

# Cooling Effect of Citrus Peel Fiber: FiberDesign™ Citrus

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## Upcycled Thickener



**FiberDesign™ Citrus** (INCI: Citrus Limon (*Lemon*) Peel Powder & Sclerotium Gum & Citrus Aurantifolia (*Lime*) Peel Powder) is a thickener with suspension properties derived from lemon and lime peel fibers combined with sclerotium gum. Using a side stream of food grade lemon and juice, pectin is extracted from the citrus peels leaving citrus peel fibers resulting in

96% of lemon and lime valorization. These fibers are processed with sclerotium gum which is an exopolysaccharide produced through the fermentation of sugar by the fungi *Sclerotium rolfsii* using 100% renewable feedstocks. This unique combination produces a powder that provides formulations with elegant sensorial properties and long-lasting freshness. Not only is it highly compatible within a variety of systems, but studies have also demonstrated a cooling effect that lasts for up to eight minutes post application. This upcycled thickener is ideal for viscosity building and rheology modification with the added benefit of creating quick-breaking, cooling sensation in applications to leave the skin smooth and fresh.

This thickening agent is 100% naturally-derived<sup>1</sup>, readily biodegradable<sup>2</sup> and vegan suitable<sup>3</sup>, and can be used in cold or hot process formulations and works across a wide pH range in skin and sun care applications.

## Sourcing

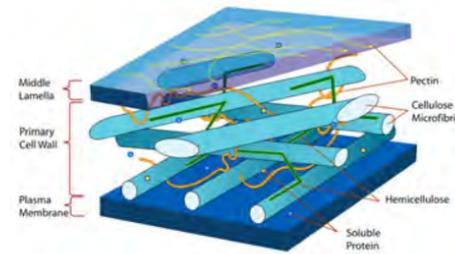


## Mimic Nature, Let Fibers Strengthen Your Formula

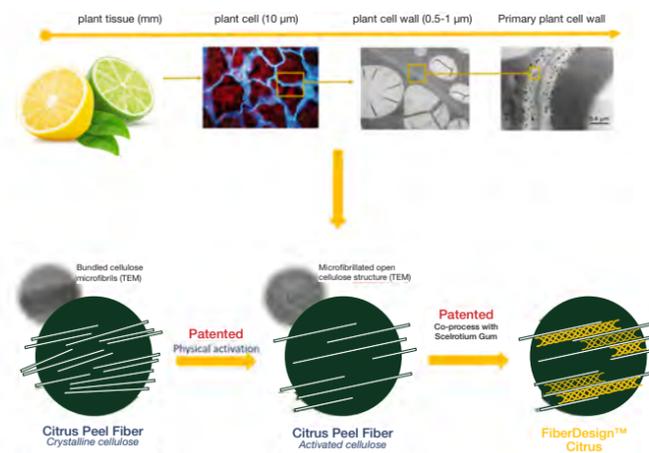
Plant cell wall (typically the primary plant cell wall of citrus fibers) is a complex polysaccharide network that surrounds the plant cells and ensures the cohesion of the tissues.

The major components of the plant cell wall are **cellulose, hemicellulose and pectin**. Fibers or plant cell wall-derived fibers are composite biomimetic materials constituted of the three main components with other minor components.

The most important biological role of these fibers is their contribution to **strengthening the cell wall by providing structural and mechanical properties** through the well-known interactions with cellulose.



## From Fibers Originating from Plant Cell Walls to Patented Technology



## Thermal Cooling for Skin and Sun Care Applications

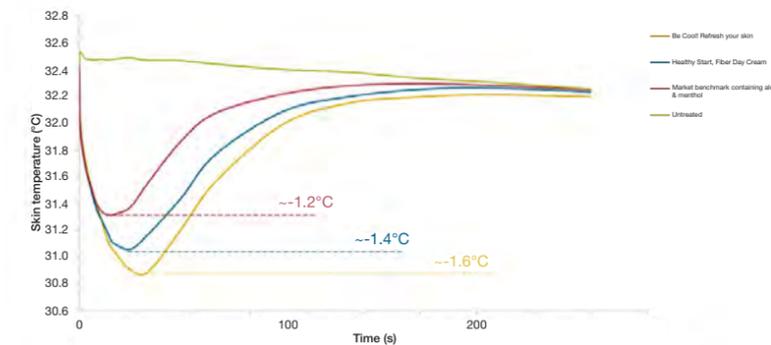
### Study Details

**In vivo study:** Clinical evaluation and comparison of the cooling efficacy of three cosmetic products versus untreated skin on a panel of 21 subjects (9 women and 12 men, 22-64 years of age with Phototypes I to IV) after one single application.

**Method:** Application once on the volar forearms. Measurement of the cutaneous temperature by infra-red camera over 15min.

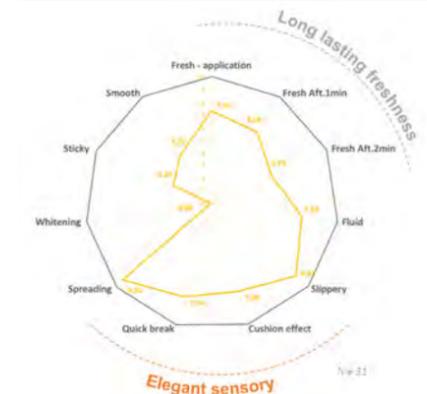
**Application:** Application on 4 randomized areas (3 products + 1 untreated – 2µl/cm<sup>2</sup>) until complete penetration on inner forearms.

### Evolution of the Cutaneous Temperature by Infra-red Camera after Product Application



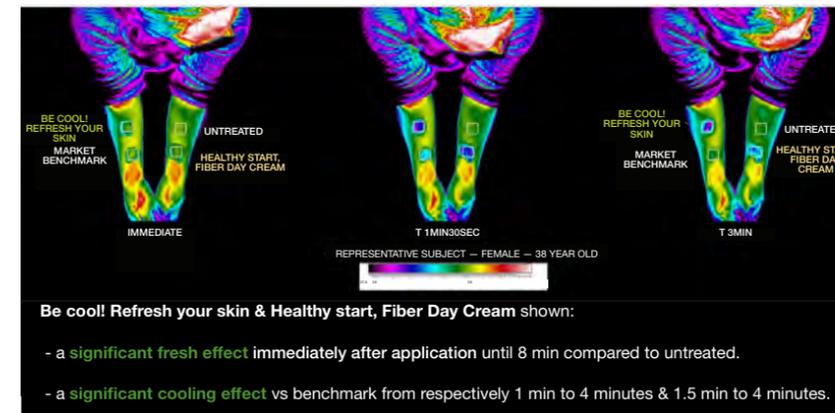
Be cool! Refresh your skin*	Healthy start, Fiber Day Cream*	Market benchmark « Ice cube effect » Gel
Aqua/Water/Eau, 2% FiberDesign™ Citrus, Glycerin, Benzyl Alcohol/Salicylic acid/Glycerin/Sorbic acid, Sodium Hydroxide.	Aqua/Water/Eau, Cocos nucifera oil (EU) or Cocos nucifera (Coconut) oil (US & China), 1.5% FiberDesign™ Citrus, Benzyl Alcohol/Salicylic acid/Glycerin/Sorbic acid, Lecithin, Tocopherol Sodium phytate/Aqua / Alcohol sodium hydroxide	Aqua/Water/Eau, Alcohol denat., Glycerin, Lavandula Angustifolia (Lavender) Flower Water, Peg-7 Glyceryl Cocoate, Butylene Glycol, Oleth-10, Menthol, Carbomer, Oleth-20, Lavandula Angustifolia (Lavender) Oil, Linalool, Sodium Hydroxide, Mentha Piperita (Peppermint) Oil, Tetrasodium Edta, Sodium benzoate, Geraniol, Citric acid, Potassium sorbate, Limonene
*without perfume or colorant		

### Sensory Evaluation: Be cool! Refresh your skin



### FiberDesign™ Citrus:

- **COLD or HOT Processable**
- Homogenize using high shear equipment
- Appearance: Light beige powder
- Add to aqueous phase
- Dose of use: 0.4-2.5%
- Compatibility: electrolytes, surfactants (including cationic), alcohol (up to 10%), oils, preservatives
- pH range: 3-12



**FiberDesign™ Citrus** is a patented technology to meet the growing consumer trend towards sustainable ingredients. Using upcycled fibers and sclerotium gum, which is produced by fermentation, this product allows for the recution in the amount of food waste and minimize the use of natural resources.

Cargill Beauty has introduced a 100% naturally-derived<sup>1</sup>, readily biodegradable<sup>2</sup> thickening agent which offers a smooth after-feel and elegant sensory. Perceived to give a quick breaking effect, easily spreadable with a tested cooling effect, this product offers new opportunities in texture and viscosity for after sun products.

Presented at the Society of Cosmetic Chemists SunCare Symposium - September 2023 - Florida

References and footnotes:  
 1. Naturally derived according to ISO 16128.  
 2. According to OECD 301B.  
 3. The responsibility of a vegan claim lies with the cosmetic manufacturer. Please consult your own legal or regulatory experts to ensure suitability of the product with your preferred standard.  
 4. Plant structure - O'Neill, M. A., et York, W. S. (2003). The composition and structure of primary cell walls. In J. K. C. Rose. The Plant Cell Wall (pp. 1-54). Boca Raton, FL: CRC Press.