HydroSal® Bug Guard

A safe and long-lasting insect repellent.

The technology protects the powerful botanical oils from rapid evaporation and slowly releases them over time to extend the repellency.

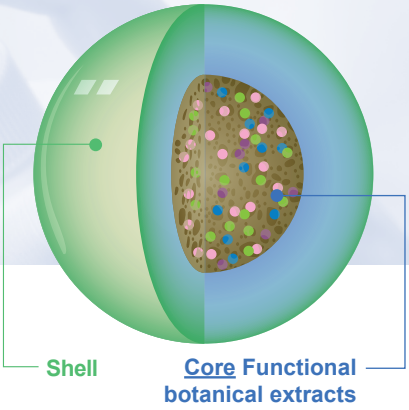

Figure 1: The sub-micron structure of HydroSal® BKC with the BKC infused within the core.

UNIQUE FEATURES

1. **NATURAL PROTECTION**
   HydroSal® Bug Guard uses safe, non-toxic, botanical oils that have proven to be effective in repelling insects.
2. **LONG-LASTING PROTECTION**
   With its controlled release technology, effectiveness of the botanical oils is extended for longer.
3. **WATER-TRIGGERED BURST**
   HydroSal® technology is engineered for skin care by providing a boost release of active ingredients upon exposure to moisture (perspiration).

HOW THE TECHNOLOGY HELPS YOU

HydroSal® is composed of a core with a shell coating. The system's core provides a reservoir for the functional botanical extracts and the shell functions to control and prolong their release. Upon application to the skin surface, the shell 'locks down' on drying (Figure 2: A, B). In addition, this shell can be reactivated with water to provide triggered release (Figure 2: C,D).

FUNCTIONAL INGREDIENTS

HydroSal® Bug Guard uses thoughtfully-chosen all-natural insect repellents to keep bugs away.

ANDIROBA OIL
A native of South American rain forests, this rich nut oil is known for its ability to act as a highly effective natural insect repellent.

CITRONELLA OIL
Well known, safe, and non-toxic insect repellent. Works by masking scents that are attractive to insects.

EUCALYPTUS OIL
Shown to repel mosquitoes.

LAVENDER OIL
Used for centuries as a bug repellent. Lavender oil also helps control the itching and inflammation that often follows bug bites.

HydroSal® Bug Guard raw

1 Leave-on insect repellent

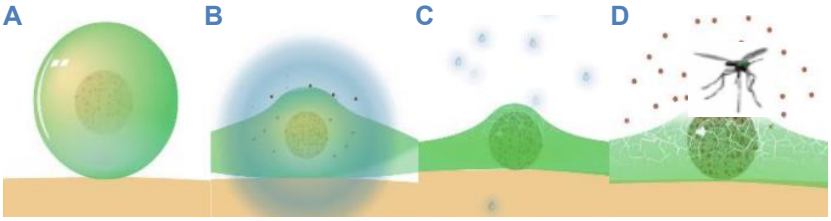

Figure 2: Description of HydroSal® changes: (A) the structure in water formula, (B) after application on a surface, the system dries out, turning flat like a film, (C) the dry product is invisible, 1µ or less in thickness. The natural antiseptics are trapped within the polymers, (D) when exposed to water, the water disturbs the polymer to expose the functional ingredients to the environment.

Tel 1-(844) SALVONA | sales@salvona.com | www.salvona.com
2521 Kuser Road, Hamilton NJ 08691, USA
v021617

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ENHANCED POTENCY OF OILS

The potency of the natural oils as insect repellents is affected by their volatility. Volatile oils will naturally evaporate from the skin, and the rate is accelerated by perspiration. When the concentration is reduced below a minimum effective level, it reduces their efficacy. HydroSal® technology is able to combat this issue and increase the effectiveness of functional ingredients on the surface of the skin.

In an analysis, we measured the release of Andiroba oil from the skin (Figure 2). HydroSal® Bug Guard allows for the retention of oil at a much higher level (2.5x) for a longer period of time. The product lost about 20% weight over the first two hours, then remained stable for 10 hours, while the control, a free blend of the same oil, evaporated and lost weight quickly with time.

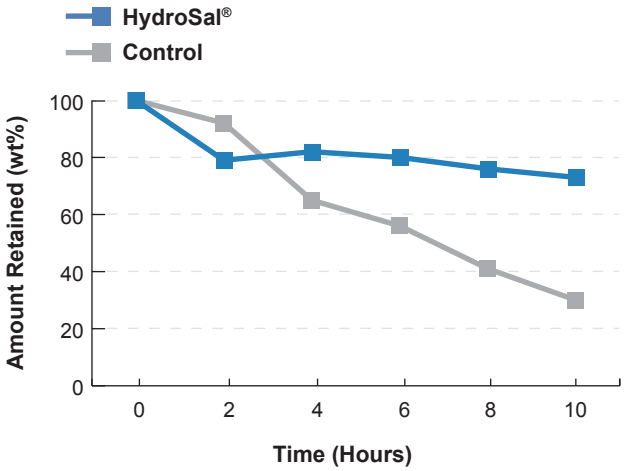

Figure 3: Analysis of Andiroba oil release from the skin over time. HydroSal® sustained the release of Andiroba oil for 10 hours. The level of Andiroba was determined by GC/MS.

NATURAL EFFECTIVE INSECT REPELLENT

Clinical studies have tested the efficacy of botanical oils compared to DEET, which is known as the most effective mosquito repellent. The study involved four volunteers submitting their forearms covered with different treatments directly to healthy females of Aedes sp. When the first and third bites were checked, the results showed that pure Andiroba oil is more effective than Andiroba at 15%, with soy oil exhibiting the same performance as the Andiroba at 15% (Milot, H.A., et al[1]). This goes to prove that each ingredient in HydroSal® Bug Guard shows superior performance in repelling insects.

References

1. Milot, H.A., et al. Comparative study of the topical effectiveness of the Andiroba oil (Carapa guianensis) and DEET 50% as repellent for Aedes sp. Rev. Inst. Med. Trop. Sao Paulo. 2004, Sept-Oct, 46 (5): 253-6.

FORMULATION

Ingredients	(W/W %)
HydroSal® Bug Guard	10
Salvona Pre-Mix S #5016	10
DI Water	79
Preservative	1

TECHNICAL DATA

Appearance @ 20°C	Opaque fluid
Applications	Leave-on insect repellent products
Color	Off-white
Odor	Characteristic
pH (1 % solution)	6.0 ± 1.0
Shelf Life (months)	18
Usage Level (wt%)	10%
Storage (°C)	Closed container at 12-32°

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