

Belinal[®]

Silver Fir Branch Extract



Grow your market through science and innovation
Clinically proven.
Harvested in EU mountain forests.



Abies Trade

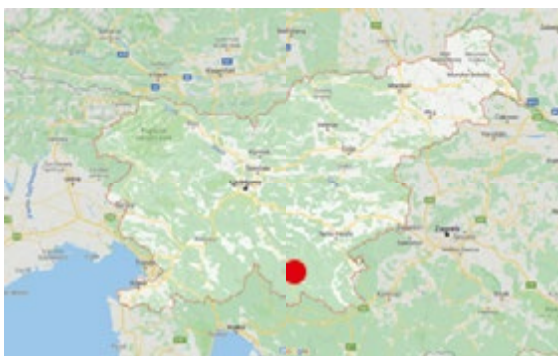
Differentiating Benefit and Value Proposition of Belinal®

The story of Belinal® is the Story of a Christmas Tree

The symbolic meaning of Christmas trees originates in Celtic culture where the silver fir tree represents life, rebirth, and stamina needed to endure the winter months. Early Christians knew the symbolism of silver fir as they added candles and apples and held the silver fir tree as a symbol of life until nowadays. The healing properties of the silver fir branches have long been known to our ancestors. Silver fir branches used to be significantly consumed among people in mountain areas of Europe for the making of tea against the common cold and rheumatism.

Pure Natural Source – It All Begins in Mountain EU Forest: Traceability

High in the cold mountain forest, only the most durable plants survive extreme conditions. This is the home of a silver fir tree that hides healthy ingredients developed in millions of years. Silver fir branches grown in the pristine European mountain forest are manually selected for the production of Belinal® extract. This way we ensure the highest quality of the silver fir tissues with accurate knowledge of their origin. The wood and branches we use are strictly from the regular felling only. We take care to preserve nature and sustainability.



Regulatory

Silver fir branch extract is an innovative botanical ingredient recognized in the EU Novel Food Catalogue (2017).

Belinal® holds self-affirmed GRAS status, with safety confirmed by qualified experts based on publicly available scientific data.

R&D

Belinal® supplements are backed by proprietary scientific research, clinical studies, and published articles.

Quality and Safety

Standard composition of Belinal® is characterized by specific lignans. For identification and quantification of the compounds, HPLC and spectrophotometry are used. All our production processes are environmentally friendly. Pure water is used during the extraction. Belinal® is certified as natural by Ecocert Cosmos attestation.





P-cumaric acid, protocatechuic acid and gallic acid represent **phenolic acids**.

The main flavonoids in Belinal® are **catechin** and **epicatechin**.

Belinal® extract is a powder of moderately brown color and is water soluble, with small molecule mass components that break through cell membranes and act where they are needed.

Belinal® has a scientifically proven anti-oxidant activity, anti-diabetic activity, cardiovascular disease prevention, regeneration, anti-aging activity and anti-inflammatory activity.

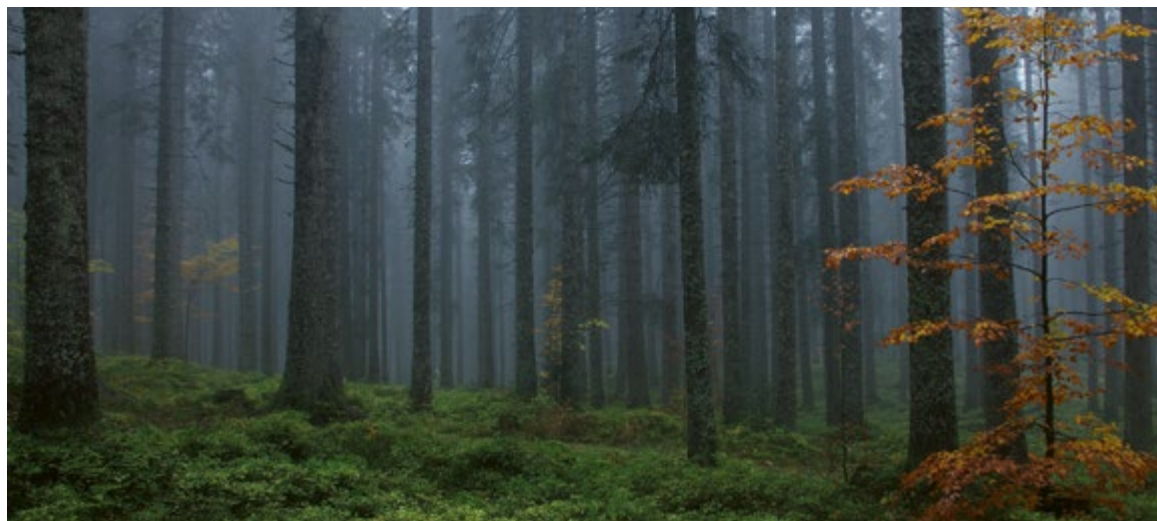
Trademark and Patents

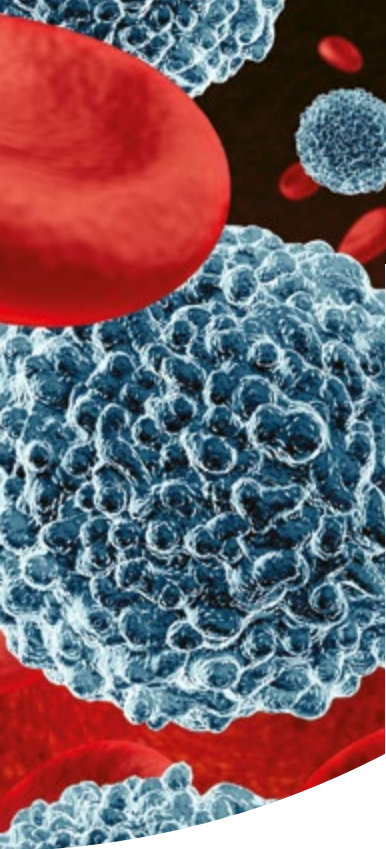
Belinal® is a registered trademark and protected by three patents.

Phytochemical Characteristics of Belinal®

We established that 70 % of Belinal® consists of polyphenols. 36 diverse components were identified so far. 40 % are lignans and the rest contain phenolic acids and flavonoids. Characteristic lignans that define the standard of Belinal® are **secoisolariciresinol, isolariciresinol, hydroxymatairesinol, lariciresinol, pinoresinol** and **matairesinol**.

Whether you are searching for novel branded supplements, **Belinal®** is where you'll find unmatched innovation for your valued buyers.



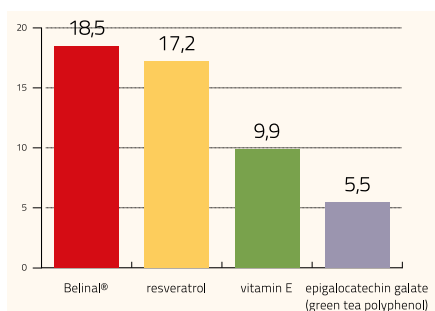


Anti-oxidant Activity of Belinal® & Tiredness Reduction

Belinal® is a powerful natural free radical scavenger. It neutralizes free radicals before they can cause any damage by oxidative stress. As a super anti-oxidant Belinal® stimulates cells to increase their own anti-oxidative power and it captures free radicals in the bloodstream.

Hydroxyl Radical Scavenging Activity of Belinal®

Artificial free radicals which are not found in the human body (e.g. DPPH; ABTS) are used in most tests, but more relevant tests measure scavenging of biologically relevant free radicals such as hydroxyl radical, which is the most common in our body.

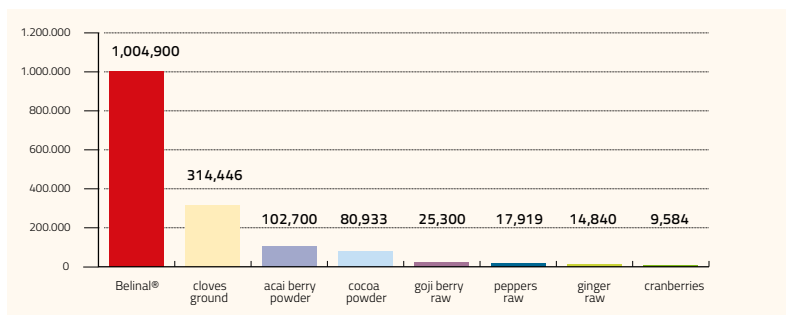


* Anti-oxidant activity (hydroxyl radical scavenging activity) expressed as a reciprocal value of IC₅₀ (100/IC₅₀) which represents the concentration needed for 50% inhibition of hydroxyl radical.

Anti-oxidant activity of Belinal® was slightly higher than antioxidant activity of resveratrol, twice as high as vitamin E and almost 4 times higher than the anti-oxidants from green tea.

ORAC – Oxygen Radical Absorption Capacity of Belinal®

Belinal® – silver fir branch extract has significantly higher anti-oxidative potential compared to TOP HIGH ORAC Value Antioxidant Foods published by NIH and USDA. ORAC value of Belinal® is **1.004.900 units expressed in µmol Trolox/100 g** (see figure below).

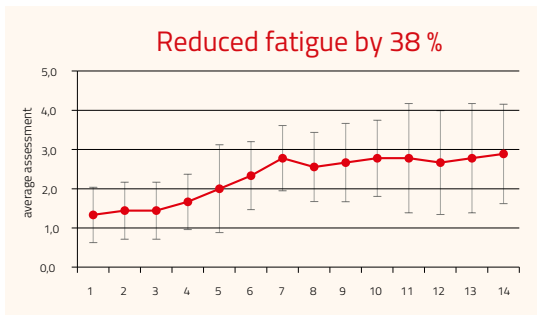


Belinal® – ORAC Oxygen Radical Absorbance Capacity

Anti-oxidant activity* of Belinal® extract is significantly higher compared to other frequently used anti-oxidants

Significant Tiredness Reduction

10 volunteers were involved in the study research during the 14-day period. They were supplemented with 150 mg of Belinal® three times daily at intervals of 6 hours. A 38 % reduction in perceived tiredness was reported. Reduction of tiredness by 38 % was reported at the end of the period.



Average scores of reduced fatigue with standard deviation. ANOVA test and Bonferroni post-hoc analysis ($p < 0.01$).

Suggested Dosage for Anti-oxidant Activity:

100–150 mg of Belinal®.

Mechanism of Action:

Anti-oxidant activity, inside cell anti-oxidant activity.

FAQ

Applications:

Anti-oxidant, anti-stress, tiredness and fatigue reduction, preventive support for the immune system, well being and energy formulas.





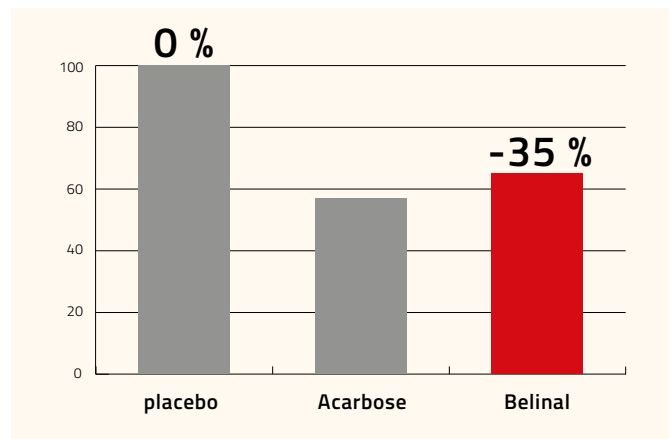
Anti-diabetic Activity of Belinal® & Weight Management

Double Blind Placebo Controlled Clinical Study

Excessive consumption of carbohydrates with the high glycemic index can lead to weight gain, glycemic disorders and type 2 diabetes.

Belinal® inhibits the enzymes alpha-amylase and alpha-glucosidase that break down carbohydrates so that not all carbohydrates are converted to glucose at one time. This can help you maintain a healthy glucose level and control the carbohydrate intake. Belinal® reduces the postprandial hyperglycemia induced by starchy meals by 35 %, as shown in a placebo-controlled clinical study. Even further, Belinal® reduced carbohydrate intake compared to Acarbose, Bayer RX medicine.

Glycaemic index of standard meal taken with Belinal® compared to placebo and RX medicine Acarbose



Main ingredients of Belinal®, as reported in scientific literature, also have other mechanisms of anti-diabetic and weight management activity:

- Increased glucose uptake into muscle cells via activation of AMPK pathway.
- Increased glucose uptake into the fat cells (adipocytes) due to the increased translocation of glucose transporters GLUT4 and increased expression of adiponectin.
- Protection and regeneration of pancreatic-cells.
- Inhibition of glucose transporters (SGLT1 and SGLT2) in the intestinal wall.

Suggested Dosage for Anti-diabetic Activity:

75 mg of Belinal® 15 min before a meal. Two times daily.

Mechanism of Action:

**Inhibition of digestion enzymes alpha-amylase and alpha-glucosidase,
Increased glucose uptake into muscle cells via activation of AMPK
pathway.**

FAQ

Applications:

Anti-diabetic, metabolic syndrome, weight management, and slimming.

What is a dosage, suggested for weight management formula and how to supplement it?

Suggested dosage is 100 mg, before a meal, or with a meal.

Can you supplement Belinal®IB parallel with an anti-diabetic RX medicine?

Yes, supplementing Belinal®IB parallel to anti-diabetic drugs is safe. We have on-going clinical study "The influence of Belinal®IB supplement as parallel treatment on diabetic type 2 volunteers". Intermediate results show an average decrease in blood glucose levels, volunteers report better well-being and to have more energy.

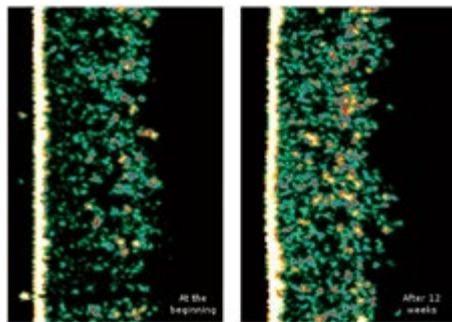




Belinal® – Beauty from Within & Skin Disorders

Belinal® has many positive effects on changes in the dermis and epidermis of the skin. A placebo-controlled derma-cosmetic discovered that Belinal® demonstrates anti-aging effects, significantly increases collagen and elastin synthesis and thus, improves the structure of the dermis after 12 weeks.

Belinal® reduces the depth and volume of wrinkles by 34 %.



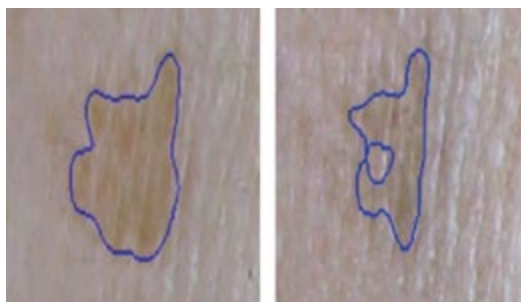
Stimulation and regeneration of structural proteins collagen and elastin improved by 34 %.

UV Photo 1:
Belinal® improves structural proteins collagen and elastin by 34 % after 12 weeks

Placebo Controlled Study with Belinal® Furthermore Shows:

- Reduction the size of hyperpigmentation by 41 %
- Improvement of skin retraction time by 43 %
- Improvement of skin barrier TEWL by 20 %
- UV damage prevention – increasing minimal erythema dose MED by 9 %
- Improvement of hydration by 26 %

Belinal® Improves Skin Parameters by Stimulation and Regeneration of Structural Proteins Collagen and Elastin.



Before treatment

After 12 weeks

Belinal® reduced the size of hyperpigmented areas and lightened up brown spots by 41 %.

Suggested Dosage for Beauty from Within Formulations:

80–120 mg of Belinal® with a meal.

Health Claims:

Contribute to the maintenance of normal skin.

Mechanism of Action:

Regeneration and growth of collagen and elastin, anti-inflammatory activity, anti-oxidant activity.

FAQ

Applications: beauty from within, skin disorders, cosmetic application.

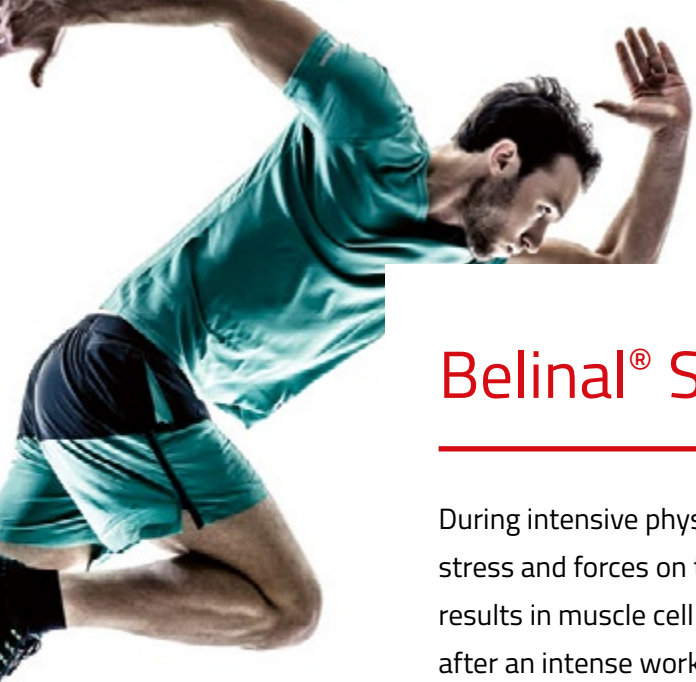
Can Belinal® be taken on a daily basis?

Skin formulations with Belinal® can be taken on a daily basis, as part of your regular beauty care. Feed your skin from within.

Can Belinal® be used in cosmetic creams and personal care products?

Yes, cosmetic grade – Belinal®C is suggested for use in cosmetic products (0.5 %–1.5 % in a water base).





Belinal® Sport

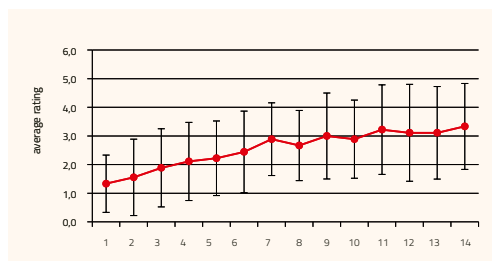
During intensive physical training, muscle injury occurs as a result of mechanical stress and forces on the muscle fibers, as well as the oxidative stress, which results in muscle cell damage. The second stage involves inflammation in muscles after an intense workout, which also causes damage to the muscle and can take up to a few days.

From this perspective, consumption of Belinal® is highly beneficial to athletes, since its effectiveness is a consequence of at least three mechanisms of action: anti-oxidant activity, anti-inflammatory activity and synthesis of collagen and elastin. Belinal® synergistically reduces feelings of soreness and preserves from muscle damages induced by sports practice, supporting recovery after intensive physical activity, allowing athletes and fitness enthusiasts to resume training faster.

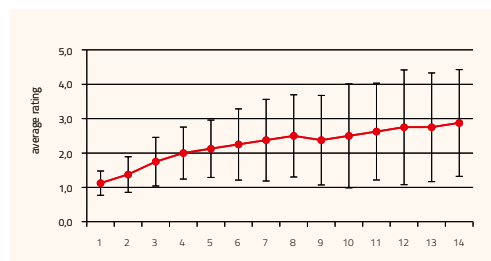
Belinal® Significantly Improves the Physical Condition of Athletes in a Research

Ten athletes were involved in the research study during the 14-day preparation period. Volunteers were asked to take one capsule three times daily at intervals of 6 hours. Every day, athletes assessed regeneration and endurance with a mark of 1 to 5, where 1 indicated that there was no change and number 5 indicated maximum rate of change.

Improved Recovery by 45 %



Enhanced Endurance by 36 %



Average score with standard deviation. ANOVA test and Bonferroni post-hoc analysis (*, $p < 0.05$; **, $p < 0.01$).

From the above diagrams, it is evident that the score increased with time of taking Belinal®. Athletes consuming Belinal® daily detected a significant positive changes.

Suggested Dosage for Sports Formulations:

140–180 mg of Belinal® before sports activity and after sports activity.

Health Claims:

Contribute to the normal muscle function.

Mechanism of Action:

Anti-oxidant activity, anti-inflammatory activity, muscle and tissue recovery by synthesis of collagen and elastin.

FAQ

Applications:

Sports recovery, endurance, tiredness reduction, energy booster.

Is Belinal® safe for professional athletes?

Yes, Belinal® is safe for athletes and not banned by the athletic body Banned Substance List of WADA.





Belinal® – Atherosclerotic Plaque Reduction

Belinal® Demonstrates Significant Reduction of Atherosclerotic Plaque Formation and Protection of Arteries

Atherosclerosis is the major precursor of serious cardiovascular conditions and can be described as a chronic inflammatory process in arterial walls that is caused by the accumulation of macrophages and oxidized low-density lipoproteins. Atherosclerosis is caused by elevated total cholesterol and low-density lipoprotein cholesterol.

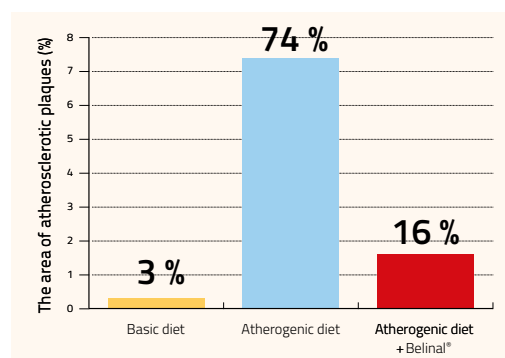
In Vivo Treatment Animal Study Protection of Arteries

Guinea pigs exhibit a cholesterol profile that most closely resembles that of humans when challenged with a high-cholesterol diet. The guinea pigs were shown to be one of the best models of atherosclerotic damage. Similarly to humans, these animals have most of their blood cholesterol in LDL form. In this study, guinea pigs were divided into three groups. The first group had access to a basic diet, the second group had access to atherogenic diet (basic diet with yolk, lard, cholesterol and fructose) and the third group had access to atherogenic food supplemented with Belinal®, 10 mg per kg of body weight.

Belinal® Reduced the Atherosclerotic Plaque Formation by 80 %.

The area of atherosclerotic plaques as the percent of the total area.

We observed that Belinal® reduced the atherosclerotic plaque formation by 80 %. We demonstrated that Belinal® prevents morphological and functional changes of the arterial wall of guinea pig aortas caused by an 8-week atherogenic diet.



The atherosclerotic plaque areas were 0.3 % (Basic diet), 7.4 % (Atherogenic diet) and 1.6 % (Atherogenic diet + Belinal®) as the proportions of the total aortic luminal area.

UV Photo 1:
Belinal® improves structural proteins collagen and elastin by 34 % after 12 weeks

Suggested Dosage for Atherosclerotic Plaque Reduction and Heart Formulations:

80–120 mg of Belinal®. Two times daily.

Mechanism of Action:

Inhibition of atherosclerotic vascular plaques, anti-oxidant activity, anti-inflammatory activity.

FAQ

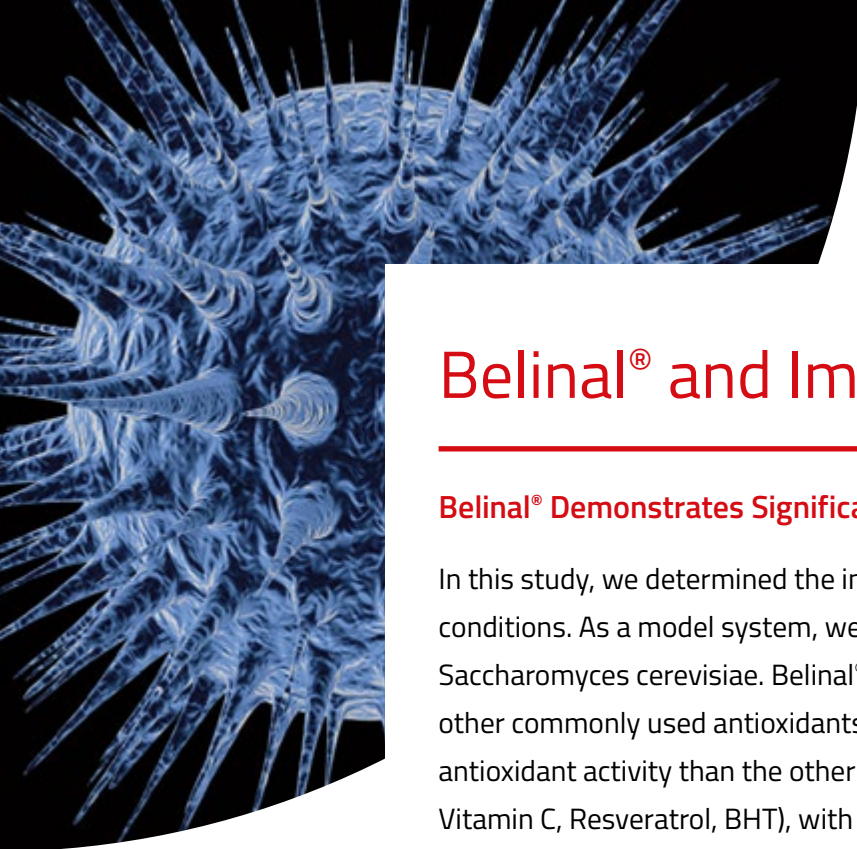
Applications:

Cholesterol reduction, heart protection, blood vessels elasticity.

Can Belinal® be used safely alongside statins?

Belinal® can be used safely and effectively alongside statins or fibrates and produce a significant additive benefit.



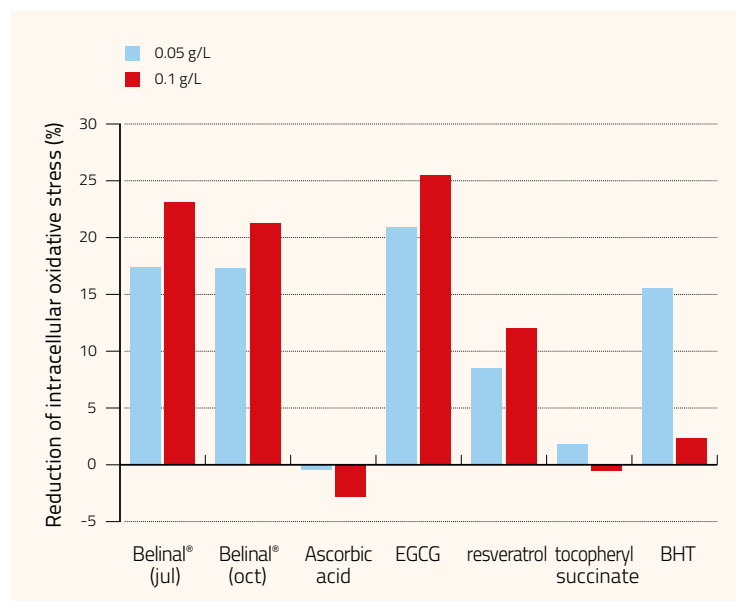


Belinal® and Immune System

Belinal® Demonstrates Significant Inside Cell Anti-oxidant Activity

In this study, we determined the intracellular anti-oxidant activity in in-vivo conditions. As a model system, we used the living eukaryotic cells of yeast *Saccharomyces cerevisiae*. Belinal® antioxidant activity was compared with some other commonly used antioxidants. Belinal® (both industrial batches) had greater antioxidant activity than the other comparator antioxidants (Ascorbic acid – Vitamin C, Resveratrol, BHT), with the exception of EGCG which had comparable activity as Belinal®.

This way, we also obtained indirect evidence that the components of Belinal® successfully pass through the cell membrane of an eukaryotic cell.



Suggested Dosage for Immune Booster Formulation:

180–250 mg of Belinal®. Three times daily.

Mechanism of Action:

Anti-oxidant activity, Anti-inflammatory activity, Immune system support (Th1 / Th2 / Th17).

FAQ

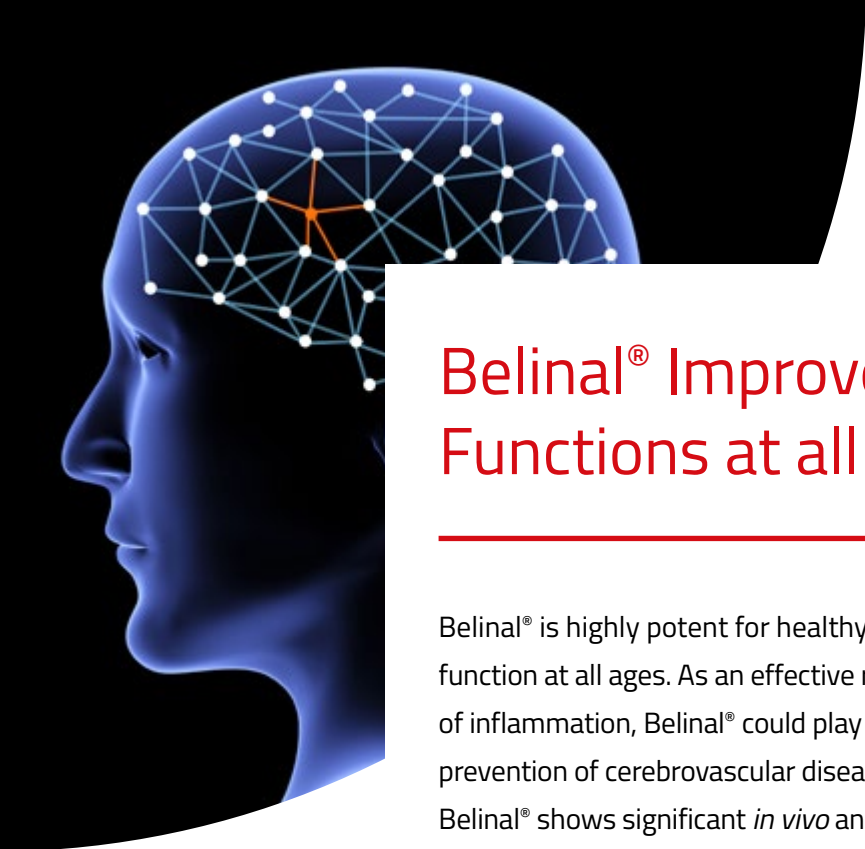
Applications:

Immune system booster, At the first signs of a Common Cold or a Flu.

Can Belinal® be used safely alongside drugs like Paracetamol and Aspirin®?

Belinal® can be used safely and effectively alongside Paracetamol, Aspirin® and produce a significant additive benefit.





Belinal® Improves Cognitive Functions at all Ages

Belinal® is highly potent for healthy brain aging and improving cognitive function at all ages. As an effective relaxant of human brain arteries and inhibitor of inflammation, Belinal® could play an important role in future treatment and prevention of cerebrovascular diseases and cognitive functions. Furthermore, Belinal® shows significant *in vivo* and *in vitro* antioxidant activity. Belinal® is a powerful natural free radical scavenger. It neutralizes free radicals before they can cause any damage by oxidative stress. Aging, in most species studied to date, is accompanied by the progressive accumulation of oxidative damage in many tissues. The brain, in particular, is highly vulnerable to oxidative damage.

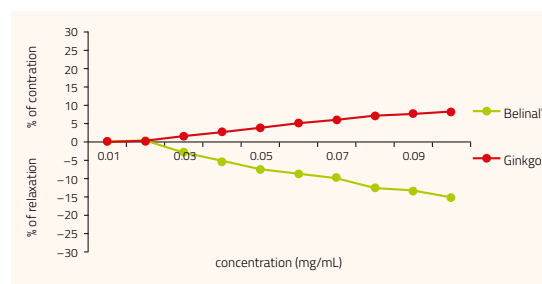
Normal cognitive function of the brain is crucial for a healthy life.

Belinal® is an Efficient Vasorelaxant of Brain Arteries

Belinal® is an effective relaxant of human brain arteries. Study on isolated human brain arteries shows that silver fir branch extract relaxes smooth muscle cell rings through prostacyclin release mechanisms (PGI₂) and/or through endothelium derived hyperpolarizing factor (EDHF).

The study shows that Belinal® causes significant relaxation of the brain vascular rings opposed to ginkgo EGb 761®, which contracts the rings. The highest percentage of relaxation was 15.3 %.

Diagram 1: Belinal® – relaxation of human brain arteries compared to Ginkgo extract



From the diagram above it is evident that compared to ginkgo extract EGb 761®, Belinal® significantly relaxes human brain arteries after acute cumulative addition.

Belinal® Decreases Histamine Concentration in Brain Arteries

Study shows the effect of Belinal® on inhibition of histamine, which is a mediator of inflammation. We studied the effect of histamine on the cerebral arteries before and after incubation with Belinal®. Maximum added concentration was 0.1 mg/ml, which is the common concentration of active ingredients in blood in therapeutic use.

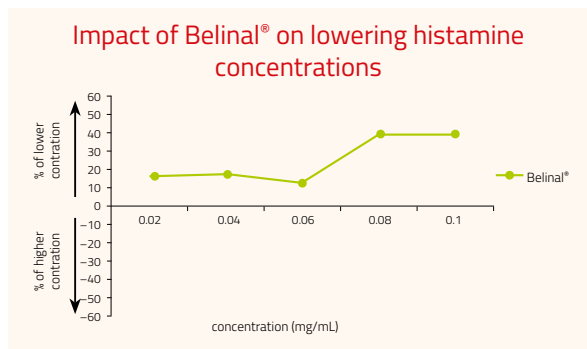


Diagram 2: The impact of Belinal® on lowering histamine concentrations

We find that addition of Belinal® suppresses histamine activity and thus inhibits inflammatory responses in brain arteries.

Belinal® Shows Powerful Anti-oxidant Activity

Belinal® is a powerful natural free radical scavenger. It neutralizes free radicals before they can cause any damage by oxidative stress. As a super antioxidant, Belinal® stimulates cells to increase their own anti-oxidative power and captures free radicals in the bloodstream.

Suggested dosage for cognitive formulations: 80–100 mg of Belinal® daily when combined with other actives. 200 mg daily, when Belinal® applied solely.

Mechanism of Action:

Vasorelaxation of smooth muscle cells through prostacyclin release mechanisms (PGI₂) and/or through endothelium derived hyperpolarizing factor EDHF, Anti-oxidant activity, Anti-inflammatory activity.

FAQ:

Applications: healthy brain aging, improvement of cognitive function at all ages, attention and concentration, prevention of cerebrovascular diseases.

Can you supplement Belinal® alongside prescription drugs?

Belinal® can be used safely and effectively alongside prescription drugs for cerebr-vascular diseases.





Belinal® in Joint Discomfort and Osteoarthritis

Osteoarthritis is the most widespread, chronic, progressive and debilitating joint disease of the elderly population. A majority of people over the age of 65 show signs of osteoarthritis. Essentially all joints may be affected, but the most commonly affected are joints in hips, knees, fingers and spine. Initial inflammation has been shown to have a major role in cartilage breakdown in osteoarthritis. Exhaustion of the endogenous reparative potential of mesenchymal stem cells, and in particular their chondrogenic potential is demonstrated in patients with advanced osteoarthritis.

Our study shows that Belinal® boosts the chondrogenic potential of mesenchymal stem cells from patients with osteoarthritis, under both non-inflammatory and inflammatory conditions.

Effects of Belinal® on Chondrogenesis Under Non-inflammatory Conditions

Patients with hip osteoarthritis under routine hip replacement and healthy donors with no evidence of musculoskeletal disorder were included in the study. Primary cells were isolated from subchondral trabecular bone harvested from femoral heads in patients with osteoarthritis, and from the medial tibia in the post-mortem donors.

Chondrogenic differentiation was determined using micromass assays and Alcian blue staining (Diagram 1). In the mesenchymal stem cells from patients with hip osteoarthritis, Belinal® showed higher chondrogenesis in comparison with Pycnogenol® and significantly higher absorbance (increased chondrogenesis) in comparison with the control and the polyphenols Resveratrol and Quercetin.

The chondrogenesis of mesenchymal stem cells derived from healthy donors was lower and there were no such significant differences seen between the treatments with the Belinal®, Pycnogenol®, Resveratrol and Quercetin. See diagram 1.

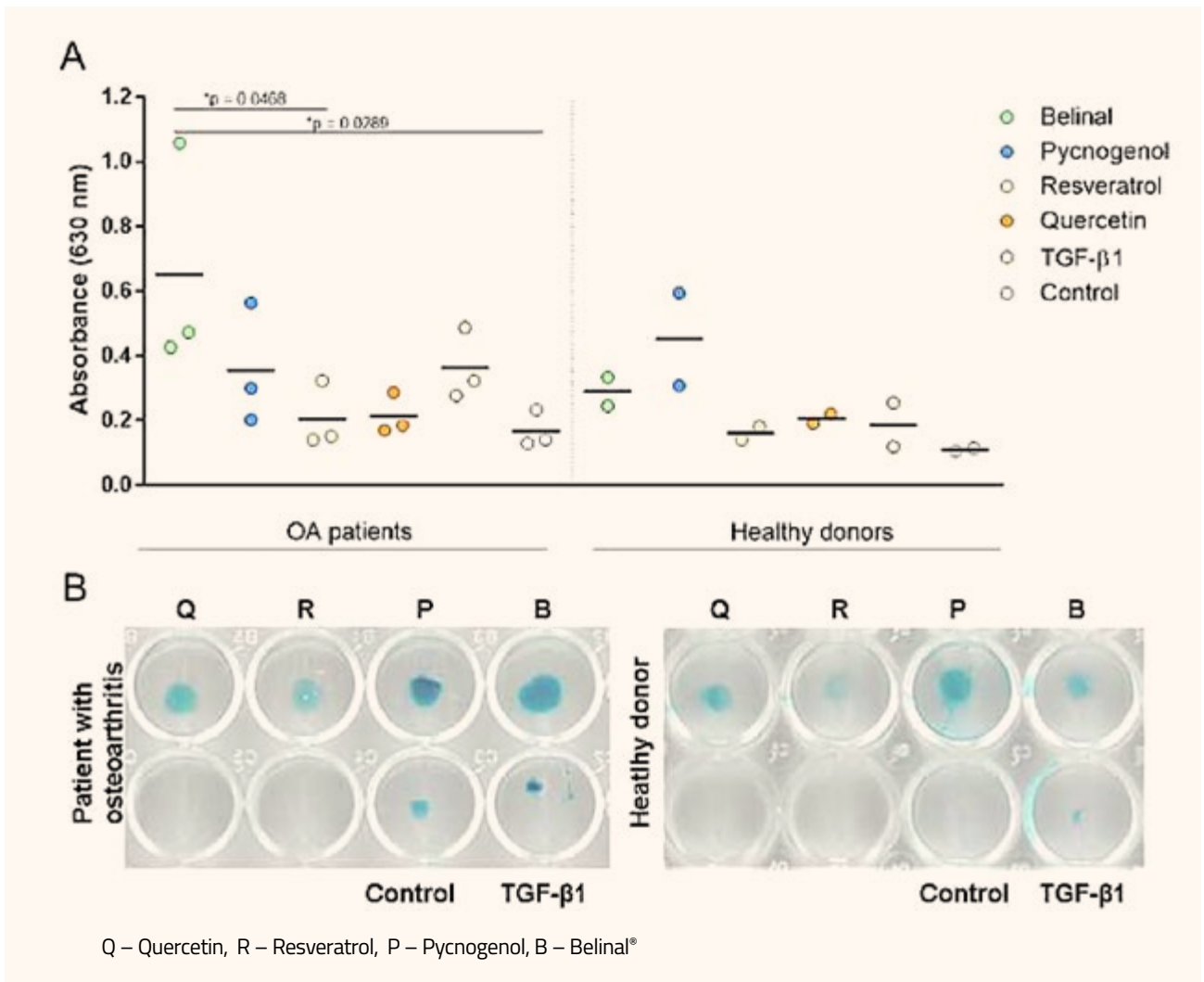
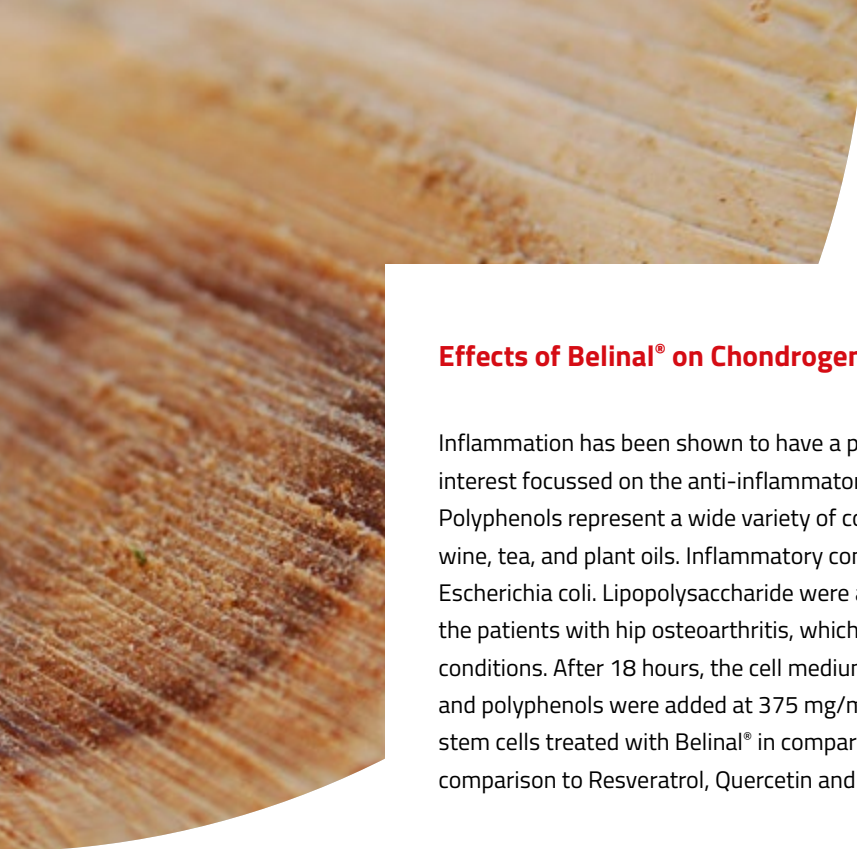


Figure 1: Effects on chondrogenesis under non-inflammatory conditions

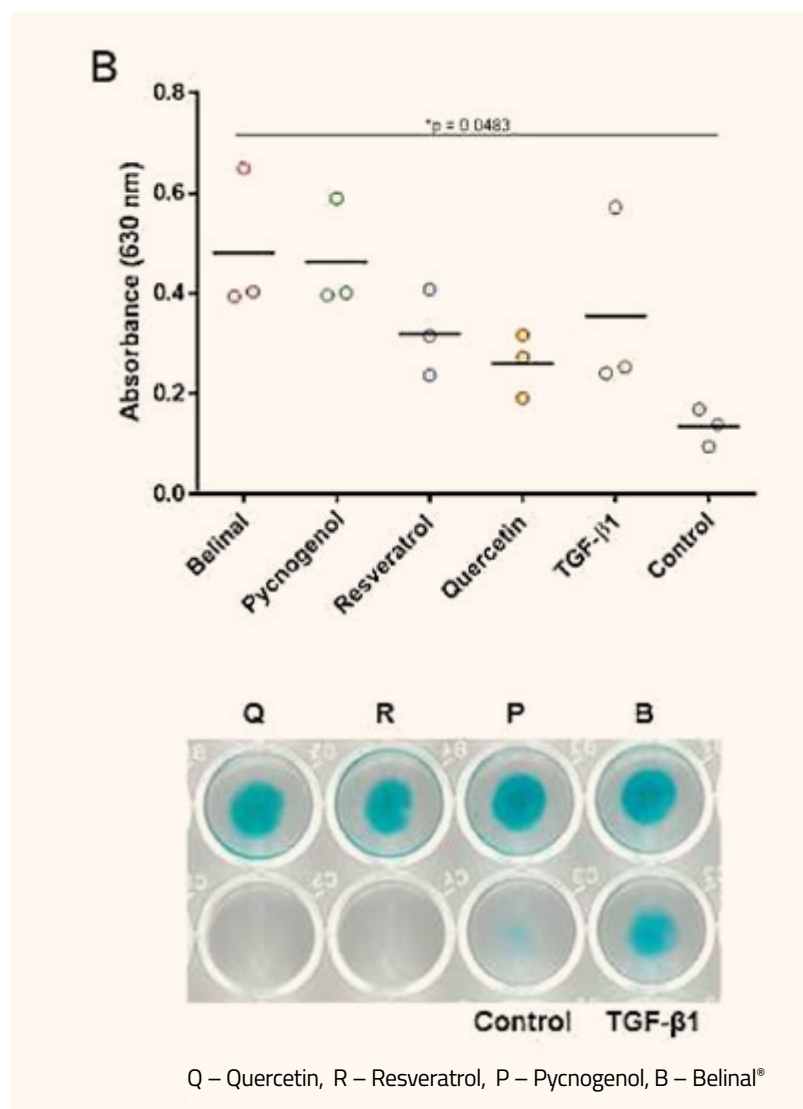




Effects of Belinal® on Chondrogenesis Under Inflammatory Conditions

Inflammation has been shown to have a pivotal role in cartilage degradation, with particular interest focussed on the anti-inflammatory actions of natural compounds, such as polyphenols. Polyphenols represent a wide variety of compounds that are found in fruit, vegetables, red wine, tea, and plant oils. Inflammatory conditions were induced using lipopolysaccharide from *Escherichia coli*. Lipopolysaccharide were added to primary mesenchymal stem cells from the patients with hip osteoarthritis, which were left for 18 hours to simulate inflammatory conditions. After 18 hours, the cell medium was changed and the tested polyphenolic extracts and polyphenols were added at 375 mg/mL. Chondrogenesis was higher for primary human stem cells treated with Belinal® in comparison with Pycnogenol® and significantly enhanced in comparison to Resveratrol, Quercetin and control. See diagram 2.

Figure 1: Effects on chondrogenesis under non-inflammatory conditions



Suggested dosage for joint formulations:
100–140 mg of Belinal® daily when combined
with other actives. 200 mg, when Belinal®
applied solely.

Mechanism of Action:

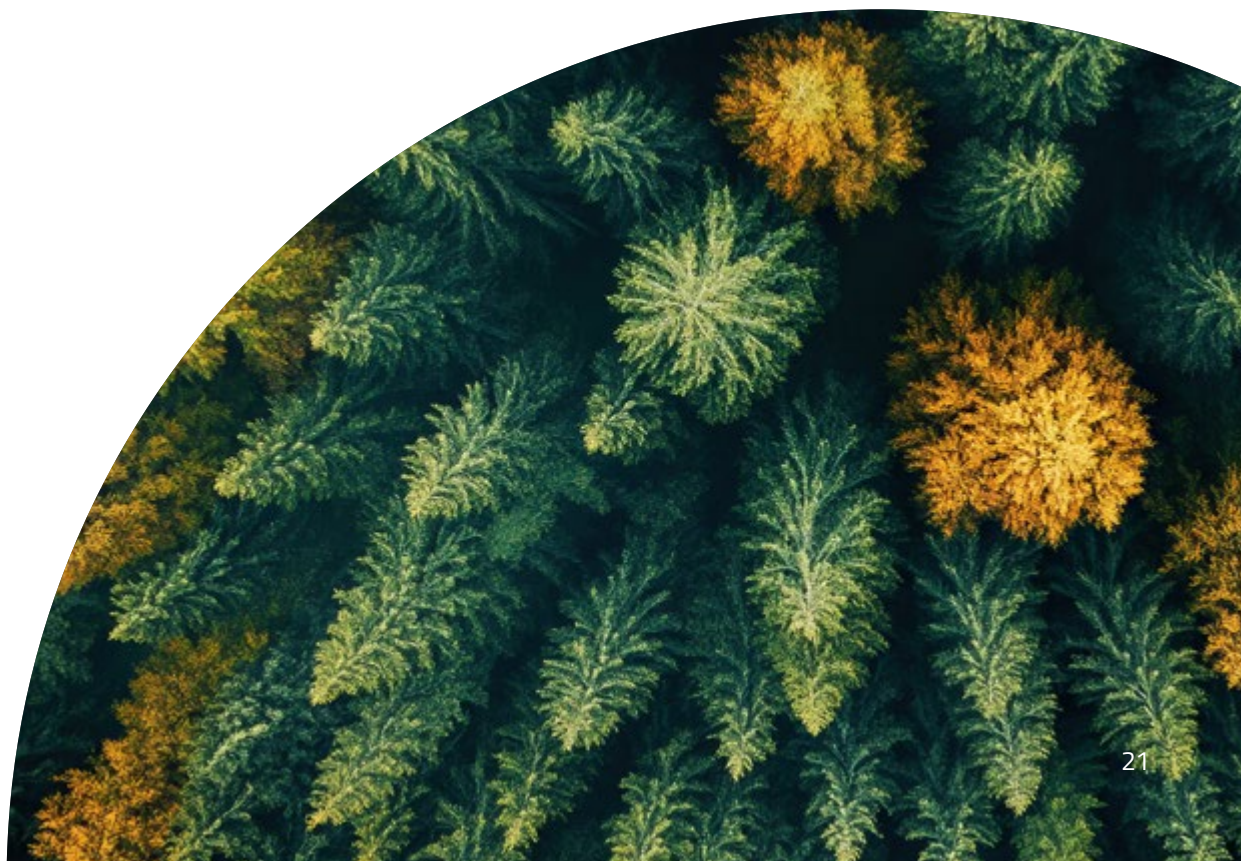
Chondrogenesis – growth of chondrocytes in cartilage, anti-inflammatory activity.

FAQ

Applications: improvement of joint mobility, regeneration of joint physical function, lowering of joint pain, parallel therapy for osteoarthritis.

Can you supplement Belinal® alongside prescription drugs?

Belinal® can be used safely and effectively alongside prescription medication for osteoarthritis.





Belinal® and Cancer Prevention

In addition to being a major burden on public health care and a common cause of death, cancer is also an important incentive for a healthier lifestyle due to extremely demanding therapy for each individual patient. This is important not only from the perspective of cancer prevention, but also as support during treatment, despite its mostly psychological impact.

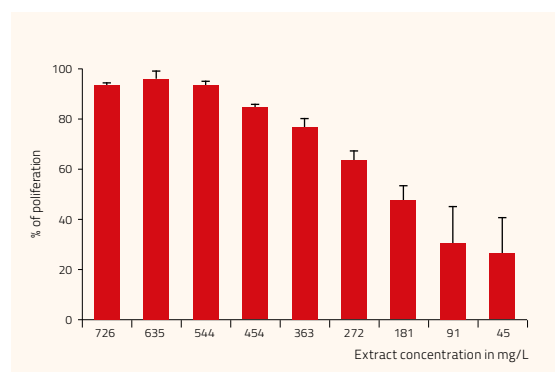
Belinal® shows potential cancer prevention effects on the *in vitro* proliferation of three different human cancer-derived cell lines without any significant direct cytotoxic effects.

In the in-vitro study, human cancer cell lines: LNCaP (Lymph Node Carcinoma of the Prostate), HepG2 (Hepatocellular carcinoma) and Jurkat (T-cell leukemia) were tested with Belinal® concentrations.

Inhibition of Proliferation of the Human Prostate Cancer Cell Line LNCaP

Presented on the X-axis, is the inhibition of LNCaP cell line growth shown in percentages of positive control proliferation (no Belinal® extract present) after 72 hours of incubation with different Belinal® concentrations. Values shown are averages of triplicate measurements, subtracted by the average negative control value (no cells). The error bars represent standard deviations (Figure 1).

Figure 1: Inhibition of prostate cancer cell line



Inhibition of Proliferation of the Human Liver Cancer Cell Line HepG2

Presented on the X-axis is The inhibition of HepG2 cell line growth shown in percentages of positive control proliferation (no Belinal® extract present) after 72 hours of incubation with different Belinal® concentrations. Values shown are averages of triplicate measurements, subtracted by the average negative control value (no cells). The error bars represent standard deviations (Figure 2).

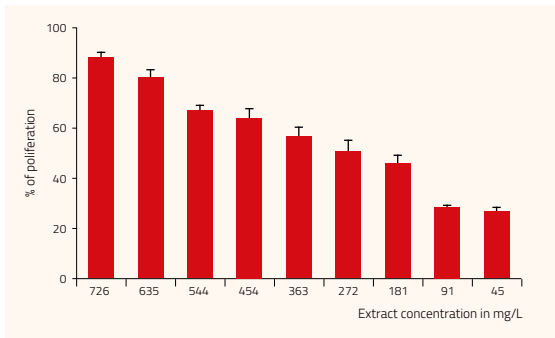


Figure 2: Inhibition of liver cancer cell line

Inhibition of Proliferation of the Human Acute T-cell Leukemia Cell Line

Presented on the X-axis is the inhibition of Jurkat cell line growth shown in percentages of positive control proliferation (no Belinal® extract present) after 72 hours of incubation with different Belinal® concentrations. Values shown are averages of triplicate measurements, subtracted by the average negative control value (no cells). The error bars represent standard deviations (Figure 3).

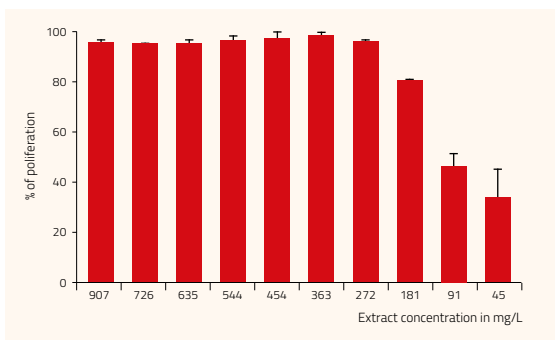


Figure 3: Inhibition of leukemia cell line

The anti-proliferative potency of Belinal® extract was observed on three tested human cancer cell lines, however the mechanism by which a relatively complex mixture of various polyphenols interferes with the growth still remains to be explained. The results of this study could indicate that lifestyle changes, including regular consumption of Belinal® might be also beneficial from the perspective of cancer prevention and support of regular cancer treatment.





Belinal[®] and Gut Health

A balanced gut microbiota plays a central role in nutrient metabolism, immune regulation, and the maintenance of intestinal barrier function. Disruptions in microbial composition are increasingly associated with metabolic imbalance, low-grade inflammation, and reduced physiological resilience.

Prebiotic Activity and Microbiota Modulation

Belinal[®] Silver Fir Branch Extract represents a novel and differentiated approach to gut health formulation. Derived from sustainably sourced EU mountain silver fir (*Abies alba*), this patented, water-based extract combines a unique profile of polyphenols rich in lignans, phenolic acids, and procyanidins with non-starch polysaccharides. This uncommon composition makes Belinal[®] highly attractive for developers working on microbiota-focused and synbiotic concepts.

To better understand its interaction with gut bacteria, Belinal[®] was evaluated in an in vitro study focusing on its compatibility with probiotic strains and its influence on bacterial growth behaviour, both critical aspects for successful gut health formulations.

Clinical Evidence

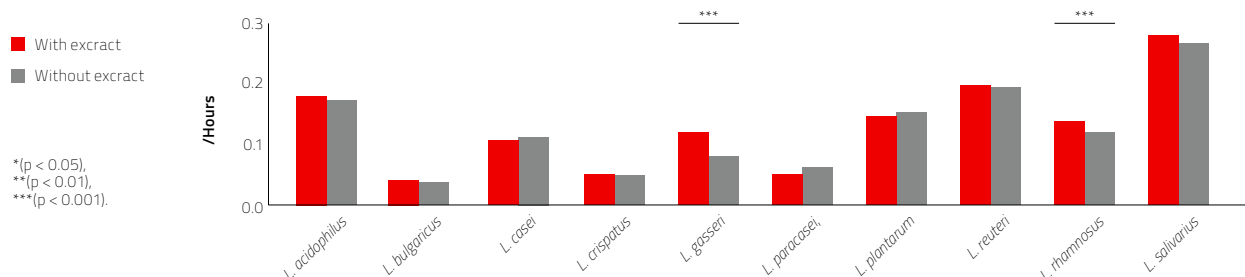
We demonstrated that Belinal[®] extract is compatible with all tested bacterial strains and promotes their growth. Furthermore, the extract acted as a prebiotic for specific bacteria, including *L. paracasei*, *L. acidophilus*, *L. rhamnosus*, *L. gasseri*, *L. crispatus*, and *L. bulgaricus*, suggesting that its compounds can stimulate their proliferation.

In this study, we concluded that the silver fir branch extract Belinal[®] exhibits bacterial compatibility and displays prebiotic properties. These findings suggest that the combined use of Lactobacillus probiotics with Belinal[®] may have a positive impact on gut health.

Diagram 1: Growth rate of different Lactobacillus species with and without silver fir extract. *(p < 0.05), **(p < 0.01), ***(p < 0.001)

Increased Growth Rate of Selected Lactobacillus Strains

Growth rate of 10 Lactobacillus species cultured with and without Belinal[®] Silver Fir Branch Extract.

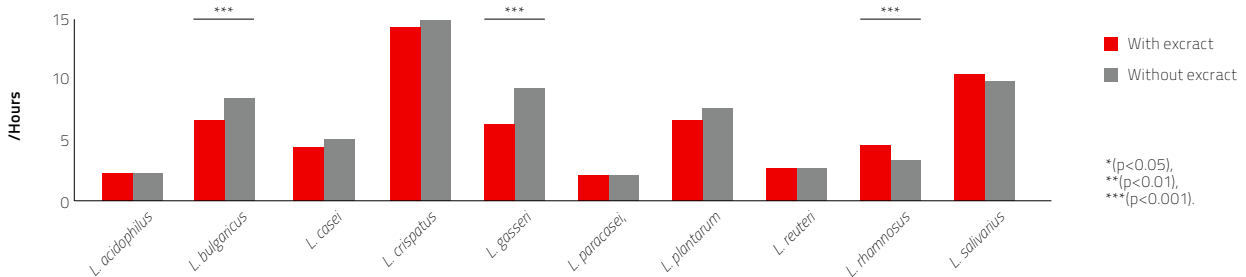


A statistically significant increase in growth rate was observed for *L. gasseri* and *L. rhamnosus* when cultured in the presence of the extract.

Effect of Belinal® on Bacterial Lag Time

Lag time duration of Lactobacillus species cultured with and without Belinal® Silver Fir Branch Extract. Reduction in lag time enables bacteria to reach the exponential and stationary growth phases faster, promoting earlier bacterial activity.

Diagram 2: Lag time of different Lactobacillus species with and without silver fir extract. *(p<0.05), **(p<0.01), ***(p<0.001)



Belinal® reduced lag time by 3.0 h in *L. gasseri* and 1.6 h in *L. bulgaricus*, enabling faster bacterial activation, while only *L. rhamnosus* showed a modest lag time increase (+1.1 h).

Suggested Dose of Belinal® in Your Formula:

90 mg Daily.

Directions:

1 dosage daily, preferably with a meal.

Suitable for continuous use.

Mechanisms of Action:

1. Microbiota interaction and modulation:

Silver fir polyphenols, including the lignans secoisolariciresinol, resinol, and matairesinol, interact with gut microbiota and influence strain-specific bacterial growth behaviour, as demonstrated by selective responses observed in vitro.

2. Prebiotic activity:

Polysaccharides in Belinal® act as prebiotics, providing nourishment for beneficial gut bacteria. This promotes a balanced gut microbiome, which is crucial for optimal digestion and immune function.

3. Antioxidant and Anti-inflammatory Effects

Belinal® polyphenols exhibit antioxidant activity and are associated with modulation of inflammatory processes within the gastrointestinal environment. These effects contribute to maintenance of intestinal homeostasis and prevent disorders such as irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD).

4. Support of Gut Barrier Function

Polyphenols influence tight junction function, supporting intestinal barrier integrity and controlled permeability, a key factor in maintaining gut homeostasis and limiting systemic inflammatory burden.

Advantages and Features:

- Innovative Polyphenolic Solution for Enhanced Formulations
- Clean, water-based extraction from pristine EU mountain forests ensures purity, sustainability, and full traceability.
- A unique lignan-rich polyphenolic profile enables differentiated, first-to-market formulations and supports consumer trust.
- Validated stability ensures product integrity throughout a five-year shelf life.

FAQ

Applications:

Digestive wellness, microbiota-focused products, probiotic and synbiotic formulations, and daily gut health support concepts.



Belinal® and Longevity – Healthy Aging

At the biological level, aging reflects the progressive accumulation of cellular damage over time, leading to a gradual decline in physiological function. While life expectancy continues to increase, many of these additional years are often spent in compromised health.

Healthy aging focuses on maintaining functional capacity, resilience, and quality of life throughout later stages of life.

Your Tree of Life for Healthy Ageing

Belinal® Silver Fir Branch Extract is a polyphenol-rich botanical ingredient designed to support healthy aging at multiple biological levels. Its unique composition of flavonoids, phenolic acids, lignans, and non-starch polysaccharides enables broad interaction with key mechanisms associated with longevity and age-related functional decline.

Belinal® has been investigated in a series of in vitro, ex vivo, and clinical studies addressing biological processes closely linked to aging, including oxidative stress, inflammation, metabolic regulation, vascular function, and tissue regeneration. These studies provide mechanistic insight into how silver fir polyphenols interact with cellular and molecular pathways relevant to healthy aging.

Mechanisms of Action:

1. Antioxidant activity inside cells

Belinal® protects cellular structures from oxidative stress, including telomeric DNA, and supports longevity-related signaling pathways such as SIRT6 activation.

2. Anti-inflammatory modulation

Belinal® inhibits COX-2 and suppresses pro-inflammatory mediators including TNF- α , IL-6, and IL-1 β , while also limiting histamine release.

3. Metabolic health support

Belinal® acts as a carbohydrate blocker by inhibiting alpha-amylase and alpha-glucosidase, supporting glycemic control and metabolic balance.

4. Cardiovascular and brain health

Belinal® supports vascular relaxation through prostacyclin and endothelium-derived mechanisms, contributing to healthy circulation and cognitive function.

5. Joint and connective tissue health

Belinal® enhances the chondrogenic potential of mesenchymal stem cells and supports joint tissue regeneration.

6. Gut microbiota interaction

Non-starch polysaccharides in Belinal® support beneficial gut bacteria, contributing to microbiota balance as a foundational aspect of healthy aging.

Suggested Dose of Belinal® in Your Formula:

100–140 mg.

Directions:

1 dosage daily, preferably with a meal.

Suitable for continuous use.

Advantages and Features:

- Broad-spectrum polyphenolic support targeting multiple longevity-related pathways at a low daily dose of 100–140 mg.
- Clean, water-based extraction from pristine EU mountain silver fir with full traceability and sustainable sourcing.
- Distinct lignan-rich profile enabling differentiated, first-to-market longevity formulations with low MOQ.
- Proven formulation robustness with a validated five-year shelf life.

FAQ

Applications:

- healthy aging, vitality support, metabolic balance, cognitive and vascular support.



Belinal - Health Care					Belinal - Well Being				
Metabolic		Cardio - Vascular	Joints	Gut Health	Skin		Sport	Longevity	Brain
Diabetes	Weight loss	Heart & blood vessels	Osteoarthritis	Prebiotic activity	Cosmetic	Beauty from within	Recovery, Endurance	Healthy again	Concentration & Memory
75 mg	100 mg	80-120 mg	100-140 mg	50-120 mg	0,5% - 1,5%	80-120 mg	140-180 mg	50 -150 mg	80-100 mg
before a meal	before a meal	with a meal			topical	with a meal	before activity		
2 x	3 x	1-2 x	1x	1x		1x	1-3x	1-2x	1x

Belinal® – Published Articles in Scientific Magazines:

1. Debeljak J, Ferk P, Čokolič M, Zavratnik A, Tavčar Benkovič E, Kreft S, Strukelj B. **Randomised, double blind, cross-over, placebo and active controlled human pharmacodynamic study on the influence of silver fir wood extract (Belinal) on post-prandial glycemic response.** Pharmazie. 2016; 71(10).
2. Drevenšek G, Lunder M, Tavčar Benkovič E, Mikelj A, Štrukelj B, Kreft S. **Silver fir (*Abies alba*) trunk extract protects Guinea pig arteries from impaired functional responses and morphology due to an atherogenic diet.** Phytomedicine. 2015; 22(9).
3. Drevenšek G, Lunder M, Tavčar Benkovič E, Štrukelj B, Kreft S. **Cardioprotective effects of silver fir (*Abies alba*) extract in ischemic-reperfused isolated rat hearts.** Food Nutr Res. 2016; 60(1).
4. Tavčar Benkovič E, Žigon D, Mihailović V, Petelinc T, Jamnik P, Kreft S. **Identification, in vitro and in vivo Antioxidant Activity, and Gastrointestinal Stability of Lignans from Silver Fir (*Abies alba*) Wood Extract Belinal®** J Wood Chem Technol [Internet]. 2017 Nov 2;37(6):467–77.
5. Lunder M, Roškar I, Hošek J, Štrukelj B. **Silver Fir (*Abies alba*) Extracts Inhibit Enzymes Involved in Blood Glucose Management and Protect against Oxidative Stress in High Glucose Environment.** Plant Foods for Human Nutrition. 2019 Mar; 74(1): 47–53.
6. Sirse M, Fokter K S, Strukelj B, Zupan J. **Silver Fir (*Abies alba*) Polyphenolic Extract (Belinal) Shows Beneficial Influence on Chondrogenesis In Vitro under Normal and Inflammatory Conditions.** Molecules 2020, 25, 4616.
7. Kreft S. **Phytochemical, pharmacological and clinical studies of an extract prepared from silver fir branches Belinal® (*Abies alba*).** Biologia Serbica, 2021, 43(1): 57-62.
8. Stojanov S, Ravnikar M, Berlec A, Kreft S. **Interaction between silver fir (*Abies alba*) wood water extract Belinal® and lactobacilli.** Pharmazie 76 (2021)
9. Schoss K., Benedetic R. and Kreft S. **The Phenolic Content, Antioxidative Properties and extractable Substances in Silver Fir Branch (*Abies alba* Mill.) Branches Decrease with Distance from the Trunk.** Plants 2022, 11, 333



Abies Trade GmbH

Bahnhofplatz 5 ▪ 9020 Klagenfurt am Woerthersee ▪ Austria
orders@abiestrade.com

WWW.ABIESTRADE.COM