A Novel Silicone Lotion for Wet Wipe Applications

Anne-Lise Girboux
Anne-Marie Vincent
Yan Cortes

DOW CORNING

With busy lives and greater mobility, today's consumers look for high performance, easy-to-use personal care products. The wet wipes segment of the personal care market reflects this trend, with the creation of novel products designed to meet the needs of diverse population groups. The global wet wipes market for personal care reached an an estimated $5 billion USD in retail sales for 2007, with Western Europe, North America and Asia Pacific responsible for nearly 90% of the total (1).

Euromonitor estimates total personal care wipes sales in North American were $1.4 billion in 2007, with just more than $1 billion representing the baby wipes category (1). Although it is considered relatively mature, opportunity exists in this category for brand extensions impregnated with rash-prevention creams—already a $190 million market throughout Europe.

According market data from the Freedonia Group, U.S. wipes demand will grow 6.1% annually through 2011. Developed markets in the U.S., Western Europe and Japan will remain dominant, while more rapid gains will occur in developing nations such as China and India. Baby wipes will remain the largest category, while sales of household, personal care and health care wipes are expected to grow the most quickly (2).

Many personal care marketers are looking for ways to extend their product lines by offering new product forms. Wet wipes offer a potentially lucrative option. One way to create differentiated wipes is to vary the substrate used and its corresponding lotion. From consumers' perspectives, a key component in differentiation is a pleasant skin feel with good cleansing properties. This means formulators must consider enhanced sensory profiles, including softness, reduced residue and a variety of other characteristics. These desired properties suggest greater opportunity for the use of silicones in wet wipe applications. Although silicones are widely used in personal care products, greater penetration in the wet wipes market can help formulators achieve their goals of innovative and high performance wipes.

A Multifunctional Wipes Lotion

Dow Corning® CE 0101 Wipes Lotion[a] is a silicone-in-water formulation designed for wet wipe applications (3). It is based on high internal phase technology, the Dow Corning® 7-3100 Gum Blend HIP Emulsion, and a naturally-derived stabilizer system. The silicone wipes lotion imparts the recognized sensory properties of silicone and is useful in a range of personal care wipes including those designed for facial and body care, makeup removal, baby and child care, hand sanitizing and sun care.

The versatile, low-viscosity lotion offers flexibility and multiple use options based on specific market needs or formulating expertise. It can be viewed as a master batch lotion that allows formulators to add other water- or oil-compatible ingredients, including cosmetic actives, by cold processing. Using this approach, the wipes lotion can act as a starting point for differentiated and sophisticated final formulations. In other applications, the wipes lotion serves as a ready-to-use solution, or it can easily be diluted with water. This method allows formulators to adapt the lotion to cost-in-use constraints, a factor that exists primarily for baby wipes applications. Again, additional ingredients can be added by cold processing to fit local market requirements.

[a] INCI name: cyclopentasiloxane (and) dimethiconol (and) laureth-4 (and) laureth-23 (and) steareth-2 (and) steareth-100.

As an added benefit to developers of personal care wipes, finished formulations can be loaded and packed by Dow Corning's external partner, 3G/Beauty Purse. The Beauty Purse® is a pocket-size dispenser of nonwoven tissues, especially designed for the personal care, beauty and health markets.[b]

Wipe formulations usually contain surfactants, emollients, humectants, scents, preservatives and other active ingredients, depending on individual applications. These ingredients are typically used in the lotion that is applied to the wipe substrate by saturation or spraying. A number of common personal care ingredients used in wipes have been evaluated for their compatibility with the new Dow Corning CE 0101 Wipes Lotion. Figure 1 summarizes compatible ingredients used in various wipes applications.

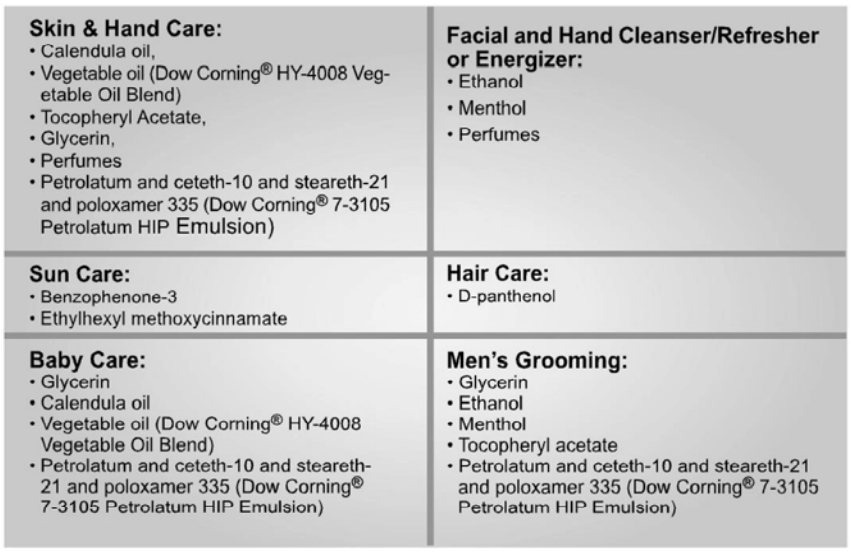

Figure 1. Ingredients compatible with the silicone wipes lotion.

Improved Sensory Characteristics

The silicone wipes lotion offers the distinctive sensory profile associated with silicones during and after application on the skin. A number of evaluations have been conducted to compare samples loaded with the silicone wipes lotion to commercial benchmark wipes. In general, experienced sensory panelists found that prototype wipes loaded with the silicone lotion imparted improved sensory attributes compared to wet wipe benchmarks. These include enhanced smoothness, as well as decreased greasiness and tackiness.

Evaluations were conducted with spunlace (50 g/m^2) and +/- 4 g lotion per wipe measuring 17.5 x 16 cm. In one series of tests, results were compared to commercial benchmark facial cleansing and energizing wipes, referred to as cosmetic wipes A. As Figure 2 (left) shows, absorbency was significantly faster from wipes loaded with the silicone wipes lotion. (In this and other evaluations, absorption refers to panelists' perceived absorption on the skin, not biological absorption.) After absorption (right), panelists noted a smoother and more slippery feel, with less film residue. Skin felt less tacky and less greasy than with the commercial benchmark.

[b] www.beautypurse.com

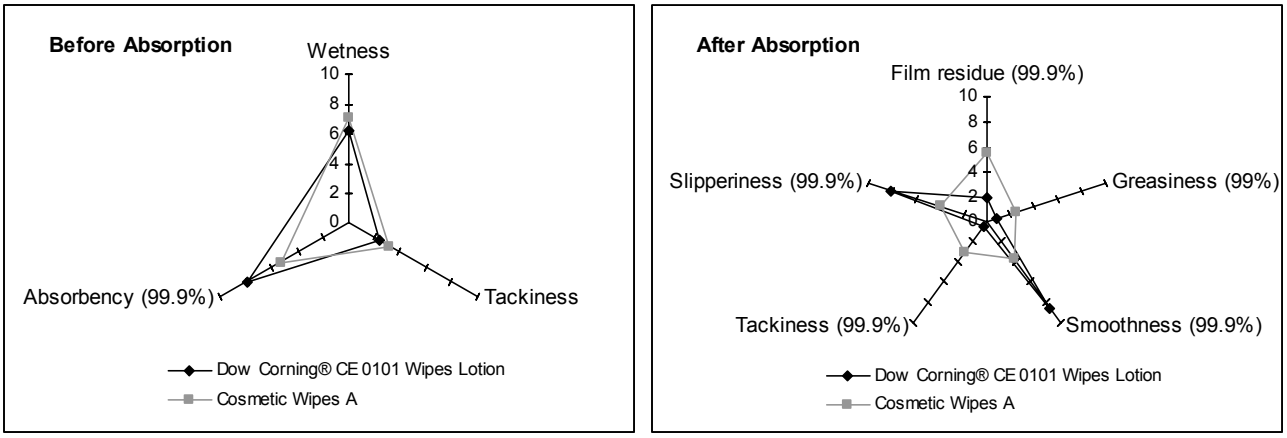

Figure 2. Sensory comparison of prototype wipes loaded with silicone wipes lotion versus commercial benchmark cleansing and energizing wipes A; before absorption (left) and after absorption (right). Numbers included with sensory parameters indicate level of confidence.

In another series of evaluations, the prototype wipes with silicone lotion were compared to commercial benchmark cleansing and purifying wipes, referred to as cosmetics wipes B. As Figure 3 (left) shows, results before absorption were very similar. After absorption (right), panelists' skin felt more smooth and slippery, had less residue and again was less tacky and less greasy. These results, as well as those in Figures 2, show sensory improvement can be achieved with the silicone lotion over more than one type of wipe benchmark.

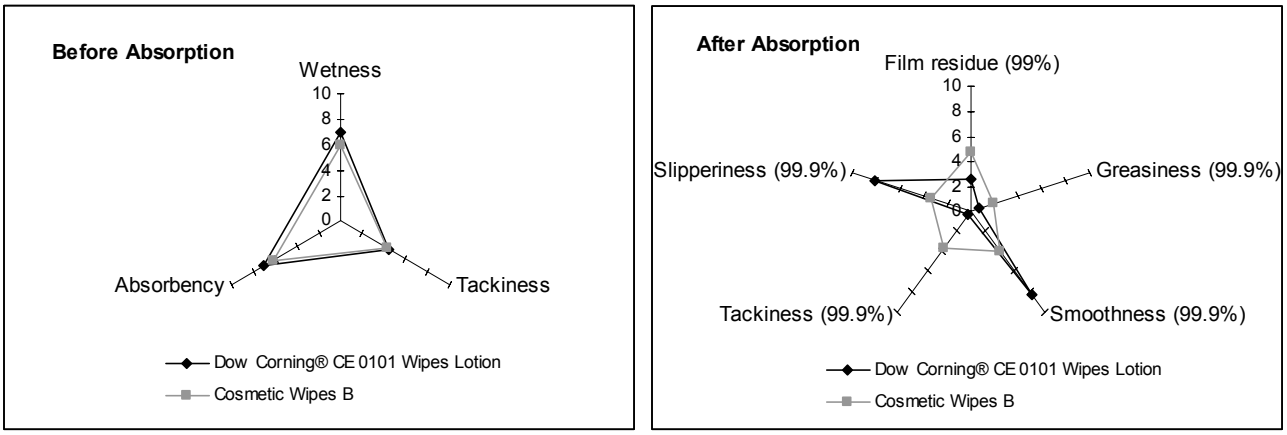

Figure 3. Sensory comparison of prototype wipes loaded with silicone wipes lotion versus commercial benchmark cleansing and purifying wipes B; before absorption (left) and after absorption (right). Numbers included with sensory parameters indicate level of confidence.

Dow Corning CE 0101 Wipes Lotion also was compared to a 20% aqueous solution of a commercial wipes concentrate.[c] Results in Figure 4 show the wipes lotion was absorbed more quickly than the commercial concentrate.

[c] INCI: Cetearyl isononanoate (and) ceteareth-20 (and) cetearyl alcohol (and) glyceryl stearate (and) glycerin (and) ceteareth-12 (and) cetyl palmitate

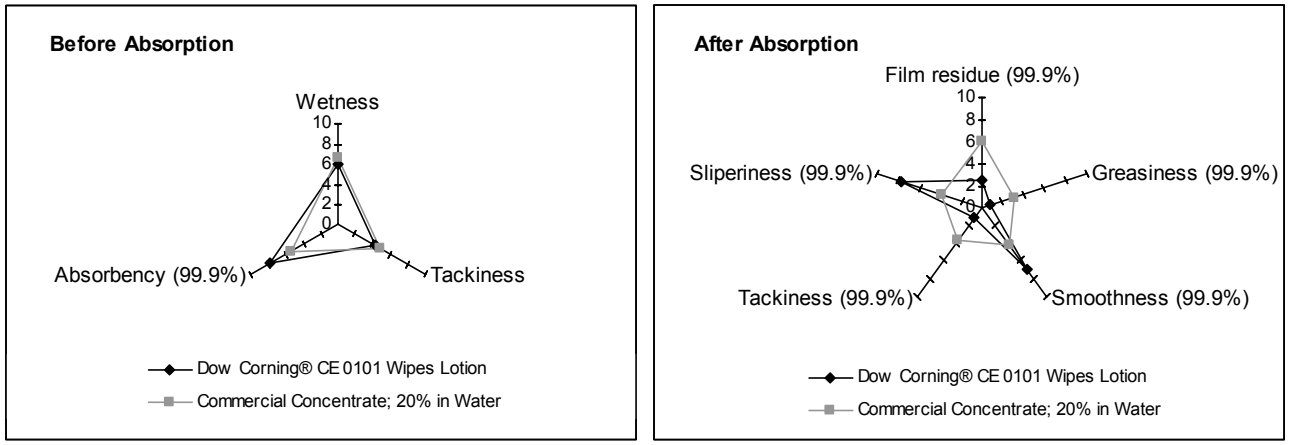

Figure 4. Sensory comparison of prototype wipes loaded with silicone wipes lotion versus wipes loaded with benchmark commercial concentrate; before absorption (left) and after absorption (right). Numbers included with sensory parameters indicate level of confidence.

After absorption, skin feel was more smooth and slippery with the silicone wipes lotion. There was less film residue, and skin felt less tacky and less greasy. Again, the combination of silicones with a naturally-derived stabilizer system in the Dow Corning CE 0101 Wipes Lotion provides enhanced skin feel.

Sedimentation Profiles

To ascertain whether the silicone lotion migrates to the bottom of a pack of wipes over time, a sedimentation evaluation was conducted using a specific protocol (4). Two packs of 18 wipes each were stored flat for one month at room temperature. At the end of this period, the wipes were weighed separately, starting from the top of the pack (wipe 1) to the bottom (wipe 18). Two measurements were recorded and averaged for each wipe. Figure 5 shows the results for wipes loaded with the silicone lotion. The data demonstrate that the wipes remain uniformly loaded with lotion, which does not migrate to the bottom of the pack over time.

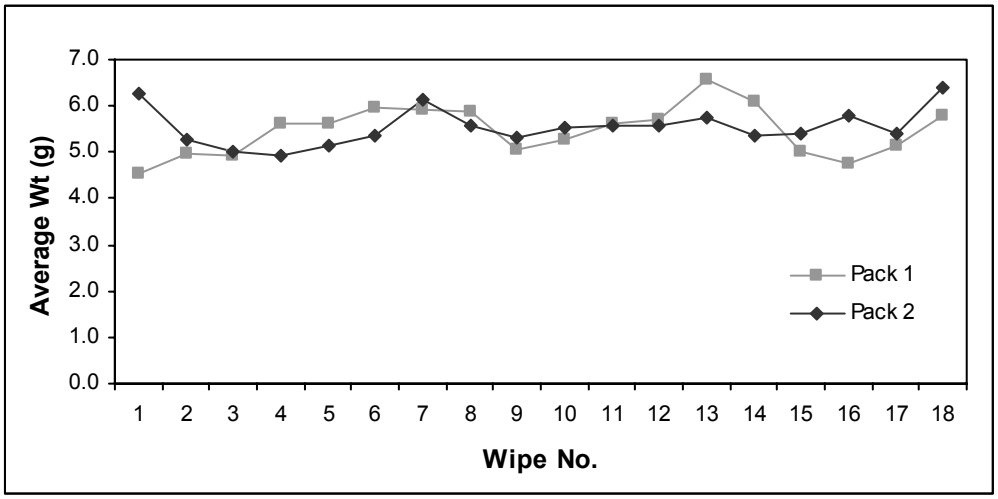

Figure 5. Sedimentation data for wipes loaded with the silicone lotion (after one month).

Cleansing Properties of the Wipes Lotion

Dow Corning CE 0101 Wipes Lotion has strong cleansing properties. An in vitro test was conducted to assess the removal of waterproof mascara using wipes loaded with the silicone lotion.[d] Two cosmetic wipe benchmarks were used for comparison. In Figure 6, delta reflectance is used as a measure of cleansing efficiency. The higher the delta reflectance, the better the wipes lotion is in terms of removing mascara. Results show the silicone wipes lotion had the best cleansing properties, compared to the commercial benchmarks, cosmetic wipes A and B.

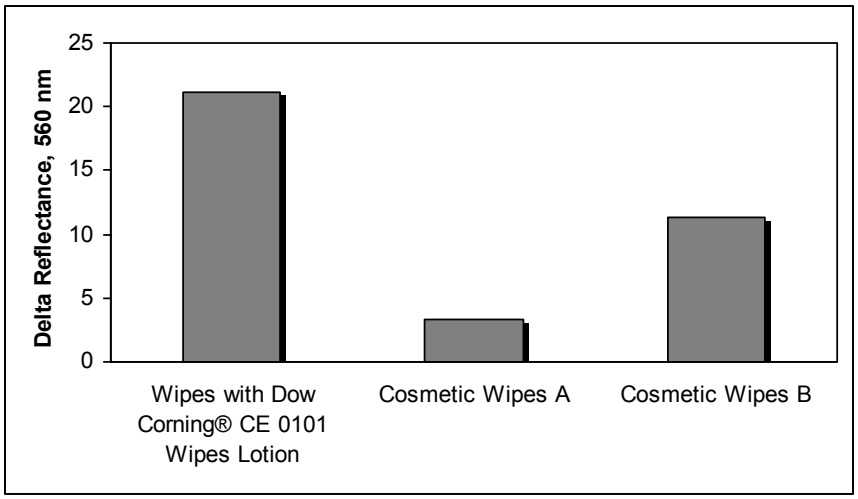

Figure 6. Comparison of cleansing performance for mascara removal.

Conclusions

The global market for personal care wipes continues to grow and evolve toward technical solutions through new types of complex substrates and multifunctional lotions. From a formulation perspective, the market shows a greater focus on superior performance properties with more sophisticated lotions. Consumers look for innovative benefits along with new applications, which include self tanning, exfoliation, and sun care. The silicone wipes lotion was designed for multifunctionality in a broad range of wipes applications. Coupled with the creativity and expertise of formulators, the personal care market is poised to deliver innovative, next-generation wipes that meet changing global needs.

References

1. *Euromonitor International* (2008).

2. Wipes to 2011- Demand and Sales Forecasts, Market Share, Market Size, Market Leaders, Freedonia Group, (2008).

3. Vincent, A-M., Girboux, A-L., Rassart, B., Kowandy, V., Tonet, G., Starch, M. and Cortes, Y., Dow Corning introduces a novel silicone lotion for wet wipe applications, IPCOM000143588D, (November 11, 2006).

4. Cremieux, A., Cupferman, S. and Lens, C., *Int. J. Cosmet. Sci.,* 27:4, 223-36 (August 2005).

[d] Source: Uniqema

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