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Ingredient Spotlight: GlucoSober™ Dihydroberberine

Dihydroberberine (DHB) is a bioactive form of berberine (BBR), appearing in the intestine when berberine is ingested. This reduced form boasts higher bioactivity and superior bioavailability compared to traditional berberine. Naturally found in *Coptis chinensis* and *Phellodendron amurense*, DHB has emerged as a promising ingredient for metabolic health.

◆ Health Benefits of Dihydroberberine:

- ✓ Boosts GLP-1 Secretion – Supports appetite control and metabolic function
- ✓ Improves Insulin Sensitivity – Enhances insulin signaling and metabolic efficiency
- ✓ Reduces Visceral Fat – Aids in weight management and metabolic health
- ✓ Alleviates Intestinal Inflammation – Promotes a healthier gut environment

⚠ Challenges:

Despite its advantages, conventional dihydroberberine in powder form faces issues with stability, bulk density, and production efficiency, limiting its practical application.

Bonerge's GlucoSober™ is the pioneering crystalline form of dihydroberberine, offering a more stable and higher bulk density alternative that enhances production and storage convenience.

💡 Most importantly, its bioavailability is 54 times that of berberine.

GlucoSober™ sets a new benchmark for dihydroberberine formulations, unlocking greater potential for functional foods, dietary supplements, and metabolic health innovations.

#MetabolicHealth #Dihydroberberine #GlucoSober #BloodSugarSupport
#WeightManagement #FunctionalIngredients #Nutraceuticals #GLP1 #GutHealth

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☀ EXPO WEST is today! ☀
We are excited to showcase our featured products at the event, including our five
standout brand ingredients: Fisetin ❤️, Urolithin A 🍌, Dihydroberberine 🌊, ...more

**PRODUCT
PORTFOLIO****Booth#3453-1
Hall D**

**Fisetin Gold Standard**

- First SA-GRAS Certified Fisetin
- Clinically Studied & Patented
- Senolytic Action | Immune Support
Defend Skin Aging | Hair Growth

**Urolithin A Premium Quality**

- Clinically Studied & Patented
- HPLC & NMR Purity >98%
- Circadian Regulation | Fatigue Reduction
NAD+ Recycling | Guilt-Free NAD+

**Dihydroberberine Pioneer Crystalline Form**

- Exclusive Process Patent
- Enhanced flowability and stability
- 54 Times Bioavailability | Visceral Fat Reduction
Vascular Health | Intestinal Health

**S-Equol Natural & Safe**

- Exclusive Process Patent
- Fermented Raw Materials
- ERβ-Selective Action | Hot Flash Frequency Reduction
Bone & Joint Health Support | Nerve & Mood Support

**Rare Akkermansia from Breast Milk**

- GRAS Certification
- 6 Patents Granted & 21 Patents Filled
- Low Akkermansia Levels Poor Health
Weight Management | Metabolism Support

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GlucoSober Dihydroberberine



GlucoSober is the brand name for high quality Dihydroberberine developed by Bonerge.

- ★ GlucoSober, with patented technology, has a content of more than 98% when analyzed by the Sigma reference standard.;
- ★ GlucoSober Dihydroberberine has a unique crystal form, with a bulk density of more than 0.6g/ml, and exhibits excellent flowability and stability.



large amounts of scientific research showing significant improvements of GLP-1

sensitivity, HbA1c reduction, nutrient partitioning, and far more;

★ Improves cardiovascular health, and cellular longevity by modulating various pathways and receptors.

CONTACT

The basic information

Brand Name GlucoSober

Product Name Dihydroberberine

Powder: Assay 98%, bulk

density 0.3g/ml

Granular: Assay 98%, bulk

density 0.6g/ml

Dry heat. Non-irradiated.

Specification

Sterilization



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Allergen

Gluten

Storage

Known allergen free.

Gluten free.

Store in a cool dry place, away from direct sunlight



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The Quality Control

Quality standards, including physical, chemical, and microbiological tests and criteria are important parts of the safety and efficacy of ingredients. Bonerge is aiming to offer premium-quality Dihydroberberine ingredients with potent healthy values to the world.



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Generation of Dihydroberberine

Unique crystal, bulk density > 0.6

HPLC Assay > 98%

HPLC Purity > 98%

Be more credible with German RS



Glucose



More Guranteed in Efficacy

Appearance of DHB sample exposed to the air after 7 days

CONTACT

1. BongeLov Management System

All of our products are developed and operated under our BongeLov Management System. We are proud to hold and maintain a full set of the world-class manufacturing certifications including cGMP, GMP+, FSSC22000, HACCP, ISO22000, Halal, Kosher etc, our process allows Bonerge to continue to meet the highest standards for purity, traceability and transparency that's backed by strict controls, monitoring and tracking to provide our customers with products they trust.

2. Analytical Procedure Life Cycle Management

With professional analytical scientists and advanced equipments, top quality and consistency among batches are the golden promises to our customers from Bonerge.

The identity test, purity test, impurity test and assay test that usually applied in the pharmaceutical industry and guided by USP requirements, is at the center of Bonerge's quality research.

3. Authoritative and credible Reference Standard(RS) for assay analysis

<https://bonerge.com/site-List/show-9-12.html>

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NNB Exh. 2136, p. 011



4. **High quality botanical source for eco-friendly and cost-efficiently manufacturing**

We are making efforts to manufacture eco-friendly and cost-efficiently to make our healthy ingredients more affordable to consumers. We work with the raw material growers closely to source high quality material that can be traced through every step. Our facility equipped with two continuous countercurrent extraction lines, and each line is available in capacities of up to hundreds tons/day raw material, enable us to produce at super large scale and achieve the best quality and cost.

The Benefits Research

★ Dihydroberberine is super Berberine, there are studies advice that the bioavailability of Dihydroberberine is 4.8 times better than Berberine.



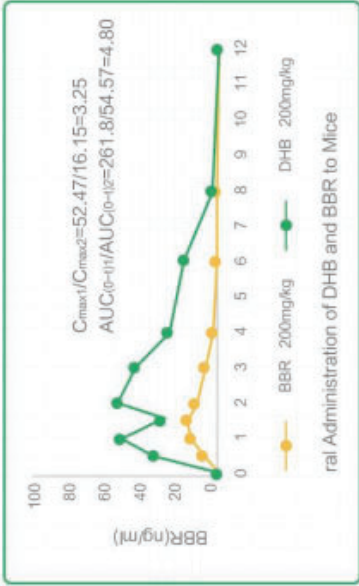
The apparent permeability coefficient of DHB is 11.9 times that of BBR



In vitro Caco-2 cell model, the apparent permeability coefficient of Dihydroberberine is 11.9 times that of berberine, indicating that the intestinal absorption of Dihydroberberine is faster than that of berberine.

Source: Sci Rep. 2015 Jul 15;5:12155. Transforming berberine into its intestine-absorbable form by the gut microbiota.

The bioavailability of DHB is 3.25 times that of BBR



In mice model, the peak concentration (C_{max}) and the area under the curve ($AUC_{(0-12)}$) of DHB group were 3.25 times and 4.80 times higher, respectively, than those in the BBR group, indicating that DHB can more rapidly increase the blood concentration of BBR.

★ And studies shows the effects of Dihydroberberine are superior to those of berberine in the following aspects:

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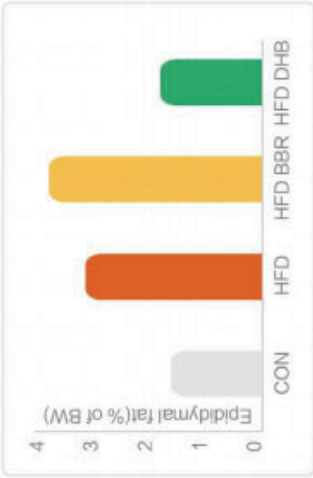
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DHB has a better effect on reducing visceral fat



In mice fed an HFD (high fat diet), treatment with DHB (100 mg/kg/day) markedly reduced adiposity (epididymal fat, muscle fat, liver fat) and improved glucose tolerance, compared with HFD controls. At the same dose, BBR had no effect on adiposity or glucose tolerance.

Diabetes, Vol57, May 2008, 1417.

DHB has a better effect on anti-atherosclerosis



The in vivo study evaluate anti-atherosclerotic effects of BBR and DHB. The result showed that DHB reduced aortic atherosclerotic lesion size, improved plaque stability when compared with control group. However, BBR at the same dosage did not show beneficial effect.

Journal of Translational Medicine 2014, 12:326.

DHB has a better effect on anti-colitis



The goblet cells produce and secrete mucus to maintain the colon mucosal barrier. In vitro studies showed that the loss of goblet cells caused by DSS were significantly reversed by DHB, and AZA (a commonly used drug for colitis) treatments. The effect of DHB (at a dose of 50 mg/kg) is better than that of BBR and comparable to that of a 13 mg/kg dose of AZA.

Phytomedicine 90 (2021) 153631.



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Dihydroberberine 97% HPLC

- ★ Berberine is one of the best known and most effective natural Glucose Disposal Agents.
- ★ With large amounts of scientific research showing significant improvements of Berberine to insulin sensitivity, fasting glucose levels, HbA1c reduction, nutrient partitioning, and far more.
- ★ Research suggests that dihydroberberine is up to 5 times better than standard berberine, bringing incredible effects at lower doses - and fewer side effects.

The Brief Info

Product Name	Dihydroberberine (Powder & Granular)
Specification	Powder: Purity NLT 97% by HPLC Granular: Purity NLT 95% by HPLC
Botanical source	<i>Berberis Aristata</i> , Family Berberidaceaetract
Sterilization	Dry heat. Non-irradiated.
GMO	Non-GMO.
BSE/TSE	Not of animal origin.BSE TSE free.
Allergen	Known allergen free.
Gluten	Gluten free.
Storage	Store in a cool dry place,away from direct sunlight



The Detail

Dihydroberberine Helps To Improve Glucose and Lipid Metabolic Health

Until now, there are large amounts of scientific research showing that in reduce blood sugar levels; promote lipid conversion; help for loss weight, **Dihydroberberine(DHB) has better effect than Berberine(BBR).**

1. Maintain Blood Sugar Standard

BBR has been shown to adjust Sugar metabolism in human body through reduced glucose absorption; inhibit gluconeogenesis; regulate insulin levels; active PKC and AMPK.

DHB shows better effect than BBR in adjust sugar metabolism, a study, which the subjects were mice shows BBR and DHB all can improve 44% insulin sensitivity. Compared with DHB and BBR for improving insulin sensitivity. The results shows that to cause the same reaction with DHB, you need five times more than BBR.

2. Lipid Metabolism

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reduce the risk of heart disease, this is thought to be caused by BBR's inhibitor enzyme called PCSK9, which when inhibited causes more LDL (bad cholesterol) to be removed from the blood.

One study compared the pancreatic lipase inhibition of BBR and DHB, the results shows that because of the affinity of DHB is stronger than BBR, the BBR has a lower inhibitory action compared to DHB on pancreatic lipase.

3. Weight Loss and Prevent Obesity

BBR can regulate blood glucose and lipid balance in many ways, indicating that it can help regulate body weight. In one study, subjects were given BBR over time, after 12 weeks, their BMI levels dropped from 31.5 to 27.4. DHB has stronger ability in these aspect,so DHB may be considered a more effective weight-loss aid than BBR.

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Dihydroberberine a bioavailable form of berberine for glucose control

08-Jan-2025 Last updated on 08-Jan-2025 at 16:26 GMT

With the evolution of the food industry and modern lifestyle changes, health issues such as obesity, diabetes, and cardiovascular disease have become significant threats to health and wellbeing.

These health issues might be caused by metabolic disorders or metabolic syndrome.¹ Therefore, keeping a healthy metabolic function, especially blood glucose level, is the key to health management.

These issues not only impact individual health and quality of life but also place a substantial burden on society and the healthcare system. In response, brands have introduced various products to address weight loss and blood glucose control needs. Berberine has gained popularity for its multiple health benefits, including blood glucose and lipid regulation capabilities.

Since 2022, berberine has gone viral on TikTok in the US, catalyzed by a user sharing her successful weight loss journey with the supplement. These short videos garnered widespread attention, and the internet quickly dubbed berberine 'Nature's Ozempic'.

Experiences related to weight loss using berberine amassed billions of views, leading to a dramatic surge in demand. Many berberine products sold out, even causing a shortage of raw materials.

Berberine: The natural glucagon-like peptide-1 (GLP-1) stimulator

Berberine, primarily derived from plants with a long history of use, was first recorded in ancient Chinese medical 'Shen-nong's Herbal Classics' over 3,000 years ago.

In recent years, modern science has gradually uncovered various pharmacological effects of berberine, leading to its widespread use in clinical practice. Research has found that berberine exerts its health benefits through several mechanisms:

Key benefits of berberine and related health benefits:

1. Promotes GLP-1 secretion

- Increases GLP-1 secretion by promoting the expression of glucagon mRNA and the proliferation of intestinal L-cells.²
- Activates the bitter taste receptor TAS2R38 in the intestine, stimulating GLP-1 secretion from L-cells.²

2. Regulates blood sugar metabolism and improves insulin resistance

- Stimulates insulin receptor expression, enhances insulin sensitivity and improves insulin resistance.³
- Upregulates glucose transporter type 4 (Glut4) expression, promoting glucose uptake by cells and reducing blood glucose levels.⁴
- Reduces oxygen consumption and ATP production in mitochondria, and inhibits the expression of gluconeogenesis transcription factors (G6Pase and PEPCK), thereby lowering fasting blood sugar levels.⁵

3. Increases brown fat content and improves fat metabolism

- Promotes the expression of browning genes in white adipose tissue, increasing brown fat quantity and enhancing brown tissue function, leading to increased energy expenditure and thermogenesis.⁶

levels and improving fat metabolism.⁷⁻⁸

4. Regulates cholesterol metabolism

- Downregulates the expression of acyl-CoA cholesterol acyltransferase-2, reducing cholesterol uptake and cell monolayer permeability.⁹
- Upregulates the gene expression of sterol 27-hydroxylase and cholesterol-7 α -hydroxylase, inhibiting intestinal cholesterol absorption.¹⁰
- Lowers levels of plasma LDL cholesterol, free fatty acids (FFAs), and total cholesterol via the AMPK pathway while increasing HDL cholesterol levels.¹¹⁻¹²

5. Reduces inflammation and oxidative stress damage

- Exerts anti-inflammatory effects by inhibiting cyclooxygenase-2 expression through the suppression of AP-1 binding.¹³
- Modulates oxidative stress markers and antioxidant enzyme levels through complex mechanisms like AMPK activation, NF- κ B and AP-1 pathway inhibition, and Nrf2 pathway regulation, reducing pro-inflammatory cytokine levels.¹³

The limitations of berberine in practical applications

Despite the huge enthusiasm for berberine, scientific studies have found limitations in its application, such as low bioavailability, poor intestinal absorption, and potential irritations on the GI tract.¹⁴

Sub-chronic toxicity of berberine indicates the potential damage of lung and liver in animal at very high dosage.¹⁵ This has motivated Bonerge to step forward to test the safety of Berberine and Dihydroberberine.

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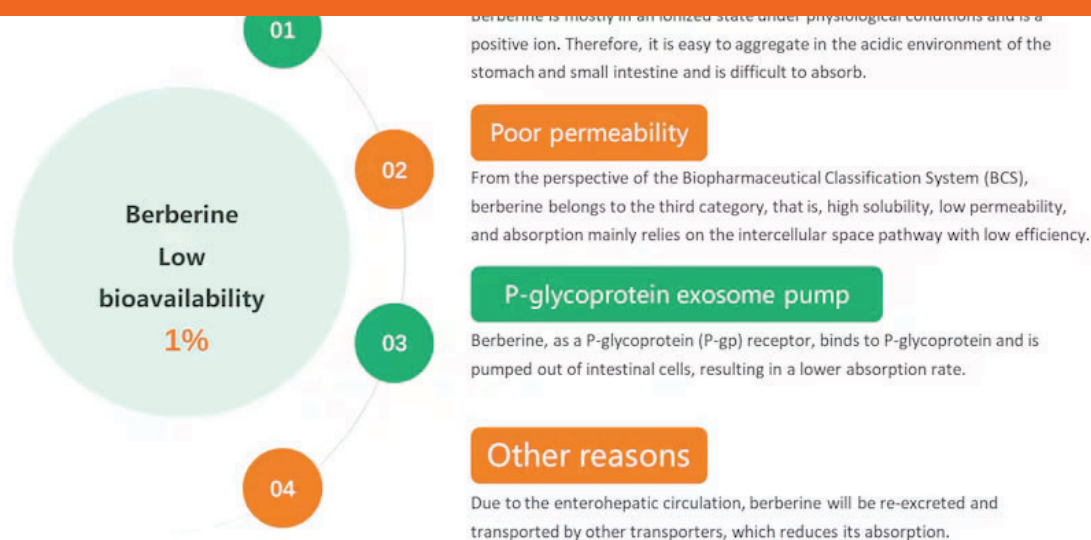


Figure 1: Reasons causing limited bioavailability of Berberine.¹⁶

Dihydroberberine: A more bioavailable form of berberine

Dihydroberberine is a research-proven bioactive form of berberine derivative. When berberine is orally ingested, it is reduced to Dihydroberberine in the intestine, absorbed through the intestinal wall, and then converted back to berberine in the blood to exert its effects. Thus, Dihydroberberine can be absorbed more rapidly by the intestinal wall, resulting in higher bioavailability compared to berberine.¹⁷

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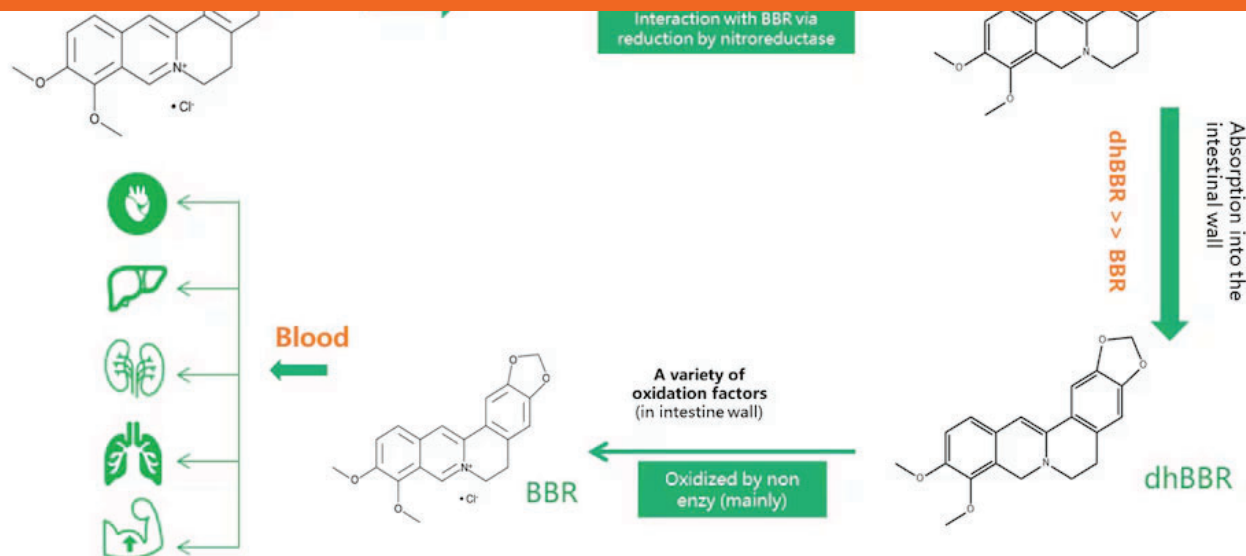


Figure 2: Berberine absorption mechanism in intestine.¹⁷

Although Dihydroberberine is a relatively new product for the weight-loss market, its efficacy has been proven by both in vivo and in vitro studies. Dihydroberberine has a better absorption rate and greater potency than berberine.¹⁷

Better absorption efficiency

- In vitro studies using the Caco-2 cell model of human colon cancer cells show that Dihydroberberine's absorption rate is 11.9 times that of berberine, with an efflux ratio 1/20 of berberine.¹⁷
- In a study conducted on mice, the absorption blood concentration curve area AUC(0-t) of Berberine is 54.57, while the AUC(0-t) of Dihydroberberine is 261.8, indicating that the bioavailability of Dihydroberberine is 4.8 times that of berberine.¹⁷

Better health benefits

cardiovascular health.¹⁷ The stable, high-quality GlucoSober® Dihydroberberine is a promising product that delivers the fuller range of health benefits associated with Dihydroberberine.

Enhanced insulin sensitivity Dihydroberberine improves whole-body insulin sensitivity in HFD rats by increasing the uptake of glucose into peripheral tissues. The glucose infusion rate was 44% higher in the Dihydroberberine-treated group compared with the HFD control group.¹⁸

Better body fat loss Dihydroberberine supplementation can markedly reduce adiposity while at the same dose, berberine had no effect.¹⁸

Better atherosclerosis effect Research shows that Dihydroberberine is better at inhibiting inflammation and reducing atherosclerotic plaque size and vulnerability. This indicates that Dihydroberberine reduces plaque area in mice arteries by 44.4%, while berberine reduces it by 15.5%.¹⁹

Better anti-colitis effect Dihydroberberine treatment effectively alleviates ulcerative colitis by relieving clinical manifestation better than berberine via a similar beneficial effect to azathioprine. 25 mg/kg Dihydroberberine was as effective as a 50 mg/kg dose of Berberine.²⁰

Improved quality Dihydroberberine cuts handling troubles

Bonerge Lifescience has initiated the patent application process for GlucoSober® – a high-quality Dihydroberberine ingredient tailored to fulfill the escalating market demand for berberine.

Relatively speaking, Dihydroberberine is a newcomer in the market, and the quality varies significantly among different suppliers. Owing to its high bioactivity

Furthermore, similar to many powder ingredients, regular Dihydroberberine tends to agglomerate when exposed to moisture and generates static electricity during encapsulation. This leads to excessive production losses and poses challenges in cleaning equipment.

To overcome the issues of Dihydroberberine's light sensitivity and clumping, Bonerge has developed GlucoSober, accomplished through a patent-pending manufacturing process.

GlucoSober is more stable, possesses better fluidity, has fewer impurities, and both its purity and content exceed 98%. Additionally, there is a distinctive high-density granulation specification of GlucoSober (bulk density greater than 0.6 g/ml), which can enhance the processing efficiency for the production of tablets and capsules.

Dihydroberberine from Different Suppliers



Dihydroberberine from Bonerge

- Remain stable when exposed to the air after one week
- Bulk density greater than 0.6g/ml, great flowability suitable for encapsulation and compact into pills



Dihydroberberine from Other Supplier

- Easily form clumps after opening
- Bulk density smaller than 0.3g/ml, easily to carry static electricity when processing.

Figure 3: GlucoSober vs. Dihydroberberine from other supplier

value of berberine and Dihydroberberine in blood glucose metabolism and weight management.

Bonerge will persist in investing in product research and evidence-based active ingredients, collaborating with global partners to select GlucoSober. Bonerge are motivated by the delight of witnessing consumers deriving health benefits from its ingredients, which inspires innovation.

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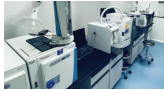
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