

Haute couture for the skin delivers self-repair benefits

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For centuries, the rose has been a symbol of love and romance, elegance and femininity. According to Greek mythology, roses originated from Adonis, the deity of plants and rebirth.

For millennia, the rose fascinates. Its sweet fragrance is often used in perfume. In beauty care, anti-inflammatory properties found in rose water can help soothe irritation and alleviate skin conditions. Over the centuries, rose oil has been used to cure illness and antioxidants from roses help hydrate skin. Rose hips can even be eaten, as they contain high amounts of vitamin C. Today, floral remedies are increasingly used in homeopathic solutions to combat everything from anxiety to depression and more.

The *Rosa* species has existed on the planet for at least 40 million years based on fossil studies. This indicates that the species has a very specific capacity to resist and maintain its exceptional beauty over the centuries.

Rosa centifolia, particularly, is an exceptional rose used to create luxury perfumes. This rose has always had the same delicate scent and maintains its rose color despite conditions of hot temperature, drought, wind, and sun in the South of France. This property is explained by a unique metabolism for healing and resistance against environmental stresses coming from its richness in small RNA and polyphenols.

Rosaliss™ biofunctional is a 100 per cent nature-derived extract from *Rosa centifolia*. Also known as the Provence Rose because it is sourced from the South of France, it has been included in the French Pharmacopoeia since the 19th century for outstanding efficacy with analgesic, hypnotic and anti-inflammatory benefits for the body.

Abstract

Rosaliss™ biofunctional is formulated by Ashland from the legendary *Rosa centifolia*. Also known as the rose of “100 petals,” its extract is obtained by plant small RNA technology, a unique patented novel green technology. With this new biofunctional, Ashland brings haute couture to the skin for flawless self-repair and healthy perfection.

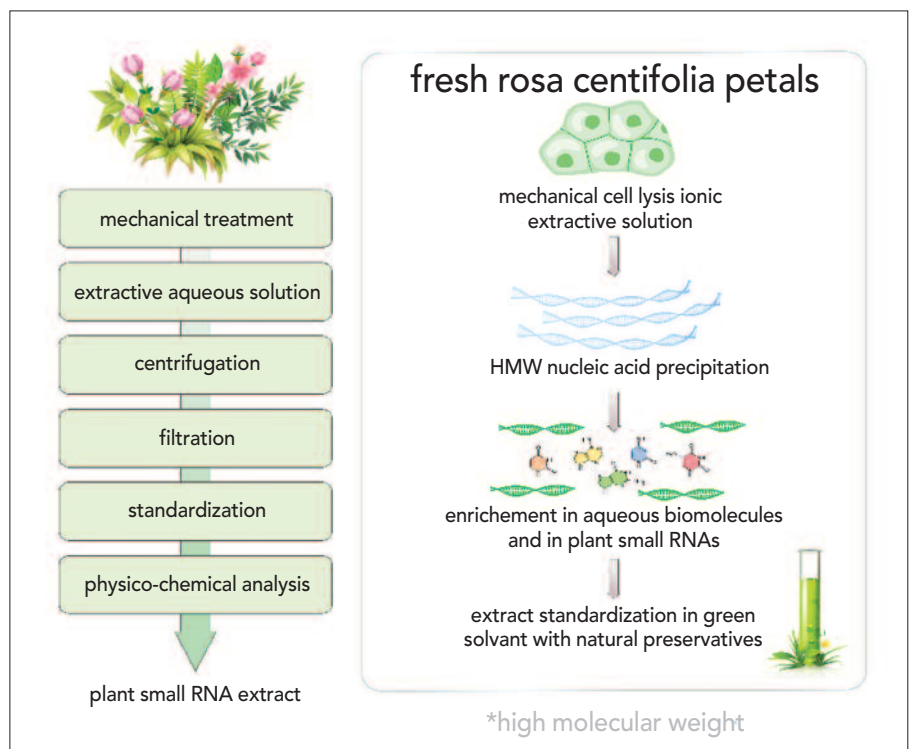


Figure 1: Ashland's Plant Small RNA (PSR) technology process.

The Rosaliss extract is obtained through application of Ashland's proprietary and patented PSR™ (plant small RNA) technology to get a botanical enriched in small RNA and potent phytomolecules.

Novel extraction patented green technology with superior efficacy

Ashland's PSR technology is natural and sustainable. This process is an aqueous based extraction, solvent-free, including only natural-derived substances, with no toxic substances generated and very limited impact on the environment. Only natural-derived waste is generated, and the rose harvesting only occurs in May, respecting the capacity of nature to regenerate.

The PSR technology allows Ashland to obtain an extract enriched in plant small RNAs and potent phytomolecules such as

Table 1: Collagen I stainin

Rosaliss™	Rosa centifolia extract without small RNA	Rosa macerate	Positive control
+26%***	ns	ns	+18%***
*** highly significant ns: not significant with Student's t test compared to placebo			

polyphenols, amino acids, sugars, and minerals. Small RNAs are part of the flower's development and defence against environmental stresses and diseases. Recent research shows that the rose flower is rich in small RNAs that are likely involved in the plant healing process.

The botanical (*Rosa centifolia*) is cultivated without pesticides close to Ashland's manufacturing facility in the south of France. This offers significant reductions in transportation thereby lowering the environmental footprint from manufacturing Rosaliss.

To capture the richest content in phytochemicals, rose flowers are collected at sunrise during their eclosion. Petals are freshly frozen right after cutting to preserve their beauty, their scent and maintain the integrity of the phytochemicals before their extraction.

Rosaliss (now referred to as 'the *Rosa centifolia* PSR extract') has proven superior efficacy than benchmarks of the market (1.5x greater antioxidant activity than green tea extract) and offers better results than classical rose macerate (e.g., collagen production).

Innovative cosmetic concept with novel perfect skin repair biomarker (MARKSL1)

As part of Ashland's research on new anti-ageing pathways, the *Rosa centifolia* PSR extract's scientific design is bioinspired by the axolotl, an amphibian and a model of regenerative medicine that possesses two unique characteristics: unlimited regeneration capacity and scar-free healing.

The MARCSL1 protein has been found in the axolotl and is linked to its unlimited regeneration capacity. It is associated with epidermal repair and regeneration of the basement membrane. This protein is expressed in human skin keratinocytes and its expression decreases with age (Fig 2).

The *Rosa centifolia* PSR extract helps

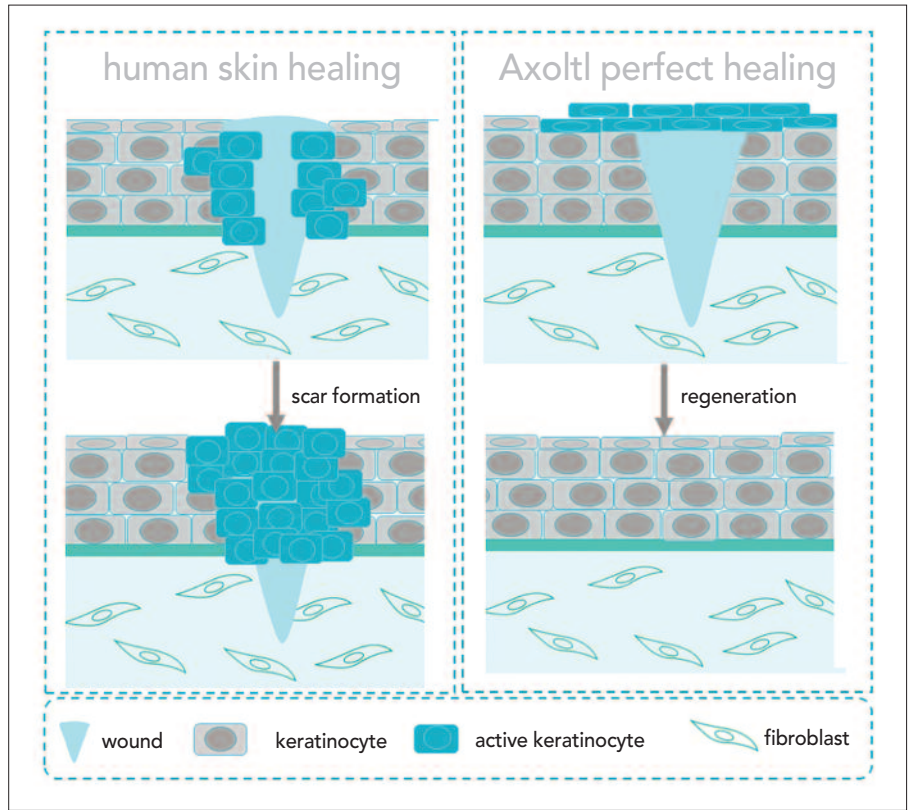


Figure 2: Healing mechanisms.

skin increase the presence of the MARCSL1 protein and other skin repair markers (collagen I; fibronectin; hyaluronic acid) in ageing models, enhancing skin's capital for self-repair (Fig 3).

miRNA-132: a skin healing signature

Additionally, some microRNAs are associated with skin repair and restoration of skin integrity after injuries. Recent research demonstrates that miR-132 blockade delays skin healing. miR-132 is implicated in epidermal repair and has been used topically to help the healing process.

In vitro testing demonstrates that the *Rosa centifolia* PSR extract helps restore homeostasis and prevents it from the senescence associated decrease of miRNA-132.

Moreover, *ex vivo* testing also has shown that the *Rosa centifolia* PSR extract helps provide skin capital to self-repair over 72 hours (Fig 4).

Benefits to manufacturers and consumers

Rosa centifolia PSR extract brings a new dimension to manufacturers with a novel type of natural and environmentally-conscious extract presenting superior and

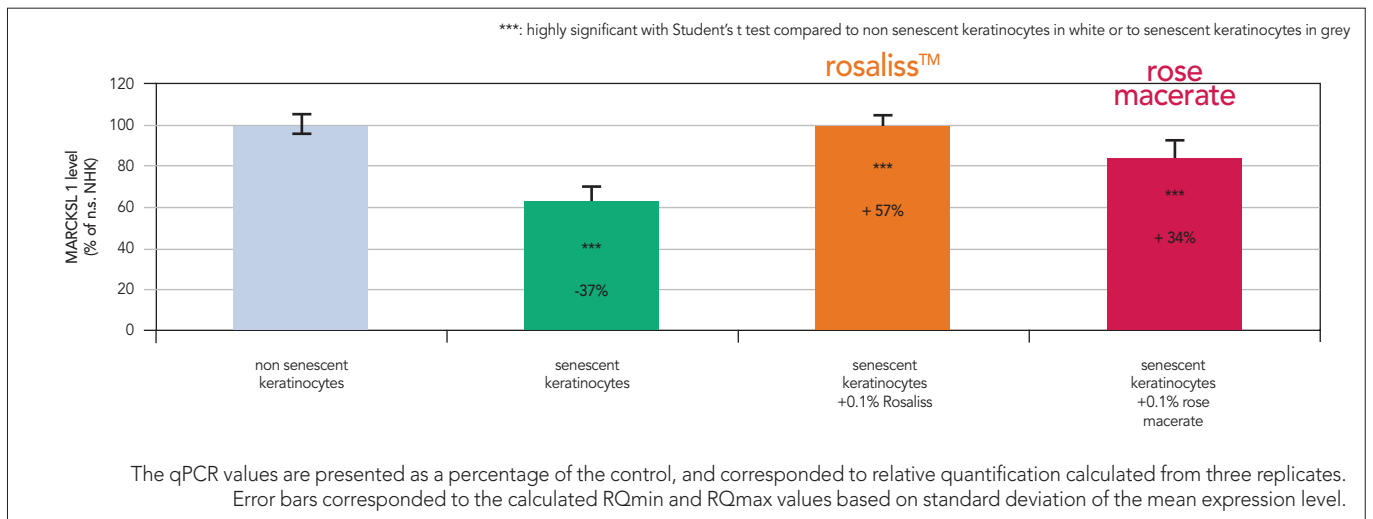


Figure 3: MARCSL1 protein levels.

proven efficacy on key skin benefits. Consumers are increasingly searching for products containing natural-derived, efficacious ingredients that both respect the environment and provide true efficacy on visible signs of skin ageing such as age flaw smoothness, skin tone homogenisation, improved skin texture and more. With its unique composition rich in plant small RNAs and rose-protecting tannins, *Rosa centifolia* PSR extract helps skin increase its capital to self-repair for visible healthy perfection. Additionally, *Rosa centifolia* PSR extract helps skin preserve the microbiome from sun damage and provides a prebiotic and postbiotic effect, which is the bioconversion of rose polyphenols by skin bacteria into more effective molecules for the skin. Alteration of skin's microbiota will enable impaired tissue repair so protecting the skin with a healthy microbiome will assist in reducing skin sensitivity and increasing skin self-repair ability.

Rosa centifolia PSR extract is water-soluble and can be easily formulated at 1% for different applications such as age perfecting products, creams to smooth skin texture and enhance skin moisture, cosmetic products with a skin repair concept and a skin microbiome care approach.

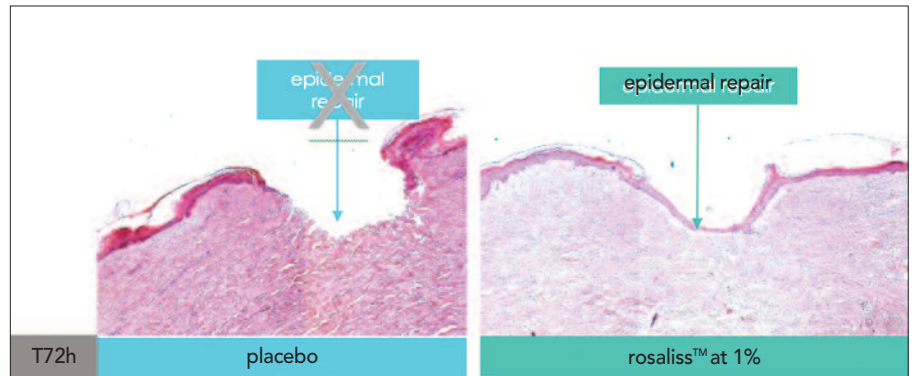


Figure 4: Epidermal repair test.

Conclusion

Ashland has developed other biofunctionals using the proprietary and patented PSR (plant small RNA) technology. PhytoRNX Baobab™ is extracted from baobab seeds and is also rich in plant small RNA. This botanical is associated with improved epigenetic homeostasis in ageing skin and long lasting moisturisation.

For a total repair concept, Ashland suggests using *Rosa centifolia* PSR extract in combination with other Vincience biofunctionals for skin repair and dermal matrix.

Neomatrix™ is a peptide inspired by wound healing science and stratifin epidermal biomessenger that is linked with dermal remodeling and wrinkle repair.

Neomatrix™ enhances epidermal stratifin expression to help skin optimise epidermal-dermal cross-talk and helps the skin in its extra-cellular matrix remodeling, a key stage in skin repair process.

Actopontine™ has also been designed to optimise skin matrix architecture. This peptide is bioinspired by nature and the dermatopontin, a matrix-forming protein found in shell matrix. The richest source of dermatopontin is the skin where it can interact with collagen and other proteins to build and remodel the 3D matrix architecture.

Ashland is launching Rosaliss biofunctional during in-cosmetics Global, booth J80. PC

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