (traceable) and mass balance shea-based products to its Personal Care customers.



AAK sources shea kernels directly from the women's groups in our Kolo Nafaso program and from traditional shea traders. With two parallel supply chains, we can offer Personal Care customers segregated (traceable) and mass balance models.

The shea kernels sourced from our Kolo Nafaso program are fully segregated until they reach the mill. At this point, only the kernels needed for production of our traceable products remain segregated. The remainder are mixed with those from traditional shea traders.

In the Personal Care division the segregated kernels are used for manufacturing the fully traceable shea products in our Lipex range.

The products marked TR are manufactured using only the segregated shea kernels and are fully traceable back to the Kolo Nafaso program.

The mixed kernels are used for producing a wide range of AAK products.

In the Personal Care division, shea products produced from mixed kernels are Kolo Nafaso Mass Balance. That's because we use the same quantity of kernels to produce our shea-based portfolio as AAK as a company purchase from the Kolo Nafaso program. Although it is not a guarantee that Kolo Nafaso kernels are present in our Personal Care portfolio, it is a guarantee that when you buy our mass balance shea-based products, you are helping to support the growth of the program on the ground in West Africa.

Lipex Shea is also a climate-compensated product

This is the result of a partnership with FairClimateFund to scale a cookstove project generating Fairtrade and Gold Standard carbon credits from the AAK shea supply region, and enables us to:

- Fund climate action in the shea growing region.
- Reduce CO2 emissions and improve health and safety conditions by implementing energy-efficient cookstoves
- Give communities added access to finance through the Fairtrade premium, which goes back to households for investment in climate adaptation measures to further protect the landscape.
- Empower communities through training.

Inspirational formulations with Lipex Shea

Formulation 1

AAK-21-002, Velvet Touch Hand Cream

Raw Material	INCI Name	w/w (%)
Phase A		
Akoline PG7™	Polyglycerol-3 Stearate	4.00
Akoline SL™	Sodium Stearoyl Lactylate	0.50
Cetaryl Alcohol	Cetearyl Alcohol	2.00
GMS	Glycerol Stearate	1.00
Lipex Bassol C™	**Canola Oil**	**12.00**
Lipex Shea	**Butyrospermum Parkii Butter**	**8.00**
Phase B		
Glycerin 99%	Glycerin	3.00
Presentative	Preservative	1.00
Water	Aqua	68.40
Phase C		
Xanthan Gum	Xantham Gum	0.10
Phase D		
NaOH 20% in water	Sodium Hydroxide	0.00

pH: 6.5

Procedure:
1. Heat phases A and B separately at 75°C.
2. Add phase C to phase A under stirring.
3. Add the mix of phase A and C into the water phase (phase B) while stirring.
4. Homogenize.
5. Cool down to 30°C while stirring.
6. Adjust pH.

Concept

A moisturizing treat for dry hands. The formulation absorbs quickly on application without any sticky residue, leaving the skin feeling soft, smooth and comfortable.

Functional and technical benefits

Lipex Shea – high stable, semi-solid butter with a superior crystallization profile that brings the characteristic sensory and skin feel from shea.

Lipex Bassol C™ – offers high oxidative and photo-oxidative stability and has an odorless colorless appearance, making it a superb quality base for skin care formulations.

For information on this formulation and other inspirational material, go to our customer portal: Home Page - AAK Personal Care

Formulation 2

AAK-21-003, All Day, Everyday Body Care

Raw Material	INCI Name	w/w (%)
Phase A		
Akoline PG7™	Polyglycerol-3 Stearate	3.50
Akoline SL™	Sodium Stearoyl Lactylate	0.50
Akomed R™	Caprylic/Capric Triglycerides	10.00
Arlamor E	PPG-15 Stearyl Ether	4.00
GSM	Glycerol Stearate	1.00
Lipex L'sens™	**Soybean Glycerides (and) Butyrospermum Parkii Butter Unsaponifiables**	**3.00**
Lipex Shea	**Butyrospermum Parkii Butter**	**5.00**
Tegosoft OS	Ethylhexyl Stearate	2.50
Phase B		
Glycerin	Glycerin	3.00
Water	Aqua	66.25
Phase C		
Xanthan Gum	Xantham Gum	0.10
Phase D		
Perfume	Parfum	0.15
Preservative	Preservative	1.00
Phase E		
Triethanolamine	Triethanolamine	0.00

pH: 6.2

Procedure:
1. Heat phases A and B separately at 75°C.
2. Add phase C to the oil phase (phase A) under stirring.
3. Add the mix of phase A and C into the water phase (phase B) while stirring.
4. Homogenize.
5. Cool down to 40°C while stirring.
6. Add phase D while stirring.
7. Cool down to 30°C while stirring.
8. Adjust pH.

Concept

A deeply hydrating shea-based body lotion that does exactly what it says on the jar. A single daily application nourishes and hydrates, locking in moisture to keep skin feeling soft, smooth and beautiful from morning to night.

Functional and technical benefits

Lipex Shea – high stable, semi-solid butter with a superior crystallization profile that brings the characteristic sensory and skin feel from shea.

Lipex L'sens™ – gives an excellent skin-smoothing effect with velvety after feel and thanks to its film-forming properties, it gives a longer lasting moisturizing effect.

For information on this formulation and other inspirational material, go to our customer portal: Home Page - AAK Personal Care

AAK shea technology is an enabler for growth

Our unique value-adding processing allows us to fully utilize the properties of the shea butter raw material

Solid shea butters vary in melting profiles and crystallization properties

Liquid shea butters offer improved skin feel, higher versatility in formulation and the possibility for low energy formulations


Thank you!