

The Technology

This controlled delivery system is comprised of a double encapsulation of caffeine. The caffeine is encased in microscopic sub-micron spheres, which are then re-encapsulated in a larger microsphere. Caffeine has traditionally been used to stimulate the breakdown of fat molecules¹. It possesses substantial anti-inflammatory properties² and, when added to a cream base, it can help reduce puffiness and dark circles under the eyes³. Recent studies have also shown that Caffeine possesses benefits from application on skin before exposure to UV radiation⁴. This technology provides an ideal vehicle for caffeine, with higher loading and enhanced penetration capabilities compared to the control (free, non-encapsulated caffeine), delivering more effective treatment and superior results.

Benefits

- Encapsulates caffeine in a hydrophobic vehicle for a higher capacity in a final formulation.
- Enhanced penetration of caffeine for more effective treatment at target site
- Slow release of caffeine for long-term treatment

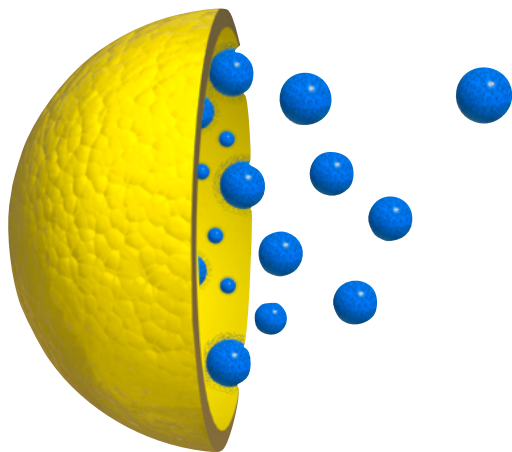


Fig. 1: Illustration of MultiSal™ technology.

Microscopic Analysis: MultiSal™ Caffeine vs. Free Caffeine

Solubility of caffeine is 2-3 % in water, thus it is estimated that 8 % is not soluble, but in fiber form. Higher loading, often needed for efficacy, results in crystal formation and product instability. Data shows that MultiSal™ technology contains a small percentage of caffeine crystals with the majority of the caffeine being encased in sub-micron spheres, thereby allowing for higher loading in a final formula with reduced crystal formation.

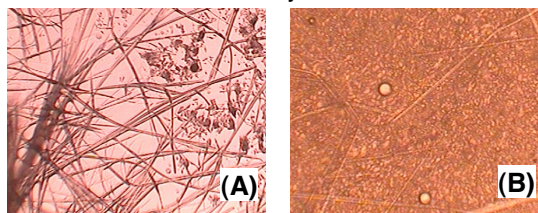


Fig. 2: (A) 10% caffeine in water. (B) Product containing MultiSal™ Caffeine (10% caffeine in final product), in water.

Effective Penetration of Caffeine: Leave-On Application

The efficacy of caffeine treatment is reliant upon the ability of the caffeine to penetrate into the skin. Ethanol skin extraction was the method used to analyze the penetration capacity of the technology.

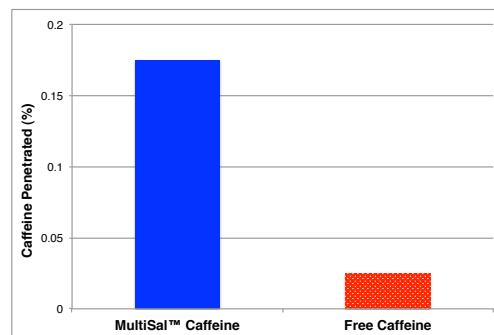


Fig. 3: MultiSal™ technology allows for better penetration of caffeine (7x) compared to the free caffeine over a 6 hour time period.

Specifications:

Caffeine Concentration (%)	33 +/- 2
Appearance, Visual	Free-Flowing Powder
Odor	Odorless
Color	White
pH (1% Solution)	3 - 5
Solubility	Miscible in Water

References:

1. Kravitz, L. & Achenbach, N.J., Cellulite: A review of its anatomy, physiology, and treatment. IDEA Fitness Journal, 7(4), 36-43, 2010.
2. Sunshine A., Laska E.M., Siegel C.E., Analgesic and anti-inflammatory compositions comprising caffeine and methods of using same, Analgesics Associates, Larchmont, NY, US 4,486,436, Dec. 1984.
3. Potin A., Bossant I., Amar C., Compositions and methods for minimizing and/or reducing the appearance of defects around eyes, US 2009/0263435, L'Oreal SA, Paris (Fr.), Oct. 22, 2009.
4. Dashnamoorthy Ravi, Harish Muniyappa and Kumuda C. Das, Caffeine inhibits UV mediated NF-κB activation in A2058 melanoma cells: an ATM-PKCδ-p38 MAPK-dependent mechanism, Molecular and Cellular Biochemistry, Volume 308, Numbers 1-2, 193-200.