Ecobeads provide effective exfoliation without causing damage to the skin (i.e. skin barrier disruption or erythema), resulting in an effective yet gentle finished product that is preferred by consumers over polyethylene beads.

Ecobeads [INCI: Stearyl Stearate (and) Euphorbia Cerifera (Candelilla) Wax (and) Jojoba Esters] are botanically-derived beads that can be used in exfoliating formulas as an alternative to polyethylene beads or to harsh natural exfoliants that often have sharp, jagged edges. Mechanical exfoliation can often lead to an increase in skin redness and barrier dysfunction as a result of irritation caused by the rough surface of exfoliants. The images below demonstrate the smooth surface of Ecobeads as compared to the rougher edges of other common exfoliants (magnified under 40x).

Clinical Study Facts¹:

In double-blind, controlled, bioinstrumental studies, Ecobeads in an exfoliating facial scrub provided the following benefits when compared to other exfoliating beads:

- Effective exfoliation as quantified by a reduction of dihydroxyacetone-induced skin color and improvement in skin scaliness (indication of desquamation) (Figures 1 and 2)
- Less disruption of skin barrier function as measured by transepidermal water loss (TEWL) (Figure 3)
- Less diffuse facial redness (Figures 4 and 5)
- Less erythema (i.e. redness) (Figure 6)

Formulation Benefits:

- Biodegradable
- Botanically-derived
- Available in a wide variety of colors
- Microplastic-free²

¹. Final Reports available upon request. Figures can be found on the next two pages of this document.
². Compliant with all current microplastic bead legislation.
Figures:

Ecobeads Provided Efficient Exfoliation

Ecobeads Did Not Disrupt Skin Barrier Function

Legend for Figures 1 and 2:
- A vehicle + 6% Ecobeads
- B vehicle + 6% polyethylene
- C vehicle + 6% apricot shells
- D control (water)

Figure 1: All test articles produced statistically significant (p<0.05) reductions in color at all evaluation time points. The test articles containing 6% Ecobeads and 6% polyethylene particles produced statistically significantly (p<0.05) higher percent decreases in skin color than the control (water) at Day 4. (See Claim Sheet 15-061.)

Figure 2: Test articles containing 6% Ecobeads and 6% polyethylene particles produced statistically significant decreases (p<0.05) in skin scaliness at Days 4 and 5. (See Claim Sheet 15-061.)

Figure 3: The test article containing 6% Ecobeads did not produce a statistically significant reduction in skin barrier function (i.e. increase in TEWL) over baseline or the vehicle; whereas the test articles containing either 6% polyethylene particles or 6% apricot shells each produced statistically significant (p<0.01) reductions in skin barrier function. The test article containing 6% polyethylene particles also resulted in statistically significantly (p<0.05) larger reductions in skin barrier function than the vehicle. (See Claim Sheet 15-063.)

3. All studies were conducted double-blind, vehicle-controlled, and randomized.
Ecobeads Did Not Increase Erythema (Redness)

<table>
<thead>
<tr>
<th>Immediate Post-Exfoliation</th>
<th>Percent Change in Diffuse Facial Redness from Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>vehicle + 6% Ecobeads</td>
<td>0.4%</td>
</tr>
<tr>
<td>vehicle + 6% polyethylene</td>
<td>5.1%</td>
</tr>
</tbody>
</table>

Figures 4 and 5: The test article containing 6% polyethylene particles produced statistically significant (p<0.01) increases in diffuse facial redness immediately post-exfoliation. Ecobeads did not produce a significant increase in diffuse redness over baseline. (See Claim Sheet 15-064.)

Ecobeads were Preferred by Consumers

<table>
<thead>
<tr>
<th>Overall Product Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gentleness**</td>
</tr>
<tr>
<td>Smoothness of Skin</td>
</tr>
<tr>
<td>Less Irritation**</td>
</tr>
<tr>
<td>Effectively Exfoliates*</td>
</tr>
<tr>
<td>Refreshed Appearance of Skin</td>
</tr>
<tr>
<td>Texture/Consistency**</td>
</tr>
</tbody>
</table>

Figure 7: Although subjects indicated polyethylene particles as more effectively exfoliating, they also indicated a preference for Ecobeads for all categories that would be a result of effective exfoliation (e.g. refreshed skin appearance, smoothness of skin, softness of skin). Ecobeads were also viewed as milder to the skin (i.e. gentleness and less irritation). Statistical (**) and directional (*) significance was apparent where indicated (p<0.05 and p<0.10, respectively). (See Claim Sheet 15-065.)
Formula: Gentle Face Scrub with Biodegradable Ecobeads

This facial scrub featuring Ecobeads gently exfoliates, leaving the skin feeling smooth and refreshed. Ecobeads are low-cost, biodegradable scrubbing beads made of natural waxes that are proven to exfoliate as effectively as polyethylene. Additionally, due to their spherical shape Ecobeads are gentler than polyethylene and other natural exfoliatives, and therefore result in less erythema and barrier disruption during exfoliation. Ecobeads are available in many colors and are ideal for formulators seeking a natural biodegradable exfoliative positioned for value.

Procedure:
1. Add the Versene Na2 Crystals to the deionized water with moderate propeller agitation and mix until completely dissolved.
2. While heating to 75-80°C, add the remaining ingredients of Phase A in the order listed with moderate propeller agitation.
3. In a separate vessel, mix all ingredients of Phase B. While heating to 75-80°C, mix with moderate propeller agitation until uniform.
4. Add Phase B to Phase A with rapid propeller agitation at 75-80°C.
5. Add Phase C to Phase AB with rapid propeller agitation at 75-80°C to achieve pH 6.5-7.5.
6. Cool Phase ABC to 45-50°C.
7. Add Phase D to Phase ABC with moderate propeller agitation at 45-50°C to achieve pH 4.8-5.0.
8. Add Phase E to Phase ABCD at 40-45°C and cool to room temperature.
9. Add Phase F when the batch has cooled to room temperature.

Formula Properties:

<table>
<thead>
<tr>
<th>Property</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>4 - 6</td>
</tr>
<tr>
<td>Viscosity</td>
<td>302 - 964 kcP</td>
</tr>
</tbody>
</table>

Ingredient Information

24/7 Online

www.floratech.com/info

ecobeads®