

SalSphere® Natural Hair Growth Promoter (SS NHGP)

A technology that makes new hair grow.

Procyanidin oligomers from apples have been clinically shown to promote hair growth. However, there are issues associated with using this ingredient. Procyanidin B2 is water-soluble, which limits its ability to penetrate into the hair follicles, and it is highly unstable, creating a challenge for formulators and compromising efficacy. SS NHGP aims to tackle these issues and increase efficacy.

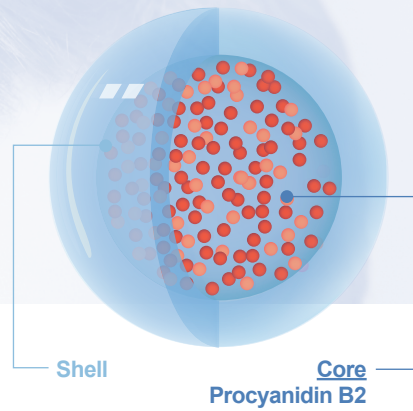


Figure 1: The sub-micron structure of SS NHGP, with its core containing procyanidin B2.

UNIQUE FEATURES

- APPLE EXTRACT SS NHGP** contains purified and concentrated apple extract (procyanidin B2), which has been clinically shown to re-grow hair.
- EFFECTIVE TECHNOLOGY** Sub-micron spheres are used to transform hydrophilic apple extract to hydrophobic spheres that enhance adhesion and enable it to reach the hair roots.
- TARGETED DELIVERY** The SalSphere® technology delivers procyanidin B2 to hair follicles, increasing efficacy of the apple extract.

HOW THE TECHNOLOGY HELPS YOU

SalSphere® is a proprietary technology comprised of sub-micron spheres (Figure 1). As a water-based suspension, it is easy to formulate stable products.

MECHANISM OF ACTION

Procyanidin B2 enhances the proliferative capacity of hair epithelial cells to minoxidil and control.¹

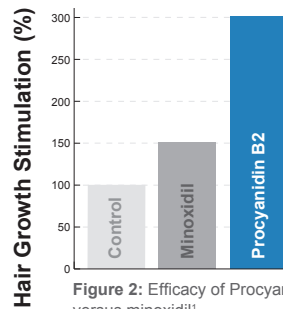


Figure 2: Efficacy of Procyanidin B2 versus minoxidil¹

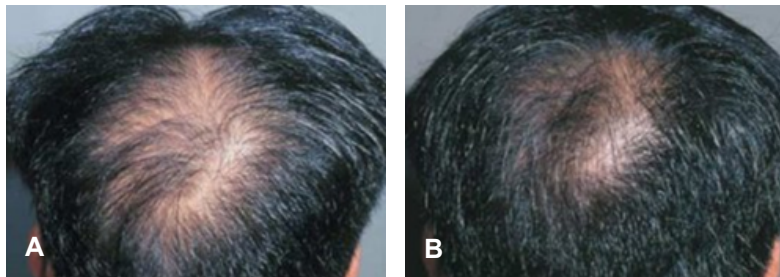
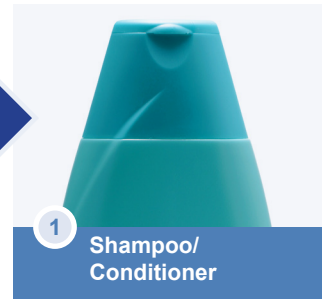


Figure 3: Illustration of before (A) and after (B) treatment with a product containing Procyanidin B2.



SS NHGP raw



1 Shampoo/Conditioner



2 Serum



3 Styling product

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TARGETED DELIVERY

The diameter of a hair follicle orifice is estimated to be in the range of 30-50 µm. The SalSphere® delivery system, with a diameter of 0.1-0.3 µm, can facilitate penetration of Procyanidin B2 into the hair follicle in a targeted manner and can thus increase the efficacy (Figure 4).

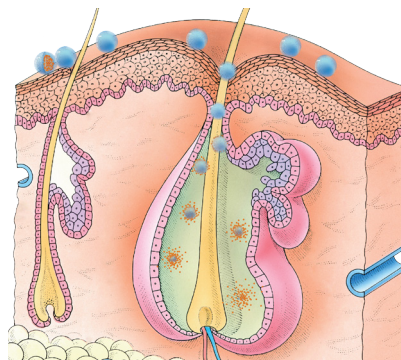


Figure 4: Illustration of mode of penetration of SalSphere® NHGP into the hair follicle.

ENHANCED SHELF LIFE

SalSphere® technology effectively shields Procyanidin B2 from oxidative forces and maintains the aesthetics of final product formulations. Free Procyanidin B2 turns dark brown in a formula whereas a product using SalSphere® remains lighter in color (Figure 5).



Figure 5: Pictures of a lotion containing SalSphere® NHGP (A) and a lotion containing free apple extract (B) after stability testing under accelerated conditions of 42°C. Within 3 months, the free apple extract discolors, turning dark brown.

FORMULATION

Hair Repair Shampoo #11415-102

Ingredients	(W/W %)
SalSphere® Hair Stimulator	2
HydroSal® SalSilk	5
SalSphere® Natural Hair Growth Promoter	2
HydroSal® SalCool	1
Pre-Mix CW # 5018	30
DI Water	60

TECHNICAL DATA

Appearance @ 20°C	Opaque Liquid
Applications	Suitable for hair care applications such as conditioners, shampoos, serums, and styling products
Color	Off-white
Odor	Characteristic
pH (1 % solution)	4.5 ± 1.5
Shelf Life (months)	18
Usage Level (wt%)	2-3
Storage (°C)	Closed container at 12-32°

References

1. Takahashi T. Procyanidin oligomers selectively and intensively promote proliferation of mouse hair epithelial cells in vitro and activate hair follicle growth in vivo. *Journal Of Investigative Dermatology*. 1999 Mar;112(3): 310-316.
2. Zhang W. Procyanidin dimer B2 [epicatechin-(4 beta-8)- epicatechin] suppresses the expression of cyclooxygenase-2 in endotoxin-treated monocytic cells. *Biochemical And Biophysical Research Communications*. 2006 Jun;345(1):508-515.
3. Takahashi T. Investigation of the topical application of Procyanidin oligomers from apples to identify their potential use as a hair-growing agent. *Journal of Cosmetic Dermatology*. 2005 Dec;4(4):245-9. PubMed PMID: 17168871.
4. Takahashi T. The first clinical trial of topical application of Procyanidin B-2 to investigate its potential as a hair growing agent. *Phytotherapy Research*. 2001 Jun;15(4): 331-336.