

Ricesilk™: A Statement of Innovation

Rice Remedy's proprietary Ricesilk™ platform represents a material-level paradigm shift in professional spa and wellness skincare translating a clinically grounded biomaterial class into a treatment-room technology with measurable functional and commercial advantage.

 SCIENTIFIC & DATA-BACKED

 PATENT PROTECTED

 SUSTAINABLE ORIGIN

What Is Ricesilk™?

The Biomaterial Core

Ricesilk™ is a patented nanobiocellulose biomaterial derived from rice agricultural by-products. Produced through a proprietary fermentation and nano-processing workflow, it converts cellulose from rice crop residues into ultra-fine biocellulose fibres that self-assemble into a three-dimensional nanofibrillar network.

This architecture closely mirrors the extracellular matrix (ECM) of human skin enabling Ricesilk™ to function not as a conventional topical formulation, but as a biological scaffold that interfaces directly with skin tissue.

The technology is protected under international patent **WO2013/176633** and developed under the scientific leadership of Sombat Rungsilp. The Ricesilk™ professional spa and wellness range commercially launched in September 2025, representing the first application of this biomaterial platform in treatment-room skincare.



Biomaterial Properties: The Scientific Foundation

Bacterial nanocellulose has been extensively characterised in biomedical literature, establishing a robust empirical foundation upon which Ricesilk™ is built. The following core properties are widely reported across biomaterials science and underpin the functional rationale for its application in professional skincare.

Water-Holding Capacity

Up to **100–200× its dry weight** in water retention, creating a sustained hydration reservoir at the skin interface throughout treatment exposure.

Nanofibre Diameter

Individual fibres measure **20–100 nm** in diameter, enabling the formation of dense yet breathable three-dimensional structures that conform intimately to skin topography.

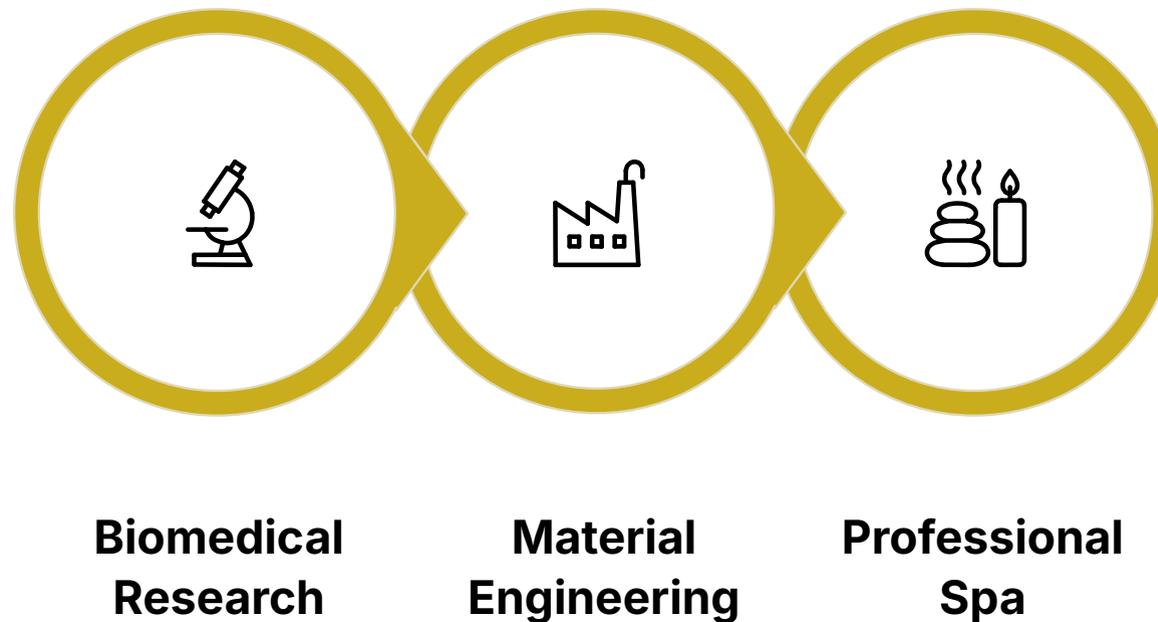
Mechanical Properties

High tensile strength combined with exceptional **conformability** allows the matrix to adhere uniformly across irregular skin surfaces without loss of structural integrity.

- ☐ All three properties are independently documented in peer-reviewed biomaterials literature and are not proprietary claims. Ricesilk™ applies this established biomaterial class to a new commercial context.

From Biomedical Research to Treatment Room

The translation of bacterial nanocellulose from wound-care and biomedical applications to professional spa skincare represents the central innovation vector of Ricesilk™. Understanding this lineage is critical for appreciating both its scientific credibility and its functional differentiation.



Bacterial nanocellulose has an established clinical track record in wound care documented through products such as Biofill® and substantiated in landmark studies including Czaja et al. (*Biomacromolecules*, 2006) and Winter's foundational moist wound healing research (*Nature*, 1962). Ricesilk™ extracts the mechanistic principles from this biomedical heritage conformability, hydration maintenance, biocompatibility and engineers them into a spa-applicable biomaterial format. This is not a repositioning of a medical device; it is the deliberate translation of validated material science into a new, complementary application domain.

How Ricesilk™ Improves Treatment Quality & Efficacy

Four mechanistically distinct pathways underpin the functional superiority of Ricesilk™ over conventional spa substrates. Each is grounded in published biomaterials science, with inference clearly distinguished from established fact.

1

Structural Skin Conformity

The dense nanofibrillar network adheres closely to irregular skin surfaces, achieving superior conformability and uniform surface contact compared to traditional woven or non-woven substrates. This ensures consistent treatment exposure across the entire contact interface. *(Czaja et al., Biomacromolecules, 2006)*

2

Hydration Retention & Moist Microenvironment

Biocellulose materials maintain a moist microenvironment, reducing transepidermal water loss (TEWL) and supporting optimal enzymatic and cellular activity within the skin. Ricesilk™ leverages this property to enhance hydration retention throughout professional treatments. *(Winter, Nature, 1962; modern TEWL literature)*

3

Barrier Support & Skin Recovery Environment

Biocellulose has been clinically deployed in burn and wound dressings due to its non-irritating, biocompatible profile, its function as a temporary protective barrier, and its capacity to support epithelial regeneration environments — making Ricesilk™ particularly suited for post-treatment protocols and compromised skin. *(Clinical cellulose dressing literature)*

4

Enhanced Delivery Environment for Actives

The nanofibre matrix increases surface contact time between skin and co-applied formulations. This extended residence time may improve the bioavailability environment for actives by reducing evaporation and maintaining hydration at the delivery interface. *(Mechanism-based inference; not a quantified delivery claim)*

Functional Mechanism in Depth: Hydration & Barrier

Two of the four efficacy pillars hydration retention and barrier support merit deeper examination, as they represent the most clinically substantiated mechanisms and carry the greatest weight in both regulatory and commercial contexts.

Hydration Retention: The Science

The principle of maintaining a moist microenvironment as a therapeutic modality was first formalised by George D. Winter in 1962, demonstrating that occluded, hydrated wounds healed significantly faster than air-exposed controls. This finding established the foundational rationale for moist wound care — a principle now universally adopted in clinical wound management.

Ricesilk™ applies this principle in a cosmetic treatment context: the high water-holding capacity of the nanofibrillar network creates a sustained hydration reservoir at the skin surface, reducing TEWL and maintaining optimal conditions for epidermal function throughout the treatment duration. It is important to note that this application represents a directional inference from wound-care data; direct clinical quantification in cosmetic contexts would strengthen this claim further.

Barrier Support: Clinical Grounding

The barrier-support function of bacterial nanocellulose is well-documented in wound-care literature. Products such as Biofill® demonstrated that bacterial cellulose dressings could act as temporary biocompatible barriers, reducing infection risk and supporting the regenerative environment without inducing irritation or inflammatory response.

Translated to professional spa application, this property positions Ricesilk™ as an optimal substrate for post-procedure protocols — including post-laser, post-peel, and post-microneedling contexts — where the skin barrier is transiently compromised and a non-irritating, hydrating, conformable barrier material provides measurable benefit. Sensitivity profiles are favourable given the non-allergenic, non-synthetic origin of the material.

Key Efficacy Properties at a Glance

The following quantitative and qualitative benchmarks, drawn from the broader bacterial nanocellulose literature, contextualise the material performance of Ricesilk™ relative to conventional spa substrates.

200×

Water Retention

Maximum water-holding capacity relative to dry weight, enabling sustained hydration throughout treatment exposure

20nm

Min. Fibre Diameter

Lower bound of nanofibre diameter range (20–100 nm), enabling dense, breathable three-dimensional scaffold structures

2025

Commercial Launch

September 2025 — first commercial application of the Ricesilk™ biomaterial platform in treatment-room skincare

1

Patent Granted

International patent WO2013/176633 protecting the Ricesilk™ nanobiocellulose technology platform

📄 Statistical values are sourced from the broader bacterial nanocellulose biomaterials literature and are not Rice Remedy proprietary performance claims. Independent clinical validation in the spa application context is recommended for regulatory substantiation.

Commercial Innovation: Creating a New Category

Beyond its technical properties, Ricesilk™ delivers a strategically significant commercial proposition in a professional skincare market increasingly characterised by ingredient commoditisation and formulation parity.



Figure 2 Complete epithelialization within two weeks.



Figure 3 Face of patient at 3 weeks after discharge home.



Figure 4

Figure 4 Visual pain analog score in each day procedure.

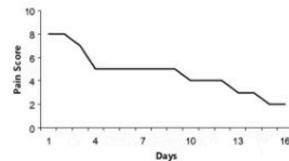


Figure 4 Visual pain analog score in each day procedure.

moisturizing and cooling effects on the burn wound may be beneficial to the patient.

Microbial cellulose may be a novel dressing for partial-thickness burn wounds. Its accelerated wound-healing properties have been investigated in only a few clinical studies but have shown effective results.⁹ The dressing is derived from a bacterium named *A. xylinum* and cultured in liquid medium. The structure of its cellulose from complex processes differs from other plant cellulose. An ultra-fine network of cellulose nanofibers can hold a large amount of water while displaying great elasticity, a high degree of wet strength, and conformity.¹⁰ This network may be suitable for providing a moist environment in burn wounds in order to promote wound healing.

The procedure for applying this material is similar to the for applying others: Sterile dressings are removed from the packaging, placed directly on the wound surface, and then covered with gauze. The dressing needs to be applied to the wound only once, and no other dressings are required. With the dressing's cooling property, patient acceptance is good, and the pain score gradually reduces each day.

Fontana et al¹¹ and Mayall et al¹² studied this cellulose dressing in burns and chronic ulcers. This wound dressing material is more effective than others. It provides pain relief, protects the wound against infections, and accelerates wound healing. Another study revealed that microbial cellulose dressings proved to be more effective than conventional wound dressing materials in the treatment of chronic venous ulcers.¹³

In this case study, we report the use of microbial cellulose as a dressing to heal clean burn wounds. The application on our patient resulted in complete resolution of a moist environment for healing, protected from additional injury from scratching, and accelerated wound healing. In addition, it may have an advantage over an allogenic amnion, a primitive treatment for temporary wound coverage, because it is sterilized and comfortable to use. We believe that the microbial cellulose properties contribute to the wound-healing process in burn patients. Use of additional materials, such as antibiotics for infection prophylaxis, will further promote wound repair. Jung et al reported

Introducing Biomaterial-Based Skinwear

Ricesilk™ introduces an entirely new product category: **biomaterial-based skinwear**. In a market dominated by emulsion-format actives and commodity ingredient narratives, this category creation provides a sustainable point of competitive differentiation that is inherently difficult to replicate without equivalent material science investment and intellectual property.

The commercial advantages compound across multiple dimensions: a patented, science-backed differentiation story; a clinically grounded narrative derived from wound-care biomaterials that confers credibility with both practitioners and educated consumers; a visible and tactile treatment experience that clients can perceive immediately upon application; and a premium positioning anchored in biotechnology rather than conventional cosmetic chemistry.

This elevates both practitioner authority — enabling treatment rooms to offer a demonstrably distinct modality — and client perceived value, supporting premium pricing and repeat treatment rates.

Marketability Drivers: The Ricesilk™ Advantage

The following four pillars collectively constitute the marketability case for Ricesilk™ in the professional spa and wellness channel, addressing both practitioner and consumer audiences.



Patented Differentiation

International patent protection (WO2013/176633) creates a defensible competitive moat. No generic or white-label equivalent exists, providing treatment rooms with an exclusive technology narrative and protecting commercial premiums over time.



Clinical Credibility

Rooted in a well-established biomedical heritage wound care, burn treatment, biocompatible dressings Ricesilk™ carries scientific authority that emulsion-based competitors cannot replicate without equivalent biomaterial investment.



Sensory & Experiential Difference

The tactile and visual properties of biocellulose its translucency, conformability, and sensation upon application provide an immediately perceptible treatment difference that communicates premium value at the point of experience.



Premium Positioning Anchor

Positioning in biotechnology rather than conventional cosmetic chemistry supports premium tier pricing strategies, differentiating Ricesilk™ treatments from commodity facial or body offerings across all professional spa and wellness contexts.

Sustainability: Agricultural Waste Valorisation

The environmental and supply chain credentials of Ricesilk™ are structurally embedded in its material origin, providing a sustainability narrative that is both authentic and scientifically defensible rooted in the concept of circular material use rather than voluntary ESG positioning.

Circular Material Origin

Ricesilk™ is derived from rice agricultural by-products specifically the cellulose content of rice crop residues that would otherwise constitute low-value or waste-stream material. The conversion of this feedstock into a high-performance nanobiocellulose biomaterial represents a textbook application of circular economy principles: waste valorisation through advanced bioprocessing.

Bacterial cellulose production is water-based and generates substantially lower volumes of toxic by-products compared to synthetic polymer production pathways — a general directional conclusion supported by the broader green chemistry literature, though the degree of advantage is feedstock- and process-specific. Rice Remedy's sourcing model also contributes to agricultural waste diversion, supports traceable material origin, and reduces reliance on petrochemical-derived substrates.

It is recommended that Rice Remedy substantiate these claims further with life cycle assessment (LCA) data specific to the Ricesilk™ production process, supply chain traceability documentation, and quantified waste diversion metrics, as these would materially strengthen the sustainability narrative for both regulatory review and ESG-oriented commercial partners.



Agricultural Waste Diversion

Rice crop residues converted from low-value by-products into high-performance biomaterial, diverting agricultural waste from disposal streams.



Traceable Material Origin

Sourcing model supports verifiable, traceable material origin — critical for both regulatory transparency and sustainability-oriented consumer communication.



Reduced Petrochemical Reliance

Bio-derived substrate replaces conventional petrochemical polymer feedstocks, supporting a directional reduction in fossil resource dependency across the formulation base.

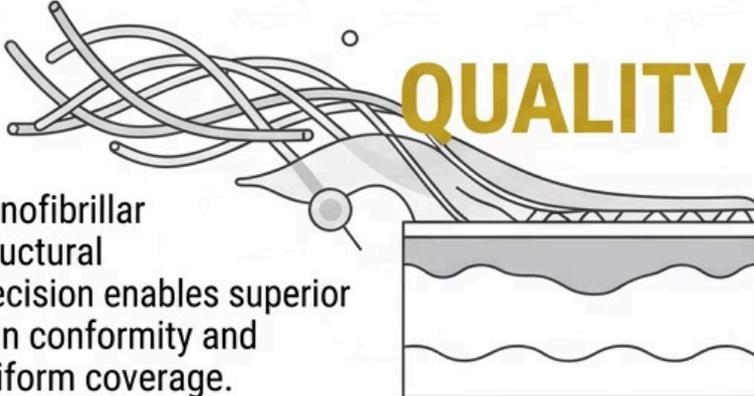


Water-Based Production

Bacterial cellulose fermentation is a water-based bioprocess, generating comparatively lower volumes of hazardous chemical by-products relative to synthetic polymer manufacturing routes.

Innovation Summary: Four Pillars of Advancement

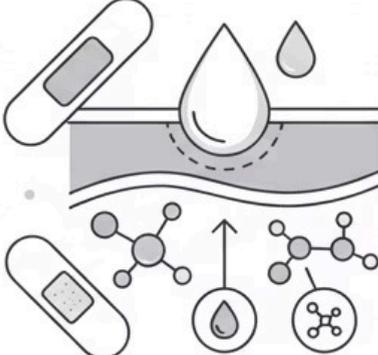
Ricesilk™ represents a material-level innovation that shifts the operational paradigm of professional skincare from passive topical application to active, engineered skin interaction. Its innovation proposition is coherently structured across four reinforcing pillars, each independently defensible and collectively compelling.



QUALITY

Nanofibrillar structural precision enables superior skin conformity and uniform coverage.

The diagram shows a cross-section of skin with a layer of nanofibrillar material applied on top. The material is depicted as a dense, interconnected network of fibers that conforms to the skin's surface. A magnified view shows the individual fibrillar structure.



EFFICACY

Hydration retention and sustained contact environments derived from biomedical moist wound care principles.

The diagram illustrates a cross-section of skin with a bandage-like material applied. A water droplet is shown on the surface, with arrows indicating its retention. Below the skin, molecular structures and a water droplet are shown, representing the biomedical principles of moist wound care.

MARKETABILITY

Patented category creation – biomaterial-based skinwear – with biotechnology premium positioning.



SUSTAINABILITY

SUSTAINABILITY

Agricultural waste valorisation converting rice crop residues into high-performance nanobiocellulose biomaterial.



Ricesilk™ does not simply improve an existing product format it introduces a new substrate class to professional skincare, translating validated biomedical material science into a commercially novel and environmentally responsible treatment technology.

For dermatological researchers, the platform offers a rigorously grounded biomaterial with an established safety and performance literature base. For clinical skincare scientists, it provides a mechanistically coherent functional rationale across hydration, barrier, conformability, and delivery dimensions. For regulatory reviewers, the patent protection, biomedical heritage, and clearly delineated fact-versus-inference framework provide a transparent basis for claims substantiation and dossier development.