BotanicalsPlus

BP—Glucan S

Superb anti-aging ingredient...naturally

INCI Name: Schizophyllan

Key Benefits:

- Improves UV-induced erythema
- Improves skin hydration
- Enhances collagen expression
- Improves the appearance of crow's feet
- Acts as a skin brightener

Background

β-glucan has properties that make it a must-have anti-aging ingredient; it's an excellent antioxidant as well as effective at hydrating. The body doesn't produce β-glucans naturally. They occur in plants, the bran of cereal grains, the cell wall of baker's yeast, certain fungi, oats, mushrooms, and bacteria. β-glucans are notable for their ability to modulate the immune system. They work in an incredibly powerful way by stimulating the activity of macrophages, which are versatile immune cells that ingest and demolish invading pathogens. As they do so, they stimulate other immune cells to join the attack. Macrophages also release cytokines, chemicals that, when secreted, enable the immune cells to communicate with one another. In addition, β-glucans stimulate lethal white blood cells that bind to tumors or viruses and release chemicals to destroy them.

Product Information

BP—Glucan S is unique in the personal care market because it is a mushroom-derived glucan. BotanicalsPlus has isolated β-(1,3)-β-(1,6) Schizophyllan Glucan from the mushroom genus *Schizophyllan*. The β-Glucan is expressed extracellularly from the growth of mushroom mycelia. The human body recognizes the structural components of the β-Glucan as a signal that causes upregulation of key biological responses.[1-4] β-Glucans have found use in numerous skin care applications as immune boosting and healing ingredients. In topical applications, in addition to the immune benefits, β-Glucans can offer moisturizing, antioxidant, anti-redness, skin brightening, and extracellular matrix protein stimulating benefits.

Typical Properties	
Appearance @ 25°C	Colorless or slightly yellow viscous liquid
pH (1-100)	6.0 - 8.0
Viscosity (40°C)	340 - 410 cps
Heavy Metals	20 ppm Max.
Arsenic	2 ppm Max.
Microbial Content	<100 cfu/ml)
Recommended Use Level	0.1 – 2.0%

References

[1] Novak M. Beta-glucans History and the Present: Immunomodulatory Aspects and Mechanisms of Action. J Immunotox 2008

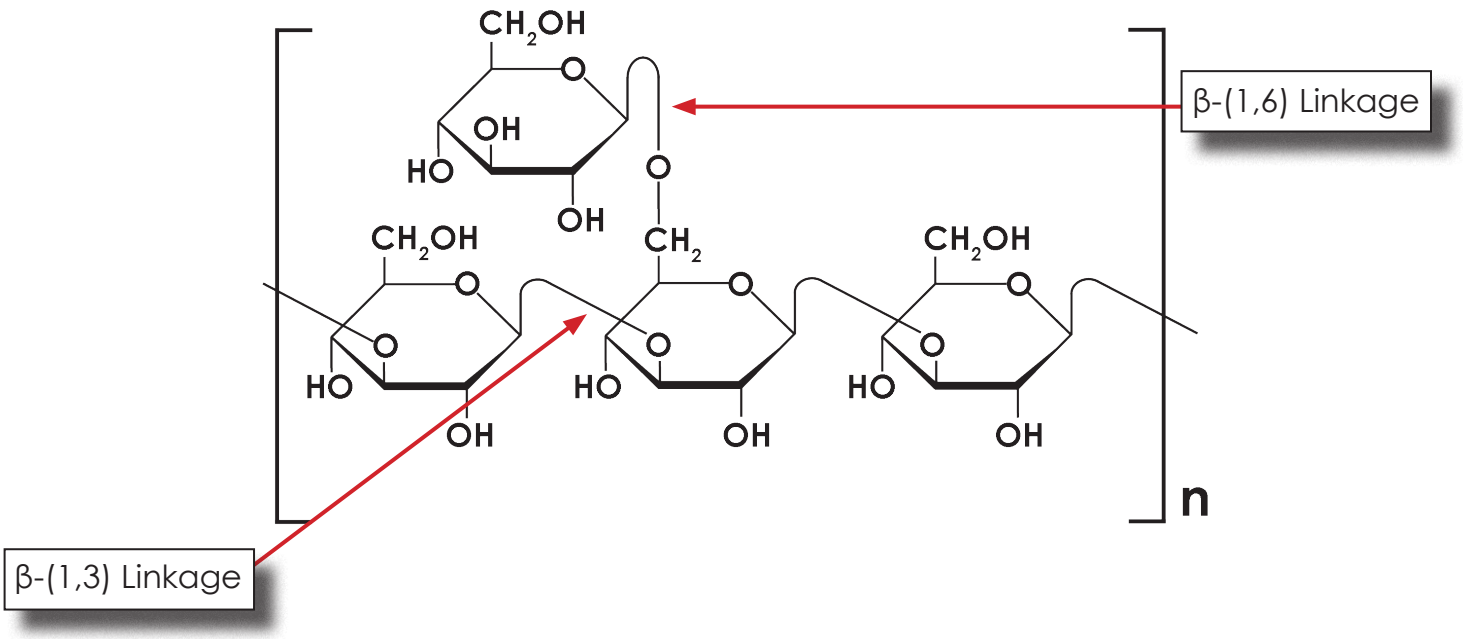
[2] Rop O., et al. Beta-glucans in Higher Fungi and Their Health Effects. Nutr Rev 2009

[3] Wasser SP., et al. Therapeutic Effects of Substances Occurring in Higher Basidiomycetes Mushrooms: A Modern Perspective. Crit Rev Immunol 1999

[4] Zhu F., et al. Beta-Glucan from Edible and Medicinal Mushrooms: Characteristics, Physiochemical and Biological Activity. J Food Comp Anal 2015

How it Works

There are advantages to using a Schizophyllan-derived β-glucan. BotanicalsPlus's β-Glucan is isolated from a unique fungal species that provides for a higher level of β-(1,6) sugar branching, which in turn provides for a more water-soluble form of the β-Glucan than can be found in grains and yeast. β-glucans from yeast and plants tend to be more linear β-(1,3) polysaccharides.



Summary of β-Glucan Properties from Various Sources

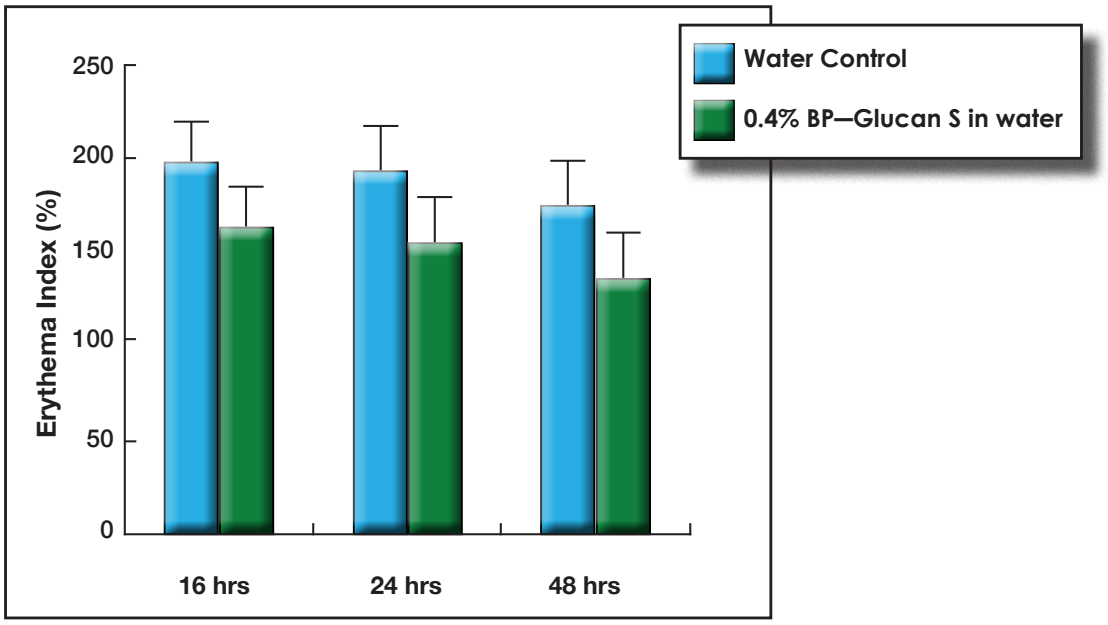
	BP-Glucan S	Yeast β-Glucan	Plant β-Glucan
Water solubility	Soluble	Insoluble	Soluble
25% alcohol solution	Stable	Precipitation	Precipitation
Production Technology	Bioconversion	Extraction	Extraction
Source	Mushroom (Schizophyllum, Grifola)	Yeast (Saccharomyces cerevisiae)	Plant (Oats & Barley)
Major component	β-1, 6-branched β-1,3 glucan	β-1,3 glucan	Mixture of β-1,2 and β-1,4 glucan
Homogeneity of Glucan	Homogeneous Glucan	Heterogeneous Glucan	Heterogeneous Glucan
Temp. Stability	+++	+++	+++
pH Stability	+++	+++	+++

Product Applications:

- Skin care products
- Moisturizers
- Skin care products that combat redness of the skin
- Skin brightening skin care products
- Anti-aging skin care products

Anti-Erythema Benefits: UV Radiation Study

A study was completed in which 10 people were exposed to simulated solar radiation to induce erythema. These volunteers were subsequently treated with either water (Control) or 0.4% **BP—Glucan S** in water at hours 8, 16, 24, and 48. Measurements of erythema were conducted at hours 16, 24, and 48 after irradiation using a Chromameter CM2002 (Minolta, Japan). Statistical significance was determined using Anova at $p<0.05$.



Results Summary

Results indicate that the **BP—Glucan S** reduces UV-induced erythema compared to placebo-treated controls, although within confidence there were no statistically significant results.

Moisturization Benefits: BP—Glucan S vs. Hyaluronic Acid

A study was completed in which 20 people applied 60µl of either 0.4% BP—Glucan S or 0.5% Hyaluronic Acid solution via occlusive patch ($1X10^6$ Daltons HA). These patches were maintained for 2 hours at a constant temperature and humidity. Skin moisturization measurements were made using conductance at initial application (t=0) and 2 hours (t=2).

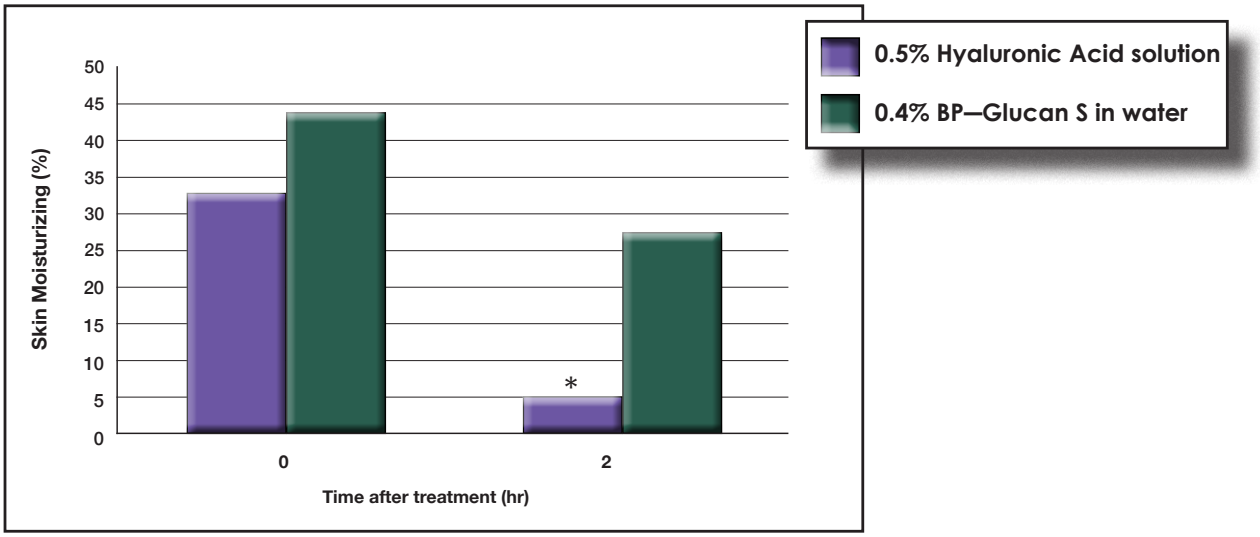
"% Skin Moisturization" was calculated as:

[(Tdi-Td0) – (NTdi – NTd0)]/[(NTdi – NTd0) + Td0] X 100

Where: Tdi is measurement value of treated area, Td0 is initial measurement value

NTdi is measurement value of non-treated area

NTd0 is the initial measurement value of the non-treated area

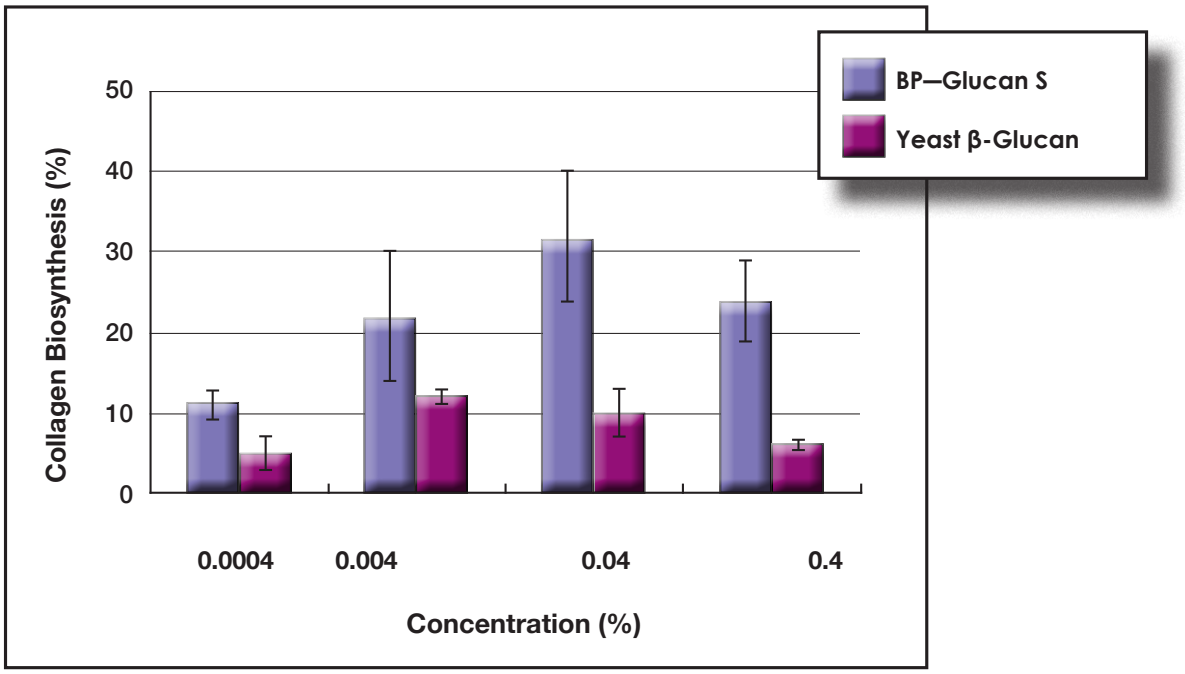


Results Summary

Results indicate that a BP—Glucan S solution maintains moisture more strongly in occlusive treated sites than a high molecular weight hyaluronic acid solution. The asterisk indicates a statistically significant result ($p<0.05$) compared to the hyaluronic acid treatment at hour 2.

Comparison of BP—Glucan S and Yeast Beta Glucan for *In Vitro* Collagen Stimulation Benefits

Normal Human Dermal Fibroblasts (NHDF) were grown to confluence on Dulbecco's Modified Eagle Serum containing 10 µCi of L-[2,3,4,5-^{3}H]-Proline. The cells were treated for 24 hours with the tritiated proline to allow incorporation into expressed collagen. The percentage of collagen expression was determined via liquid scintillation counting of ruptured fibroblast contents and cell culture media combined.



Results Summary

Results demonstrate that the **BP-Glucan S** stimulates collagen expression more significantly ($p<0.05$) than Yeast Beta Glucan.

Anti-Wrinkle Benefits of BP—Glucan S: Crow's Feet Study

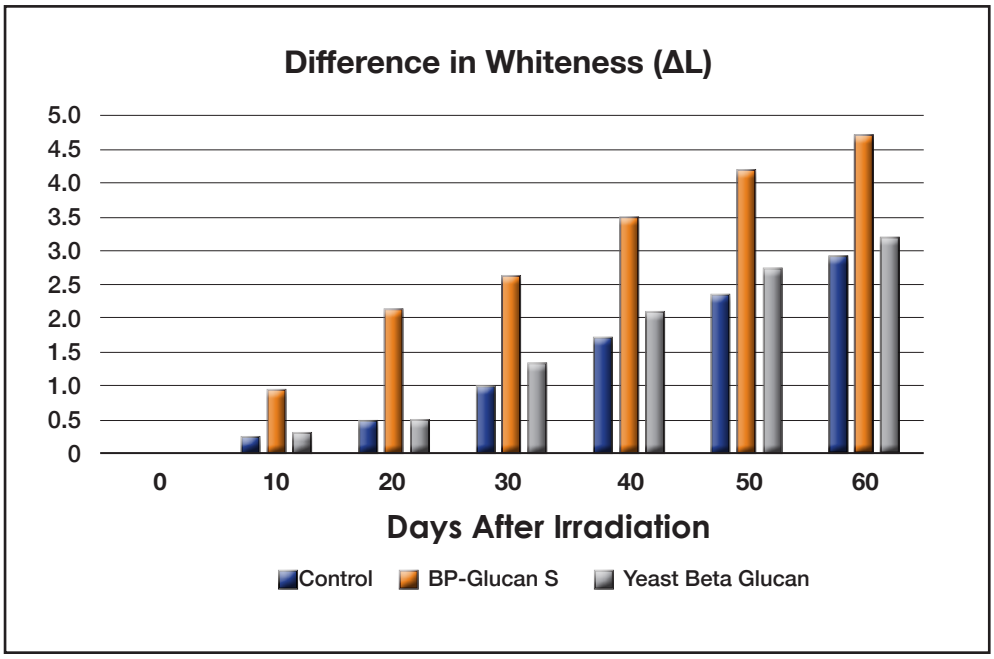
10 volunteers (ages 25-45) were enrolled in a 3-month, Half Face Crow's Feet Wrinkle Study. The participants were provided with two identical formulas except that one contained 0.1% **BP—Glucan S**. Participants applied the formulations twice a day to each side of the face with attention to the area around the eyes. Wrinkle depths were measured by taking silicone replicas of the eye area at constant temperature and humidity and then measuring wrinkle depth using a Visiometer (Courage & Khazaka). Percentage of skin wrinkle improvements was calculated as: (Δ%)={(Tdi-Tdo)/Tdo} X 100 where Tdi is wrinkle depths measured after treatments, Tdo before treatments (baseline).

Results Summary

The %Δ improvement of the left face side was 3.1+/-2.2%. The %Δ improvement of the right face side was 15.0+/-4.1%. The results demonstrate that the application of the **BP—Glucan S** improved overall wrinkle depths by over 80% compared to placebo control after 3 months of use.

Comparison of BP-Glucan S and Yeast Beta Glucan for Skin Whitening Benefits

10 male volunteers were irradiated with a combination of a TL20W/09UV lamp (Philips) and TL20W/12UV lamp (Philips) at a level of 200 mJ/cm. Beginning at week 2, the individuals applied either the control treatment (water) or 0.1% of either the **BP—Glucan S** or the Yeast β-Glucan twice a day. Skin color was measured using a Chromameter CM2002 (Minolta) prior to each product application at days 10, 20, 30, 40, 50 and 60 after irradiation. Skin lightening was determined by the difference in L-values (ΔL) measured against baseline.



Results Summary

Results demonstrate that the **BP—Glucan S** stimulates skin lightening more than Yeast Beta Glucan.

Summary

BP—Glucan S is a unique Schizophyllan-derived mushroom β-(1,3)-β-(1,6)-Glucan that is highly water-soluble. **BP—Glucan S** has proven to reduce skin erythema compared to controls. It has shown improvement in skin moisturization compared to high molecular weight hyaluronic acid. It also demonstrated enhanced *in vitro* collagen expression in NHDF compared to yeast beta glucan. **BP—Glucan S** has also reduced the appearance of crow's feet wrinkles around the eyes and, finally, it exhibits enhanced skin lightening benefits compared to the yeast-derived beta glucan.

BotanicalsPlus

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