Mastering shea: overcoming common formulation challenges

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AAK

Key takeaways for today

- Why is shea butter a widely appreciated ingredient & how the choice of shea butter can ensure you get the most out of its goodness

- What are the key challenges when formulating with shea butter & how working with a high-quality shea butter can help mitigate them

- Key parameters and characteristics that you can pay attention to when choosing a shea butter

Shea butter

- Plant-based butter, composed mainly of triglycerides, but rich in unsaponifiables.

	Handcrafted	Refined
Appearance	Beige / yellowish Original nutty odour	White / off-white Low odour / neutral
Composition	Higher variability	More consistent

- A highly valued & broadly known ingredient that ticks many boxes:
  - Natural
  - Highly desirable moisturizing and sealing properties
  - Environmentally friendly crop
  - Source of economic opportunity for women in rural Africa

Most frequent challenges

Grainy texture

Oxidation and rancidity

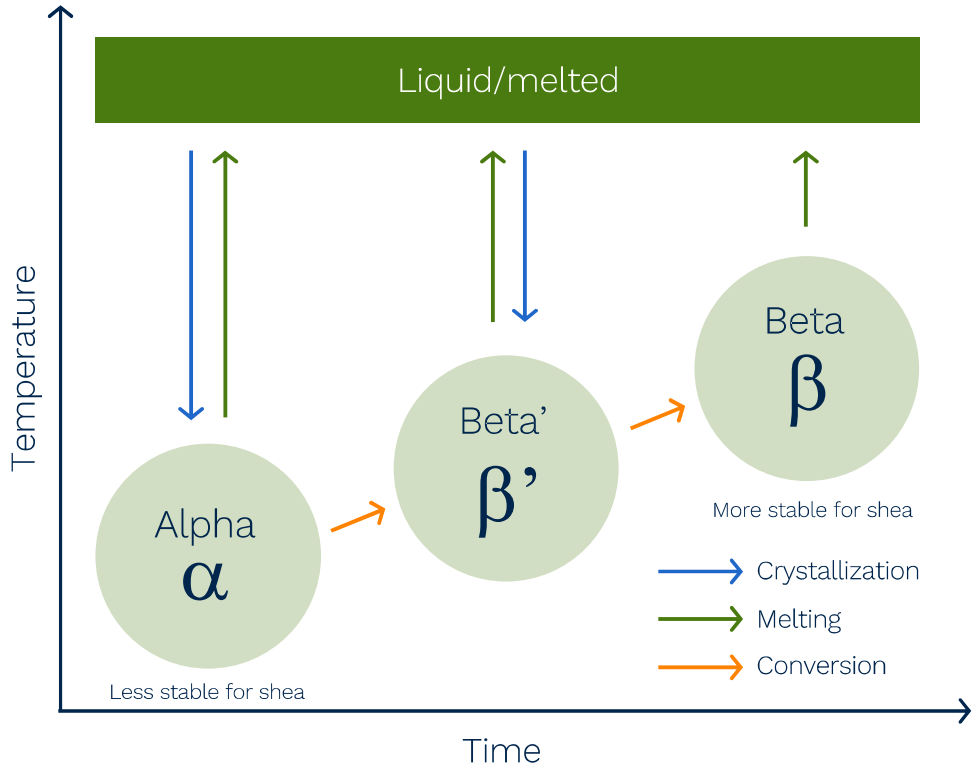
Bloom, gritty, grainy – multiple words, same phenomenon,

Formulations with bloom

- Common phenomena experienced by formulators and consumers with > 11millions entries in google linked to solving (*)
- Bloom is the result of crystal growth
- It's especially common when working with high concentrations of shea and/or in anhydrous systems.

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

The right crystallization is key



Important to understand

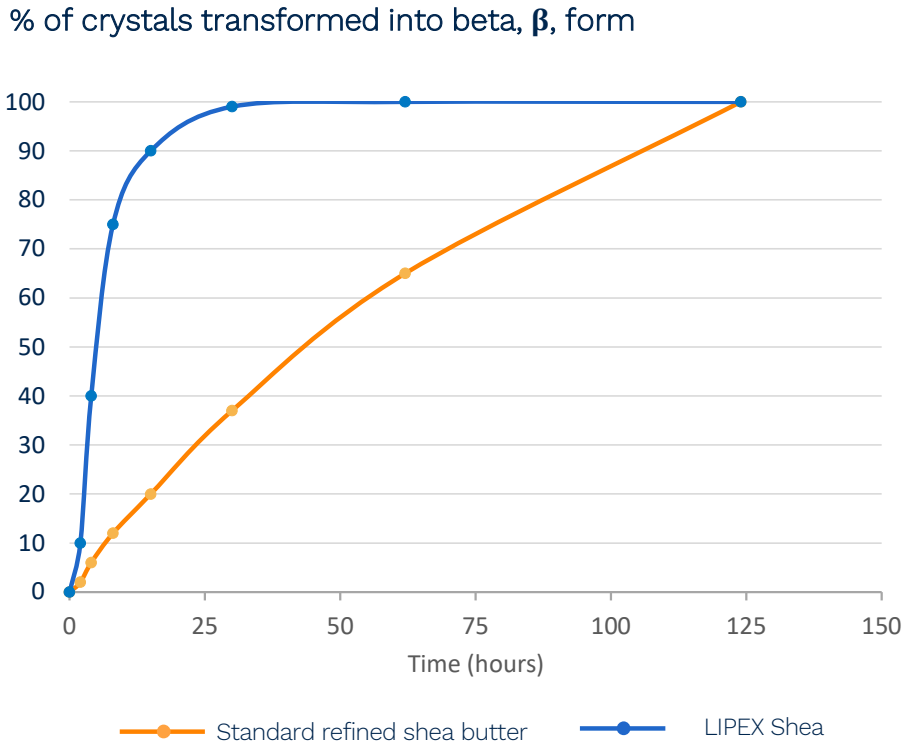
How can crystal growth behavior be controlled?

→ Crystals grow due to their transition to different crystal forms

How can blooming be avoided?

→ *F*ast transition to the stable crystal form

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



Time to transition to stable crystal form

	90%	100%
Optimized shea butter	0.5 day	1.3 days
Standard Refined Shea Butter	4.4 days	5.2 days

Formulations become stable faster with LIPEX Shea

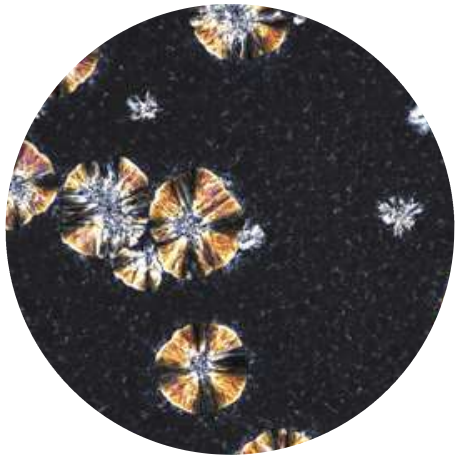
Due to its fast transition to stable crystal form, LIPEX Shea forms smaller crystals than standard refined shea butter

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

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.

See for yourself how LIPEX Shea reduces the risk of bloom significantly

Link to video in Youtube AAK PC channel

Most frequent challenges

Grainy texture

Oxidation and rancidity

AAK

The Co-Development Company

Have you ever experienced a cosmetic product...

Oxidation might be the root cause, and it is a more common issue when working with natural ingredients

Oxidation of shea butter

Causes the breakdown of products

Resistance to oxidation depends on:

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

External factors affecting the oxidative stability:

- Light, heat and presence of oxygen

Parameters used to evaluate oxidative stability:

- Oxidative Stability Index (OSI)
- Peroxide Value (PV)

LIPEX Shea has more than double the resistance to oxidation compared to standard refined shea butter

KEY PARAMETERS TO GET TO KNOW:

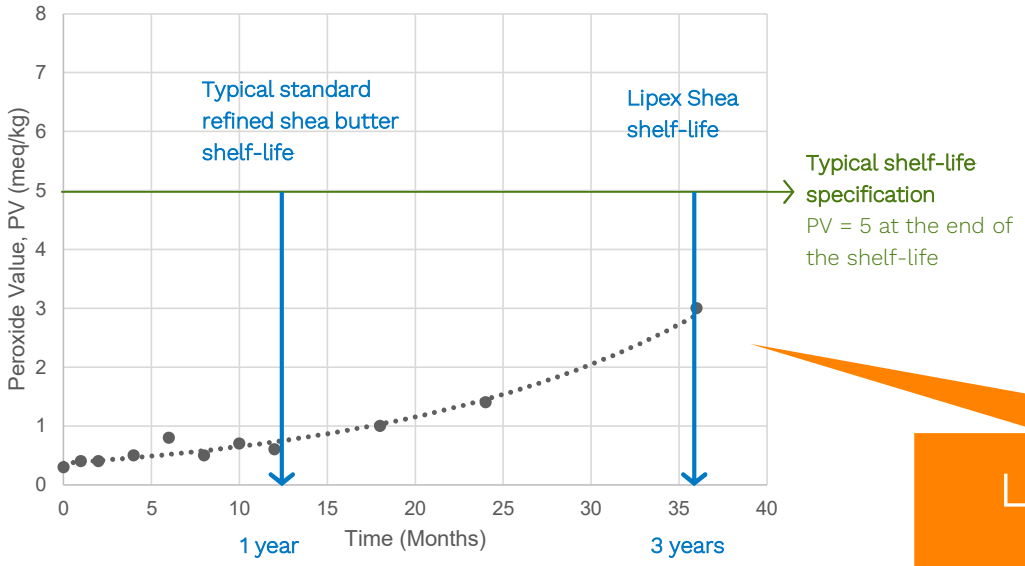
- Resistance against oxidation is typically measured by **Oxidative Stability Index (OSI).**
  - Higher OSI → Higher resistance
- **Polyunsaturated Fatty Acids (PUFA's)**
  - More easily oxidized
  - Specialized AAK processing results in a higher resistance to oxidation

	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

LIPEX Shea's slower PV development allows for a longer shelf life

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



KEY PARAMETERS TO GET TO KNOW:

- **Peroxide Value (PV)** is an indicator of the state of oxidation
  - Different PVs indicates different breakdown products are formed
  - Typical shea butter end of shelf life specification: 5 – 10.

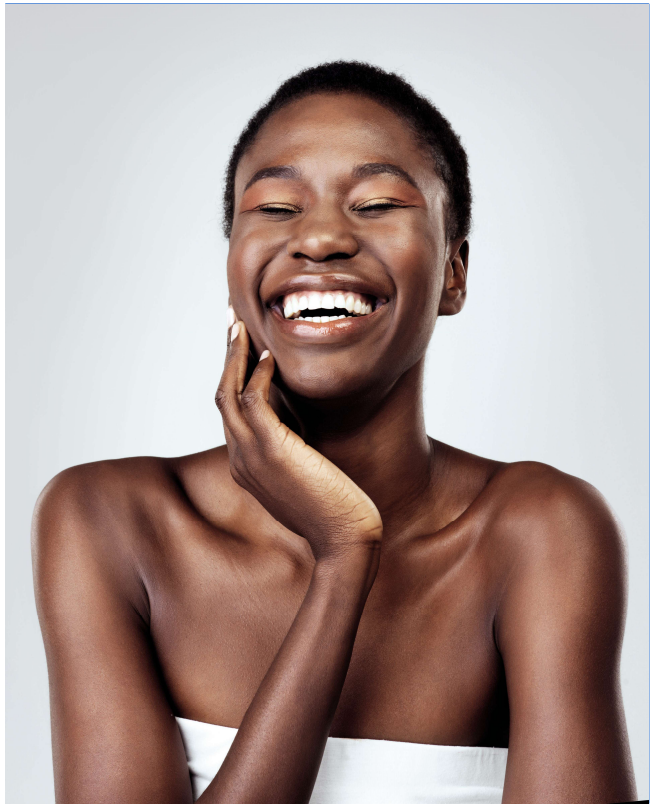
LIPEX Shea ensures a 3 year shelf-life

- Working with a high-quality shea butter can help you mitigate commonly faced challenges. It's a good idea to look at:
  - Crystallization behaviour
  - Parameters linked with oxidation: PV, OSI, PUFA

Do all the butters have the same benefit on the skin, the environment and the people involved?

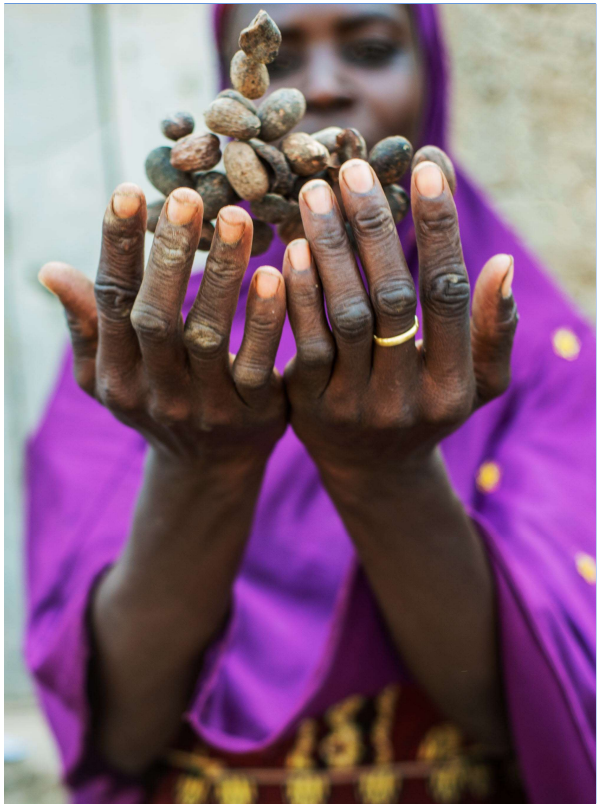
Different shea butters have different impacts

Skin



Environment

People



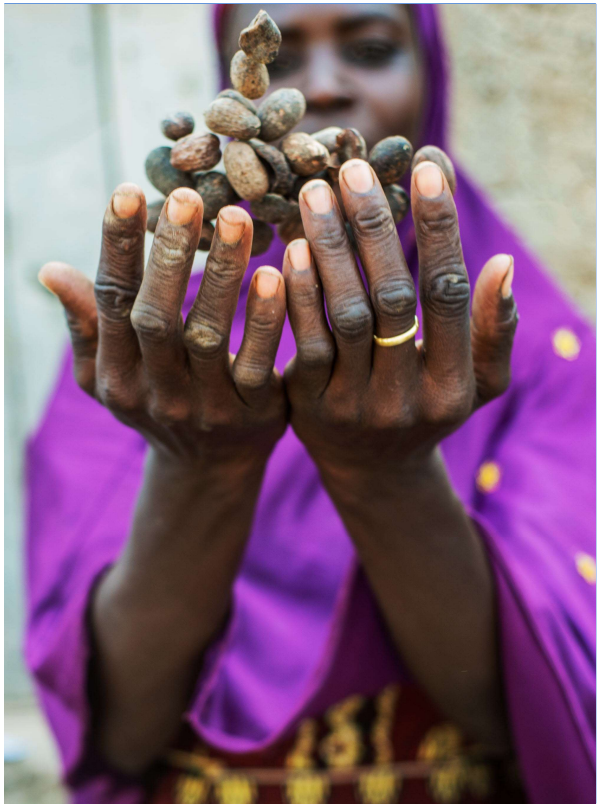
Different shea butters have different impacts

Skin

- Shea butters are rich in unsaponifiables, incl. triterpenes
- Triterpenes are known for their skin regenerating & protecting properties.
- A typical vegetable oil contains less than 1% of unsaponifiables
- Depending on the processing, shea butters will have between 5-12% triterpenes.

Environment

People



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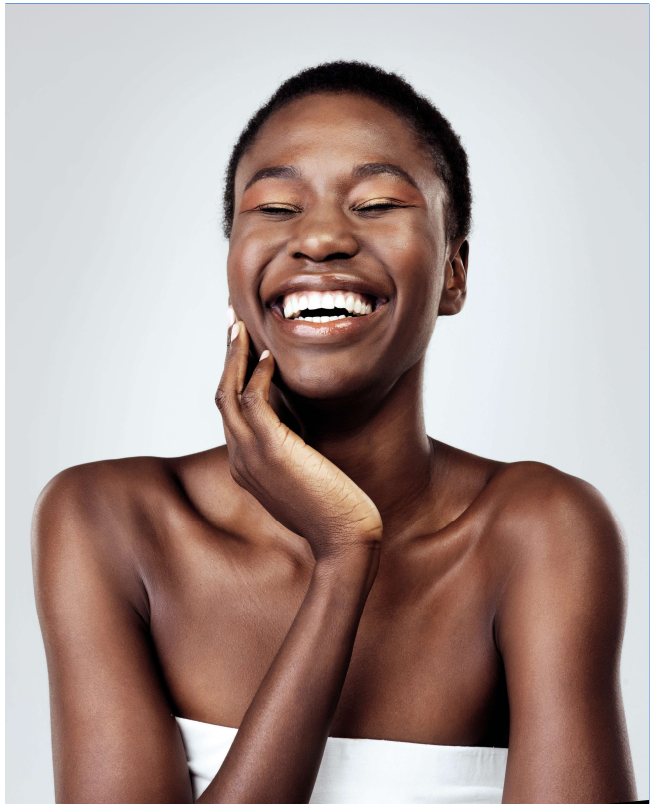
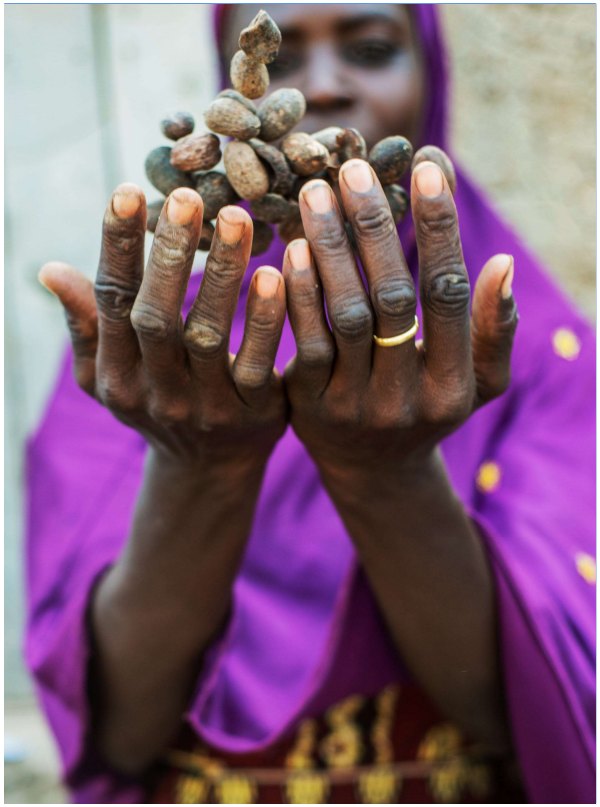


Environment

- Wild crop, manually collected
- **CO2 hotspots :** boiling of shea, transport, processing
- **Risks:** increasing threat to the shea parklands
- **Mitigating actions:**
  - Adoption on energy-efficient cookstoves
  - Direct trade optimizes logistics
  - Tree planting
  - Parkland management

People



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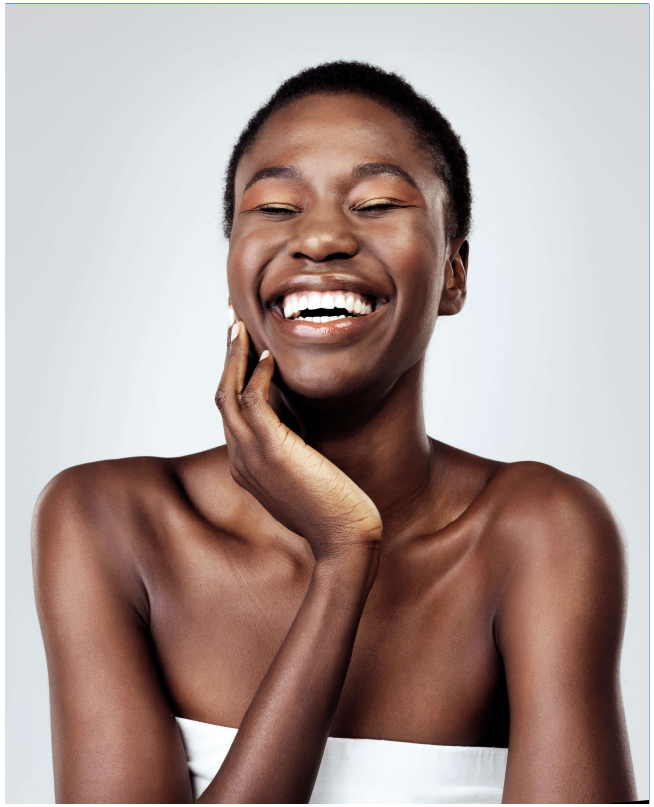

Environment

People

- Source of economic opportunity for women in rural Africa

- Risks:
  - Low income & poverty
  - Health & Safety
  - Access to Finance

- Mitigating actions:
  - Market access through direct trade
  - Prefinancing & VSLA training

Key takeaways

- Shea is a highly valued & broadly known ingredient, but it can pose challenges.

- Bloom and oxidation related issues are commonly experienced – but choosing the right shea butter can help. Keep an eye out for:
  - Crystallization behaviour
  - Oxidation related parameters like PV, OSI, PUFA

- Shea butter has a positive impact on skin, people and planet, but to which degree, it is highly depending on how it is sourced and processed.

Want to know more?

- Visit our website: https://aakpersonalcare.com/
- Or contact us:

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