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Cosmetic powder from natural feed-stock waste as alternative to microplastic powders

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Dow

Introduction:

Cosmetic powder derived from a natural feed-stock waste can bring similar or exceed optical and sensorial benefits compared to synthetic cosmetic powders currently used. Silica from rice husk origin can be a good alternative to microplastic powders.

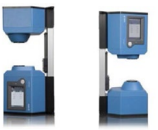
The in vitro screening and in vivo evaluations generated on the neat silica powder derived from rice husk as well as in oil-in-water formulations showed that this silica can bring multiple benefits in formulations:

- ✓ **In vitro sebum absorption**
- ✓ **In vitro water absorption**
- ✓ **Optical blur to skin (fine lines ,wrinkles, pores, redness)**
- ✓ **Smooth sensorial experience**
- ✓ **Humectancy benefit**
- ✓ **Compaction benefit**
- ✓ **In vivo sebum absorption**

Methods:

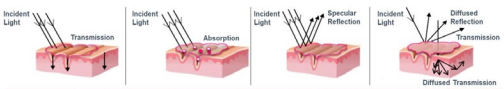
In vitro test methods

Haze/soft focus test method



Haze-gard i (BYK-Gardner GmbH; Germany)

Test conditions:
- Coat a cosmetic formulation onto a glass slide (37 µm-thick wet film)
- Drying time: 15 minutes
- Measure of total transmission (TT)
- Measure of haze: H = 100 x (T Diffused /TT)



High haze with high total transmission = high soft focus/blur (Min haze : ≥ 70)

Water and sebum absorption

Test conditions:
- Weigh 0.1 - 0.5 g of powder (based on density)
- Add water or artificial sebum drop by drop
- Mix with a spatula to allow the water or sebum absorption
- Record the amount of water or artificial sebum per 1g powder

Compaction test

Test conditions:
- Neat powder compressed in metal cup (triplicate)
- Drop 3x the cup from 30 cm high
- Record weight (before/after drop test)
- Weight loss to be < 10 %

In vivo test methods

Sebum absorption

Test conditions:
- 50 mg of hydrogel applied on panelist's forehead.
- Measure sebum using Sebumeter SM 815 on neat skin (time 0), after 2 hours, 4 hours and 6 hours (RH 50% +/- 5 %, 20 °C +/- 2 °C)
- Sebumeter equipment measures the quantity of sebum absorbed by a special tape (µg sebum/cm² skin)

Soft focus/ skin imperfections masking

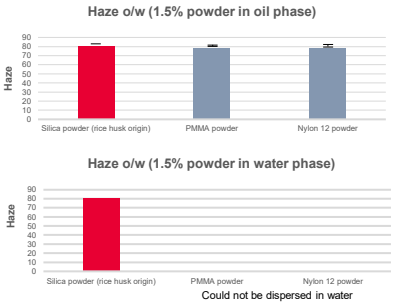
Test conditions:
- Pictures taken before formulation application (neat skin)
- Pictures taken after product application (time 0)
- Pictures taken after 1hour and 6 hours
- VisioFace - Courage + Khazaka electronic GmbH

Sensory

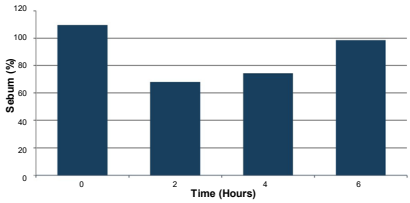
Test conditions:
- 20 mg of o/w formulation containing 1.5% powder
- 18 panelists - room condition: (RH 50% +/- 5 %, 20 °C +/- 2 °C)
- FIZZ software

Results & Discussion:

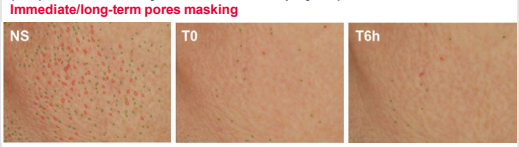
Oil-in-water formulation with 1.5% Rice husk cosmetic powder
In vitro soft focus – Haze values



Hydrogel with 2% Rice husk cosmetic powder
Sebum absorption up to at least 4 hours

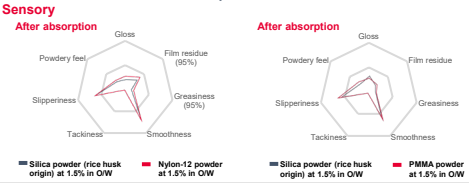


Formulation touchedeRIZ CPF# 4536 (3% Silica, 37.5% C13-15 Alkane (and) Dimethicone/Vinyl Dimethicone Crosspolymer)
Immediate/long-term pores masking



Immediate/long-term blur skin imperfections/redness

Oil-in-water formulation with 1.5% powder
Sensory



Conclusions:

Natural Positioning/regulatory

- Natural source
- Upcycled feedstock
- Plant origin
- ISO 16128
- Non-GMO
- No microplastic

Performance

- Blur skin imperfections in oil-in-water at 1.5%
- Similar smoothness and slipperiness than PMMA and Nylon-12
- Higher water absorption than PMMA and Nylon-12
- Higher sebum absorption than PMMA
- Similar compaction benefit than Nylon-12
- Alternative to traditional mineral-sourced silica
- Alternative to PMMA and Nylon-12