lignovations

From plant to product

bringing the power of lignin from nature to your skincare routine

Unlocking the power of lignin

LignoGuard® is a **bio-based** multifunctional ingredient from **upcycled lignin,** a major component of plant biomass. Lignovations' patented Colloidal Technology makes the natural protective properties of lignin accessible for cosmetic products: **boosting SPF, providing antioxidant protection,** and **improving emulsion stability.**

LignoGuard® is developed and manufactured with a focus on **scientifically proven** efficacy (in-vivo SPF studies), **sustainability** (COSMOS, NaTrue) and **consistent quality** (Cosmetic-GMP ISO 22716).

It can be used in a wide range of products such as **skin care, sun care, color cosmetics** and **anti-aging** to improve performance and replace synthetic ingredients.

LignoGuard® has been selected as the winning ingredient of the **IFSCC Sustainability Challenge** (2023) and is a finalist of the **Cosmetics & Toiletries Allē Awards** (2024).

COSMOS APPROVED

UPCYCLED INGREDIENT

NATRUE APPROVED

CLINICALLY TESTED

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Lignin - Nature's Multi-Talent

Lignin is an important component of plant biomass and gives them strength, rigidity, and resilience. However, since it is mostly considered as a by-product of the pulp and paper industry it is usually wasted or burnt for energy production.

Lignovations' technology offers a more sustainable use of lignin by unlocking lignin's properties for cosmetic applications. Our unique **LignoGuard®** ingredient is a true multi-talent!

SPF Booster

improves the efficiency of organic and mineral UV filters **up to 50%**

Emulsion Stabilizer

improves the emulsion stability by aligning at the interface of oil and water

Antioxidant

helps protect cells and oils from damage caused by free radicals **up to 84%**

Natural Pigment

brings natural color, helping to eliminate white residue

APPLICATION EXAMPLES

SUN CARE

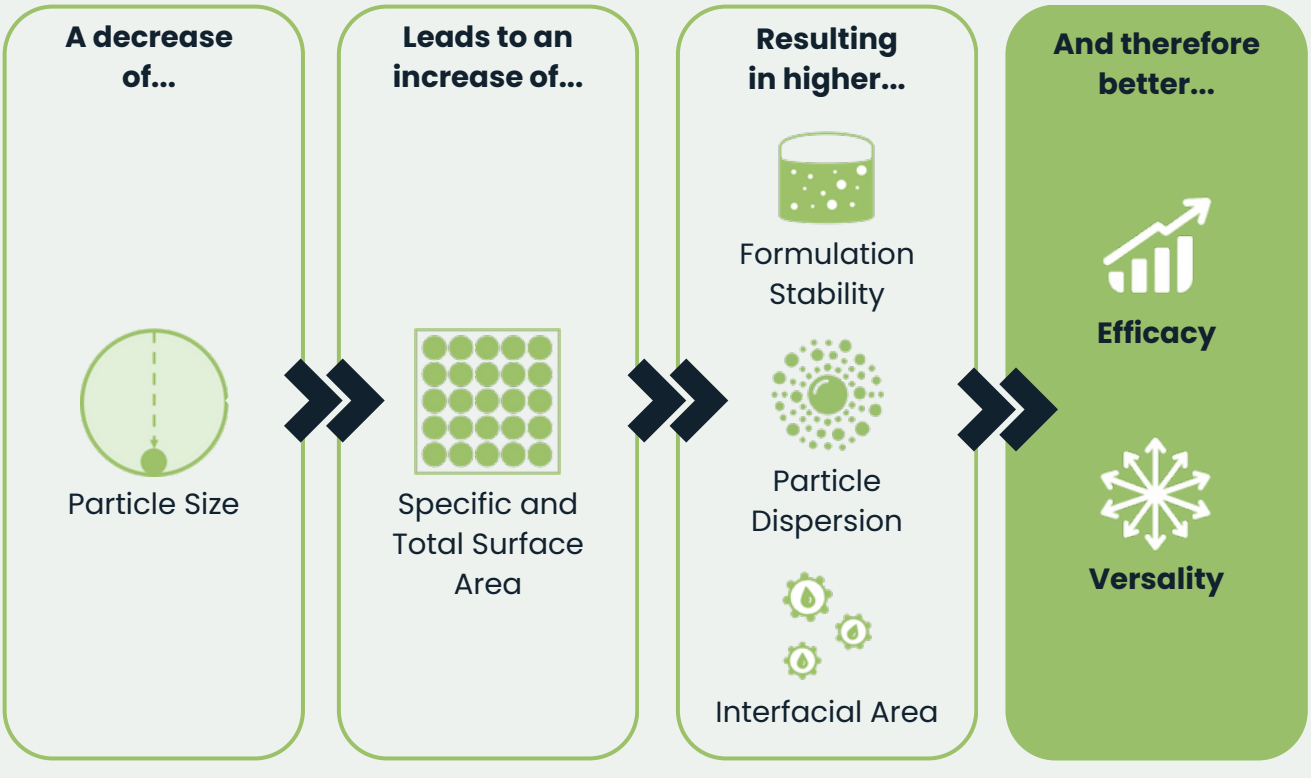
DAY CREAMS

BB/CC CREAMS

MAKE UP

Lignovations' Colloidal Technology

At Lignovations, we have developed a patented technology that allows us to create extremely small lignin particles - called Colloidal Lignin Particles. Our green process retains the natural structure of lignin and works without any chemical modification or harmful substances. To maximize performance and processability, the surface area of the lignin particle in relation to its volume should be as large as possible: a **high specific surface area** means **achieving high efficacy.** This can be achieved by **decreasing the particle size.**

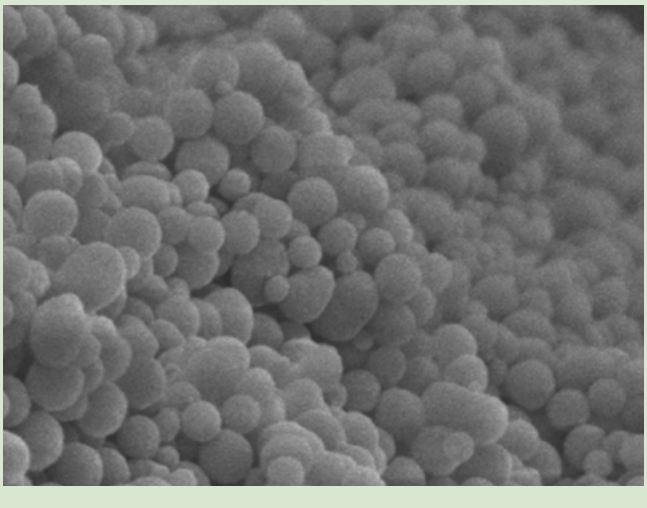


Lignovations' manufacturing process is designed to yield Colloidal Lignin Particles with a desired particle size. This allows us to maximize performance and processability by minimizing particle size while maintaining a non-nano classification.

The particle size is regularly checked using dynamic light scattering (DLS) and scanning electron microscopy (SEM) methods.

If you want to learn more about our technology visit our website at www.lignovations.com/technology.

Colloidal Lignin Particles



Upcycling Lignin into a Cosmetic Ingredient

Lignin is found everywhere in nature. Plants benefit from lignin's protection against UV radiation, oxidative stress, and other negative influences. However, in biomass processing, the vast majority of lignin is wasted and burned because it cannot be used for higher-value applications.

At Lignovations, we are on a mission to make use of this valuable resource and unlock its great properties for cosmetics and other applications. **LignoGuard®**'s proven efficacy demonstrates that lignin is too valuable to go to waste.

The biomass used for the lignin we use originates from sustainably cultivated forests. Wood residues are collected from wood processing facilities such as sawmills and subsequently fractionated into their main components: cellulose, sugars, and lignin. We transform the extracted lignin into a cosmetic ingredient retaining the lignin's natural structure and elevating its multifunctional qualities to a new level.





Tinted Organic Sunscreen SPF 50+ with **LignoGuard®**

Phase	Ingredient	INCI	%wt
W I	Water deion	Water	45.9
	Glycerin	Glycerin	3
W II	**LignoGuard®** Aqua 20	Water, Lignin (20% CLP), Pentylene Glycol	15
W III	Solagum	Acacia Senegal Gum, Xanthan Gum	0.3
	Pentylene Glycol	Pentylene Glycol	3
O I	Tinosorb S	Bis-Ethylhexyloxyphenol -Methoxyphenyl Triazine	5
	Cetiol B	Dibutyl Adipate	5
	Cetiol AB	C12-15 Alkyl Benzoate	6
	MCT	Caprylic/Capric Triglyceride	2
O II	Montanov 202	Arachidyl Alcohol, Behenyl Alcohol, Arachidyl Glucosides	3
	Cetearylalcohol	Cetearylalcohol	1
	Eumulgin SG	Sodium Stearoyl Glutamate	0.8
UV-Filter	Tinosorb M	Methylene Bis-Benzotriazolyl Tetramethylbutylphenol (nano), Aqua, Decyl Glucoside, Propylene Glycol, Xanthan Gum	10

W = water phase, O = oil phase

Procedure – Combined Hot/Cold Process

1. Mix Phase O I and heat up to 80 °C, stir for 15 min (Beaker A)
2. Add Phase O II to Phase O I (Beaker A) and heat it up to 80 °C stir for 5-10 min
3. Heat Phase W I to 60 °C (Beaker B)
4. Add Phase W II (**LignoGuard®**) into Phase W I (Beaker B) homogenize at 10,000 rpm (30 s)
5. Add Oil Phase (Beaker A) into the Water Phase (Beaker B) and homogenize at 10,000 rpm (~3 min)
6. Add UV-Filter Phase and homogenize well for another 2 min
7. After that add Phase W III into the formula and homogenize at 10,000 rpm (~1 min)
8. Cool down under low stirring

Please refer to the LignoGuard® Technical Data Sheet for extensive information on formulation and ingredient compatibility.

Tinted Mineral Sunscreen SPF 15 with **LignoGuard®** (COSMOS)

Phase	Ingredient	INCI	%wt
W I	Water deion	Water	30.10
	Glycerin	Glycerin	2
W II	**LignoGuard®** Aqua 20	Water, Lignin (20% CLP), Pentylene Glycol	15
W III	Solagum	Acacia Senegal Gum, Xanthan Gum	0.3
	Pentylene Glycol	Pentylene Glycol	3
O I	ZinClear-XP55 Sunflower	Zinc Oxide, Helianthus Annuus (Sunflower) Seed Oil, Polyglyceryl-3 Polyricinoleate, Isostearic Acid	30
	Coco Caprylate	Coco Caprylate	5
	Jojoba Oil	Simmondsia Chinensis (Jojoba) Seed Oil	4
	MCT	Caprylic/Capric Triglyceride	5
O II	Montanov 202	Arachidyl Alcohol, Behenyl Alcohol, Arachidyl Glucosides	2.33
	Cetearylalcohol	Cetearylalcohol	1
	Emulsiphos F	Potassium Cetyl Phosphate, Hydrogenated Palm Glycerides	0.87
	Eumulgin SG	Sodium Stearoyl Glutamate	0.07
	Glyceryl Stearate SE	Glyceryl Stearate	1.33

W = water phase, O = oil phase

Procedure – Combined Hot/Cold Process

1. Mix Phase O I and heat up to 80 °C, stir for 15 min and disperse ZinClear with 15,000 rpm (Beaker A)
2. Heat Phase W I to 60 °C (Beaker B)
3. Add Phase O II to Phase O I (Beaker A) and heat it up to 85 °C stir for 15 min
4. Add Phase W II (**LignoGuard®**) into Phase W I (Beaker B) homogenize at 10,000 rpm (30 s)
5. Add Oil Phase (Beaker A) into the Water Phase (Beaker B) and homogenize at 10,000 rpm (~3 min)
6. After 3 min add Phase W III into the formula and homogenize at 10,000 rpm (~1 min)
7. Cool down under low stirring

Please refer to the LignoGuard® Technical Data Sheet for extensive information on formulation and ingredient compatibility

Tinted Organic Sunscreen SPF 35 with **LignoGuard®**

Phase	Ingredient	INCI	%wt
W I	Water deion	Water	48
	Glycerin	Glycerin	5
	Rhodicare S	Xanthan Gum	0.3
	Disodium EDTA	Disodium EDTA	0.1
	Actiphos SN	Phenylpropanol, Caprylyl Glycol	1
W II	**LignoGuard®** Aqua 20	Water, Lignin (20% CLP), Pentylene Glycol	10
O	Actiphos SN	Potassium Cetyl Phosphate, Polyglyceryl-6 Stearate, Polyglyceryl-6 Behenate	1.5
	Lanette 22	Behenyl Alcohol	1
	Cetiol B	Dibutyl Adipate	5
	Herboil Olive Bio	Olea Europaea (Olive)Fruit Oil	1
	Tocopherol Acetate	Tocopheryl Acetat	0.1
	Actisorb DB	Ocotocrylene, Butyl Methoxydibenzoylmethane, Ethylhexylsalicylate, Dipropylene Glycol Dibenzoate	25
	Acticraft GR	Glyceryl Rosinate, Octyldodecanol	1.5
C	Perfume Oil	Parfum	0.5

W = water phase, O = oil phase

Procedure – Combined Hot/Cold Process

1. Disperse Rhodicare S in the water using an Ultra Turrax for about 15 minutes (Beaker A)
2. Add the rest of Water Phase W I and heat up to 50 °C
3. Heat up Oil Phase O and stir until Actiphos SN is melted (Beaker B)
4. Add Oil Phase O (Beaker B) into the Water Phase (Beaker A) and homogenize at 13,000 rpm (~1 min)
5. Add Phase W II (**LignoGuard®**) into the mixture and keep on homogenizing at 7 - 8,000 rpm
6. Cool down under low stirring
7. Add Phase C into the formula and stir

Please refer to the LignoGuard® Technical Data Sheet for extensive information on formulation and ingredient compatibility.