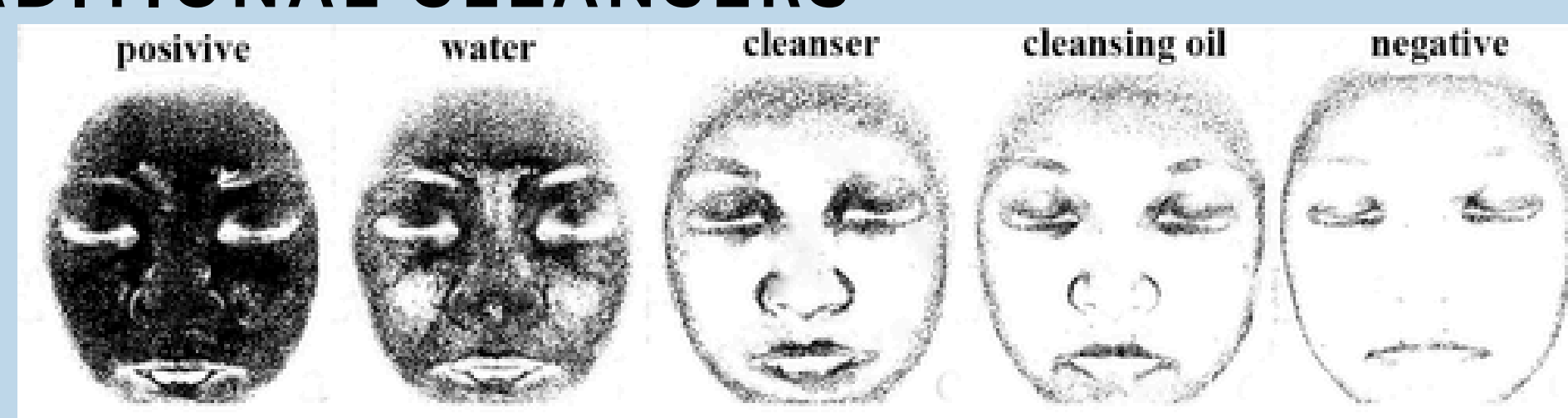


Motivation/Impact

TRADITIONAL CLEANSERS



- Users often miss edges & contours of their face when cleansing
- Residual sunscreen can lead to: Acne, Dryness, Redness, Hair loss

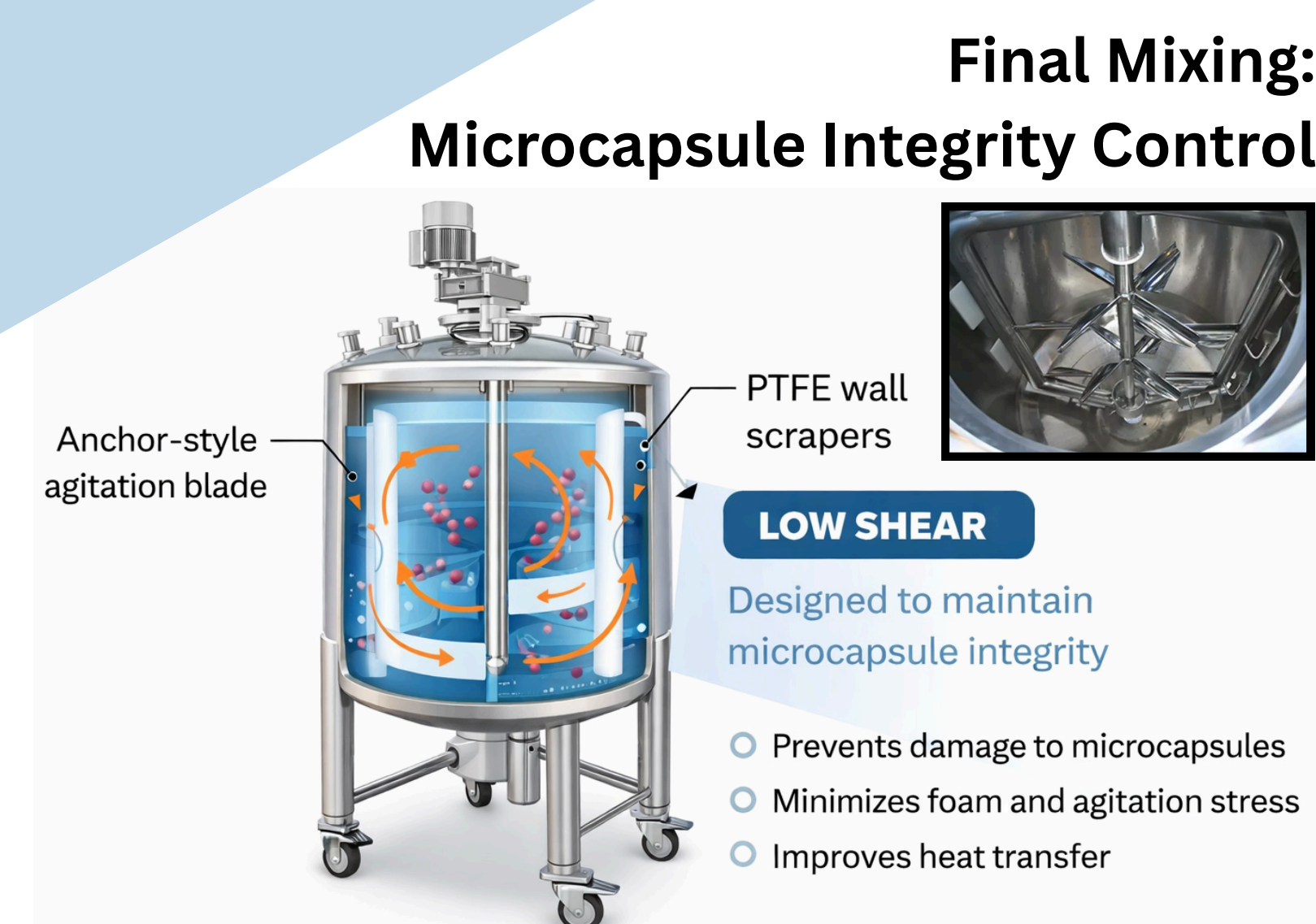
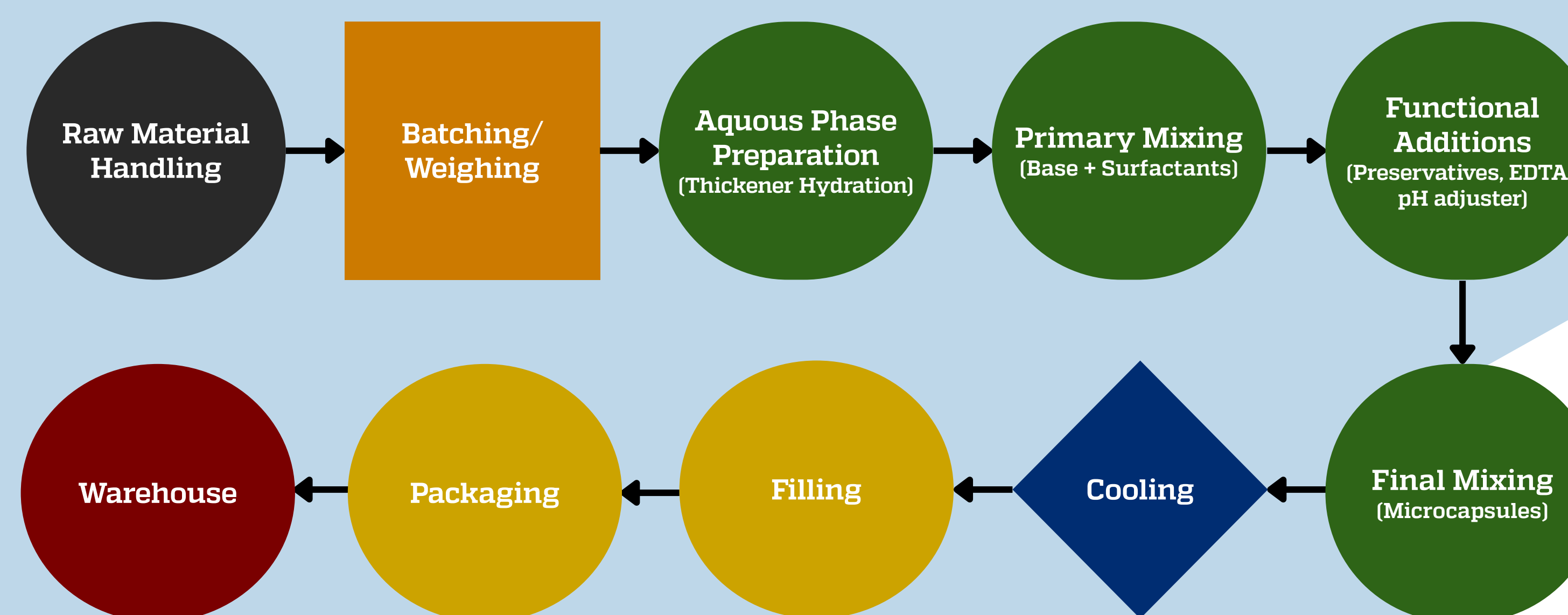
NEED FOR A CLEANSE-INDICATOR

70% of sunscreen users want a 'cleaner' solution

\$16B SPF makeup & sunscreen cleanser market size



Manufacturing Process



Product Specifications

RESIDUE-INDICATING GEL CLEANSER



CLEANSE-GRADER

- Gel cleanser with integrated visual feedback for hydrophobic residue removal.

PRODUCT OVERVIEW

- **Formulation:** Aqueous gel
- **Target pH range:** 5.0 - 6.0
- **Packaging:** 150 mL tube (7 x 3 x 18 cm)

PERFORMANCE SPECIFICATIONS

- **Indicator Performance:** Color intensity correlates with residual hydrophobic film
- **Rheological Specifications:** Viscosity controlled by HEC grade and formulation

FORMULATION

Base & Hydration

- Water
- Glycerin
- Betaine

Cleansing System

- Sodium lauroyl sarcosinate (~6%)
- Cocamidopropyl betaine (~5%)
- Decyl glucoside (~4%)

Rheology Modifier

- Natrosol 250™ HHR CS HEC

Chelating Agent

- Disodium EDTA (0.1%)

Conditioning Additives

- Niacinamide
- Panthenol

pH Control

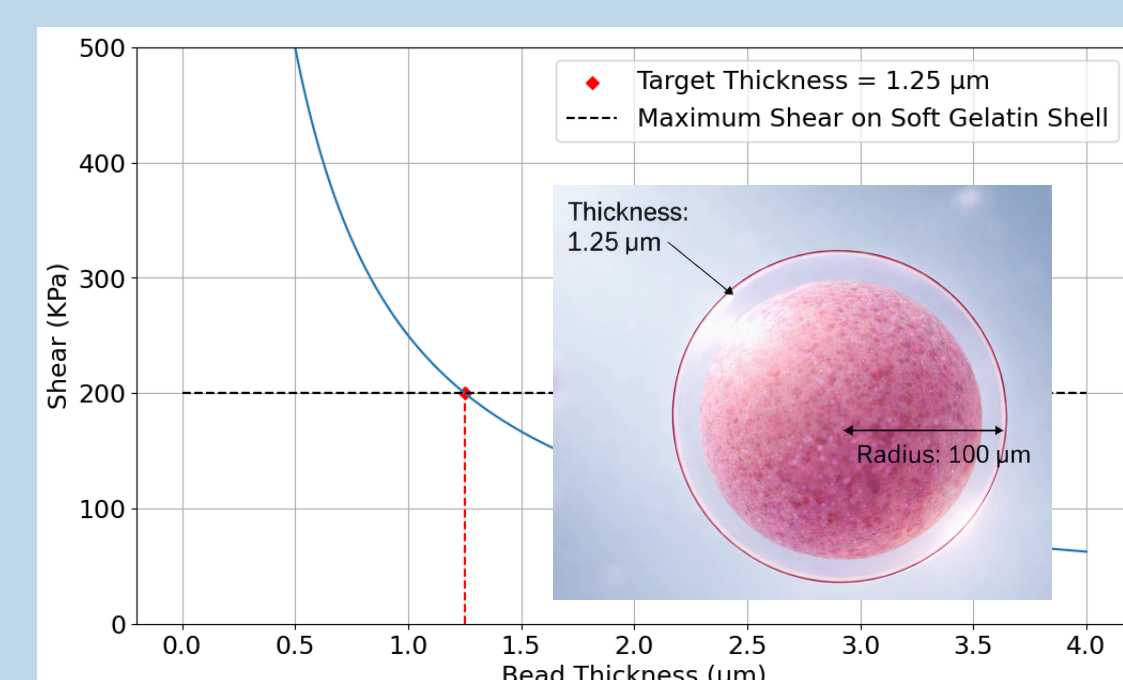
- Citric Acid
- NaOH

Indicator System

- Microencapsulated D&C Red 27 (~0.6%)

Engineering Model

MICROENCAPSULATION OF DYE



Normal Stress on Spherical Shell:

$$\sigma = \frac{P \times r}{2T}$$

- Thickness adjusted to allow capsule bursting under mechanical stress from hand rubbing
- Encapsulated dye released during gel lathering

COMSOL MODELING

Transport-Limited Cleansing Model:

$$\frac{\partial \delta_h}{\partial t} = D_S \nabla_S^2 \delta_h - \frac{K}{\delta_h(x, y, t)}$$

Color Generation Model:

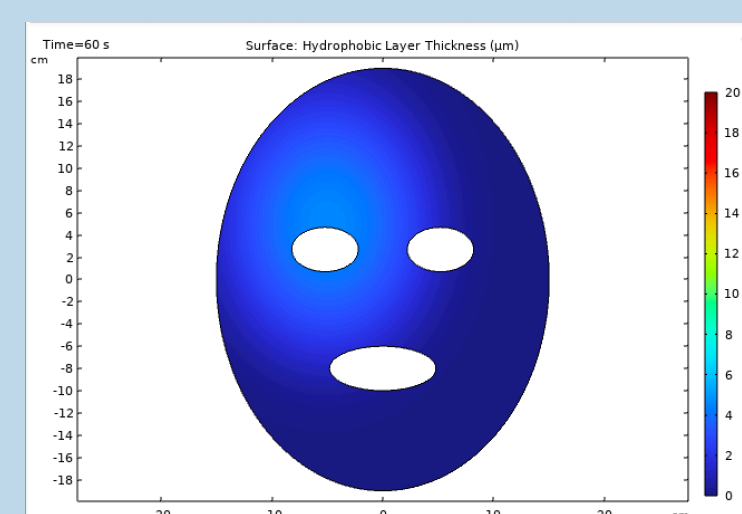
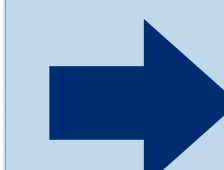
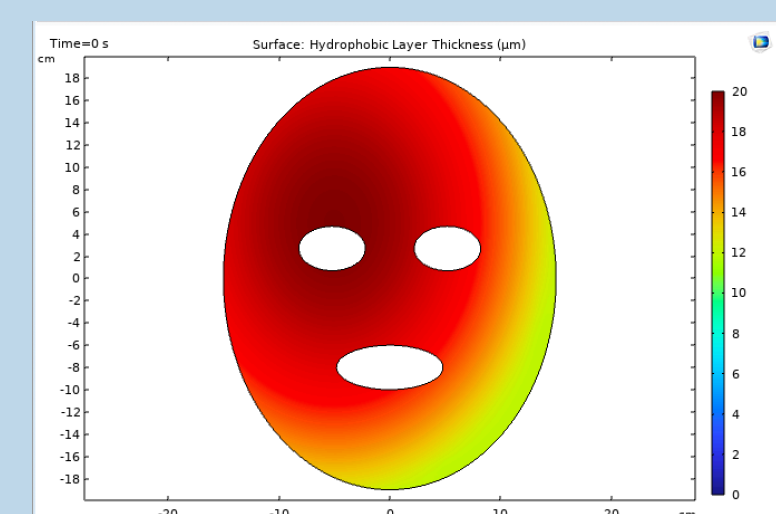
$$\delta_h \rightarrow \phi \rightarrow \lambda_{max}$$

$$\phi(t) = \frac{\delta_h / \delta_0}{\delta_h / \delta_0 + \delta_{half}}$$

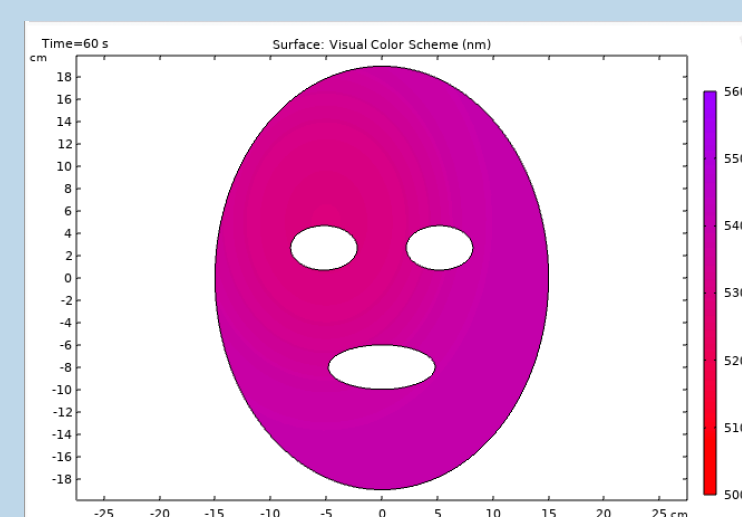
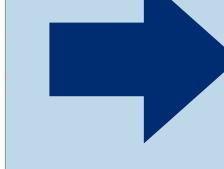
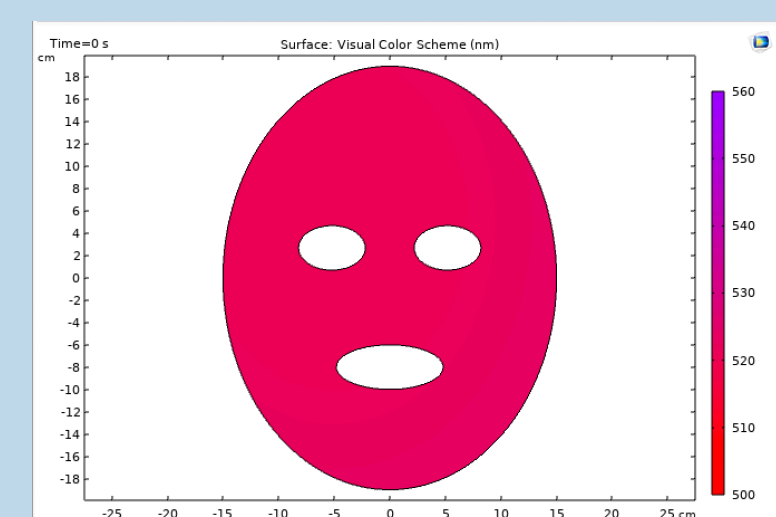
$$\lambda_{max}(t) = \lambda_{clean} - \Delta\lambda \cdot \phi(t)$$

COLOR CHANGE SIMULATION

Thickness:

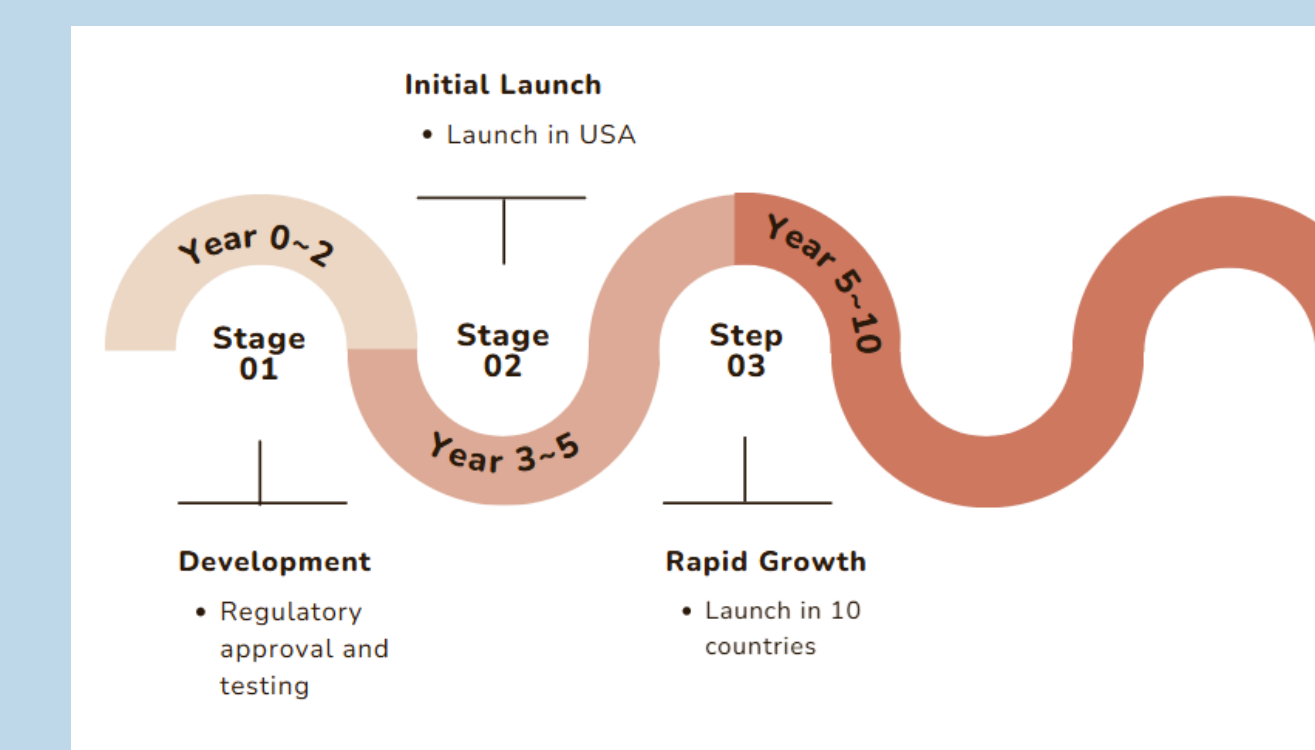


Color:



Financial Analysis

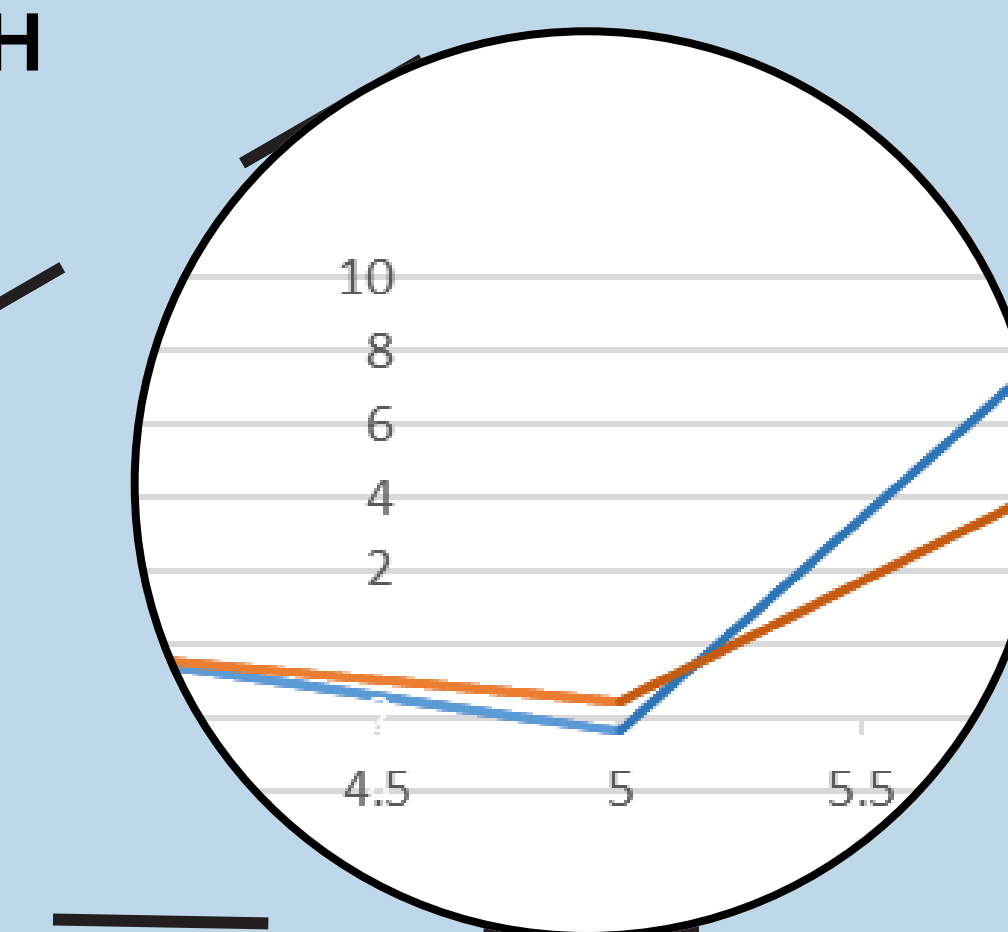
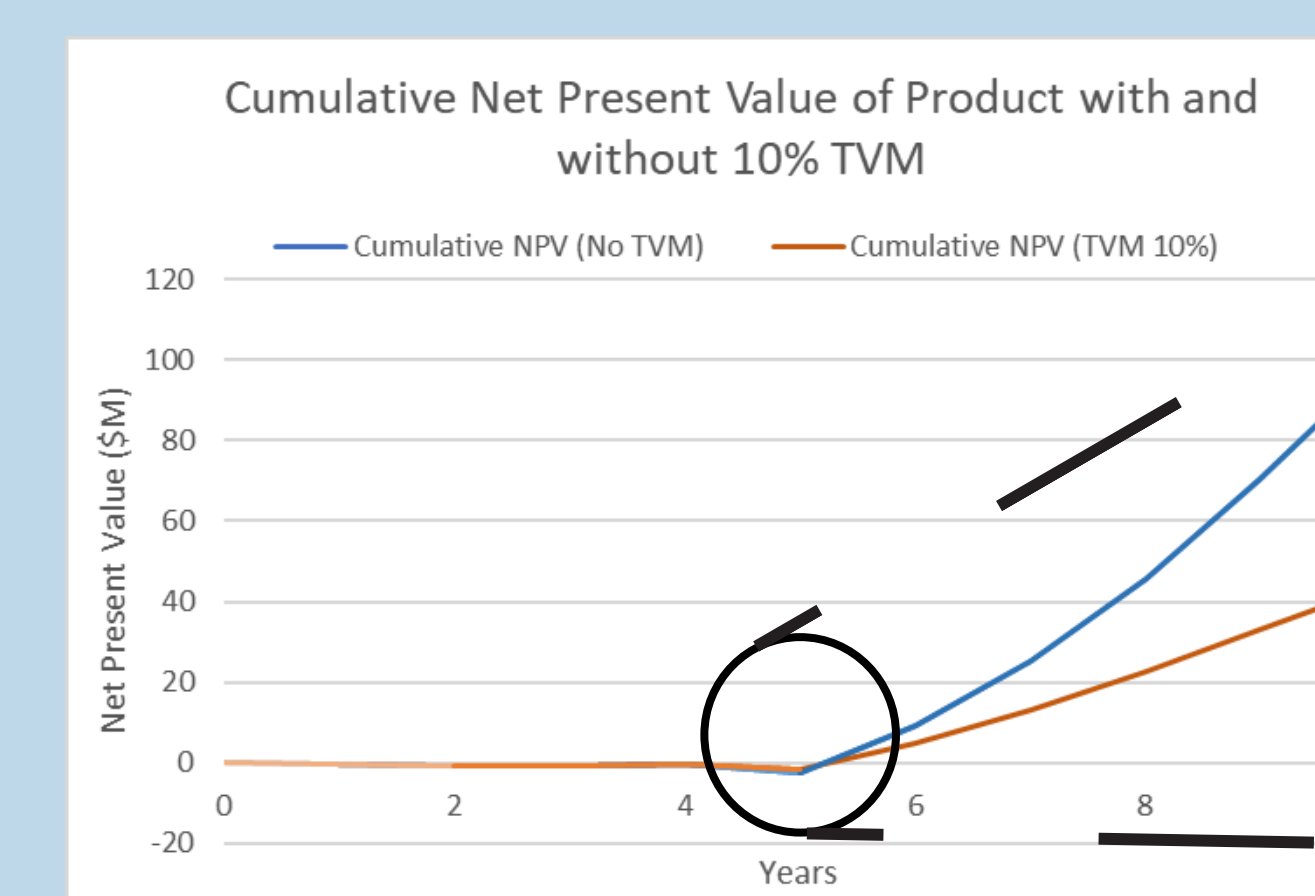
ROADMAP



ESTIMATED COST/PROFIT (\$M)

Years	1-2	3-5	6-10
Developmental	-0.05	-0.11	0
Capital	-0.05	-0.25	0
Operating	-0.36	-1.24	-33.25
Business	-0.20	-2.40	-10.00
Revenue	0	2.295	143.41
Profit	-0.66	-1.71	100.15

NET PRESENT VALUE GRAPH



Contact/citation

If you are interested in the science behind our product, please check out the works cited. For contact information, please use the QR code on the right!

WORKS CITED



CONTACT INFO

