

Technical Article:  
 SonneNatural®. Nature's Finest Emollient  
 Clay Rozic, Sonneborn Developmental Scientist  
 March 27, 2012

For over 100 years, Sonneborn has been a leader in the development and production of the purest, most diverse range of petrolatums. Based on this experience, Sonneborn scientists have developed an all natural petrolatum substitute, SonneNatural®. SonneNatural is nature's finest emollient.

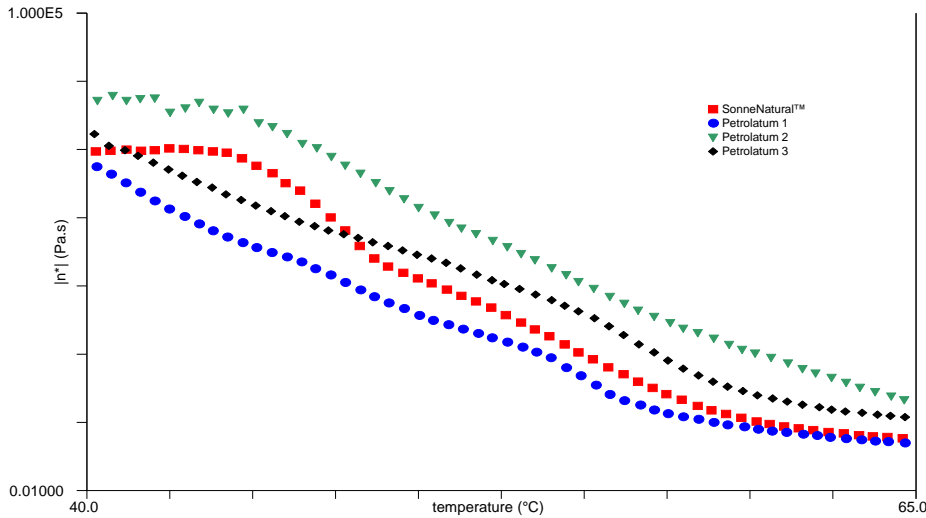
SonneNatural has similar physical and sensory characteristics to that of refined petroleum based petrolatum. The first generation of SonneNatural was developed to meet the physical and sensory characteristics of Sonneborn's White Protopet 1S.

Property	Test Method	SonneNatural® Typical	White Protopet® 1S Typical
Cone Penetration, dmm	ASTM D-937	170	190
Drop Melting Point, °C	ASTM D-127	52	56
Viscosity@100°C, cSt	ASTM D-445	16.6	14.0
Color, Lovibond 2"	IP 17	~2 Y	1.5 Y Max.

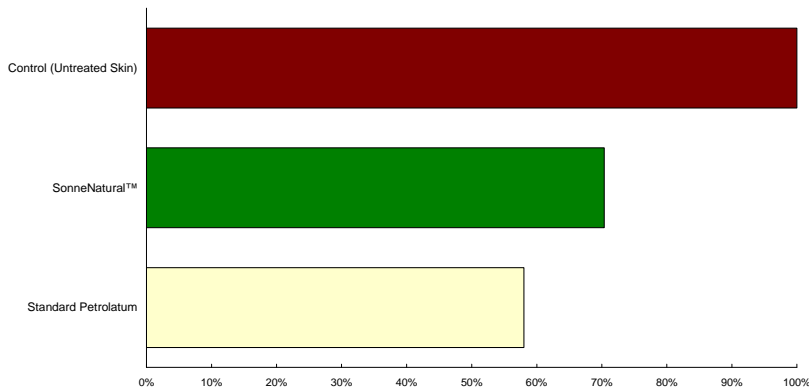
The careful selection of raw materials led to the creation of a material that has superior polymorphic stability.

All triglycerides and fats typically have three crystalline forms:  $\alpha$ ,  $\beta'$  and  $\beta$ . Each of these polymorphs has a different solid state symmetry and appearance. Many naturally based materials often exhibit fat blooms, oil bleed and different hardness due to the polymorph that it is in. Cooling rate and shear rate are critical factors in achieving a stable, smooth surface. Improper cooling rates could lead to graininess, oil bleed, or fat blooms in a packaged natural product. Typically, a fast cooling rate results in an  $\alpha$  polymorph with hexagonal symmetry (the product typically is harder and fat blooms could occur if cooled too quickly). A slow cooling rate and lower shear typically results in a  $\beta'$  polymorph which is the most unstable polymorph causing graininess and excessive softness. SonneNatural is a very stable material that, through specific cooling and shear rates, creates a  $\beta$  polymorph with triclinic symmetry.

SonneNatural has been used as a direct replacement for petrolatum in multiple formulations. SonneNatural is rheologically similar in the solid state to many commercially available refined petroleum based petrolatums. This is a primary reason why Sonnenatural has the sensory perception of a traditionally derived petrolatum.



SonneNatural offers significant moisturization properties as compared to petrolatum and white mineral oil.



If a formulation requires a natural, renewable based emollient, SonneNatural is the product to meet the need.

Clayton Rozic  
 Developmental Scientist  
 Sonneborn, Inc.