



penNatural™

NATURAL EMOLLIENTS

Experience the Penreco® difference. Our expertise and reputation were built by more than 100 years of dedicated partnerships with our customers. We are devoted to understanding the unique chemistry required to deliver customized solutions to meet the specific needs of today's consumer products. As the personal care and cosmetics industries have experienced the transition to clean beauty, our customers increasingly want to incorporate the best natural ingredients into their products.

As an industry leader in specialty products such as gels, petrolatums and white mineral oils, we rely on our experience, high standards, research and development, and innovation to create PenNatural™, a new premium natural emollient product. PenNatural delivers optimal moisturization and emollient benefits similar to petrolatum, along with a wide range of sensory attributes, perfect for your personal care and cosmetic formulations. PenNatural contains sunflower oil and sunflower wax, providing a nearly colorless product with low odor and excellent skin feel.

APPLICATIONS

- Cosmetics
- Personal Care
- Balms & Ointments
- Salves & Rubs

PRODUCT SPECIFICATIONS

| Test Method | Petrolatum | PenNatural |
|------------------------------|---------------|------------|
| Lovibond Color | 2.0Y max | 2.5Y |
| Melting Point, °F | 125 - 135 | 150 |
| Viscosity @ 210 °F, SUS | 64 - 75 | 56 |
| Specific Gravity 60 °C/25 °C | 0.815 - 0.855 | 0.883 |
| Consistency, dmm | 170 - 205 | 159 |
| Stability @ 45 °C | Stable | Stable |

PenNatural products are not yet commercially available. Please inquire if you have questions and/or would like to sample our products

International Nomenclature of Cosmetic Ingredients (INCI)

PenNatural: Helianthus Annuus (Sunflower) Seed Oil and Helianthus Annuus (Sunflower) Seed Wax



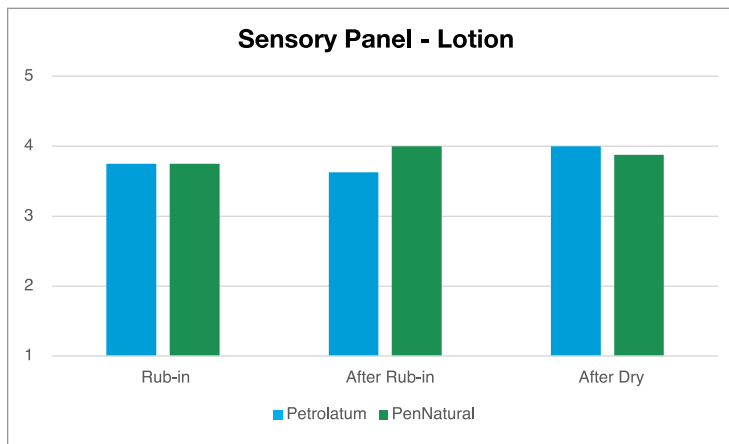
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Sensory Evaluation of Lotion Formulations

PenNatural and Petrolatum (positive control) were separately added at 3% into a lotion formulation. These lotions were tested at three use stages: rub-in, immediately after rub-in, and after 7 minutes of drying. The graph shows average preference on a 5-point scale. Panelists (N = 8) also wrote comments at each use stage.

Key Learnings

- The lotion formulations containing PenNatural and Petrolatum performed similarly across all stages. The samples applied smoothly and absorbed well on the skin.
- PenNatural displayed good consistency, had a nice shine, and was not tacky or sticky after dry.



LOTION FORMULATION

This formulation creates a creamy nourishing lotion that delivers the moisturizing and skin feel benefits of Petrolatum and PenNatural. It has a light, soothing, breezy and indulgent tropical fragrance.

PROCEDURE

1. Heat Phase 1 and Phase 2 components separately to 50 – 70 °C.
2. Pour Phase 1 into Phase 2 and blend well.
3. Cool to 40 °C then add Phase 3 components sequentially.
4. Blend to homogenize.

| PHASE | INGREDIENT | INCI NOMENCLATURE | W/W% |
|-------|-----------------------------------|---|-------------|
| 1 | Distilled Water | Aqua | 68.10 |
| 1 | Glycerin, USP | Glycerin | 5.00 |
| 2 | Sunflower Oil | Helianthus Annuus (Sunflower) Seed Oil | 8.00 |
| 2 | CreamMaker WAX (HLB 12-13) | Cetearyl Alcohol (and) Polysorbate 60 | 2.50 |
| 2 | CreamMaker Behenyl (HLB 8-10) | Behenyl Alcohol (and) Polyglyceryl-3 Stearate | 2.50 |
| 2 | Lipobutter Refined Shea | Butyrospermum Parkii (Shea) Butter | 8.00 |
| 2 | Petrolatum, or PenNatural* | Refer to the INCI listing on page 1 | 3.00 |
| 3 | Hexanediol CG | 1,2-Hexanediol (and) Caprylyl Glycol | 0.80 |
| 3 | Phenoxyethanol | Phenoxyethanol | 0.90 |
| 3 | Vitamin E Acetate | Tocopheryl Acetate | 1.00 |
| 3 | Fragrance: Coral Reef | Fragrance | 0.20 |

*Products in **bold** are supplied by Calumet, Inc.

*Each lotion formulation was created using either Petrolatum, or PenNatural.

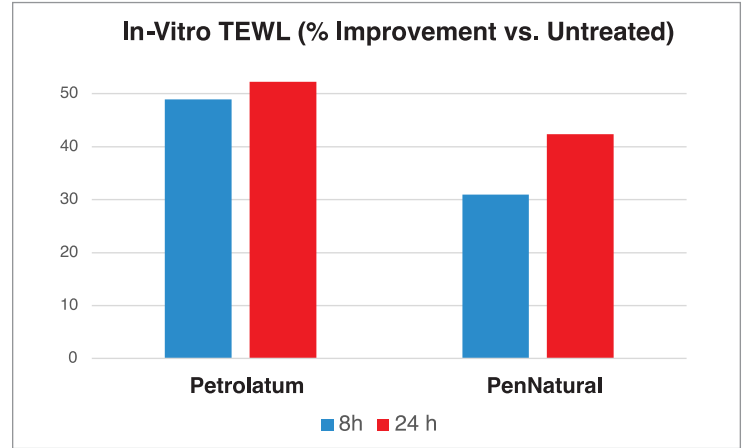
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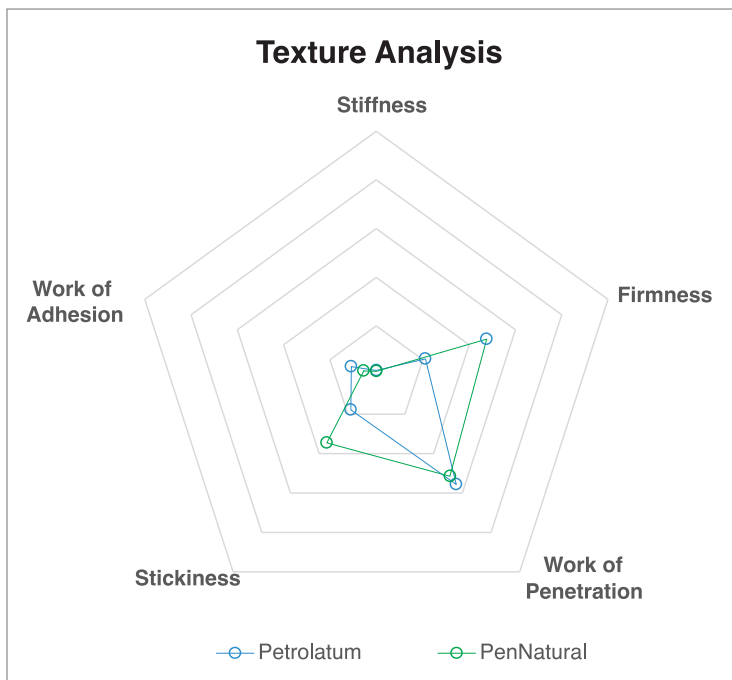
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Transepidermal Water Loss (TEWL) In-Vitro Study

The graph to the right shows TEWL reduction over the duration of the study for the neat ingredients PenNatural and Petrolatum positive control vs. untreated control. Petrolatum shows very high level of occlusive moisture retention as expected. PenNatural was less efficacious than Petrolatum but delivered meaningful TEWL results. Thus, the PenNatural products are expected to deliver high and long-lasting moisturizing benefits.



Study #26-013



Texture Profiling of PenNatural and Petrolatum

PenNatural was evaluated using instrumental texture profiling methods against Petrolatum positive control. The textural properties measured included stiffness, firmness, penetration, stickiness and adhesion. The natural emollient, PenNatural has texture profiles that resemble Petrolatum.

PenNatural exhibited slightly more stickiness and firmness than Petrolatum by this test method. Similarly to the lotion testing, panelists evaluated the texture of the neat ingredients at the rub-in stage. PenNatural felt light, luxurious, and had good consistency when applied to the skin.

*Texture Profiling measurements were done on TA.XT Plus texture analyzer using the TA-23 round end probe

PRODUCT KEY: Petrolatum PenNatural

TECHNICAL ASSISTANCE

For product or technical questions, contact your Sales Representative or Calumet Product Support at (800) 437-3188 or email technical@calumet.com.

penreco®

Formulating Lasting Partnerships
With Products Designed for Life