CBG | Creo Cannabigerol

Discover why CBG (Cannabigerol) is creating so much buzz

Introducing Creo

Creo is an ingredients technology company that focuses on one of the world's fastest growing ingredient classes – cannabinoids – which it produces using the natural process of fermentation. Founded in 2016 and headquartered in California, Creo's mission is to enable the creation of value-added cannabinoid products that help people everywhere, at scale and in a more environmentally sustainable way using advanced biology instead of the cannabis plant.

Creo's technology partner and major shareholder is industry-leading biotechnology firm Genomatica. Creo operates legally in the US on both a federal and state level. Its products contain no THC, are not regulated by the DEA, and are not considered as "drugs" by the FDA.

Capture your next big opportunity in the fast-growing cannabinoids market with CBG: the mother cannabinoid

Cannabinoids have become a natural health, wellness, and beauty phenomenon. CBD, one of the more common cannabinoids, has already gone mainstream through national resellers. Cannabigerol (CBG) is the new CBD. And like CBD, it's not intoxicating. CBG is sometimes known as the mother cannabinoid since other cannabinoids like CBD, CBC, and THC are derived from it.

According to a recent study by the Brightfield Group, consumer awareness of CBG is rapidly increasing. Already at least eight million US adults are reportedly likely to buy products containing CBG. CBG buyers represent an attractive consumer segment, more likely to be millennial, financially successful, and well educated. Social media conversations concerning minor cannabinoids are dominated by CBG. CBG is where CBD was just before its demand skyrocketed.

Indeed, many CBD companies have been launching products containing CBG to differentiate their products, with applications ranging from cosmetics and skincare to beverages, foods, and supplements.

Recently, the European Commission added CBG to the Cosmetic ingredient database (CosIng), which approves its inclusion as an ingredient in personal care and cosmetics within the European Union.

A breakthrough in biotechnology creates a new market opportunity

In order to realize their true potential, cannabinoids need to be available reliably for customers at commercial scale, with consistent specification and high purity, at an attractive and stable price, and with a clear and favorable legal status. Creo has pioneered an approach that meets all these needs through the natural process of fermentation, combined with advanced biology. Creo is now able to supply bio-identical CBG that is safe and more sustainable, at scale.

Fermentation for a more sustainable future

Many cannabinoids occur naturally in only small quantities in plants and their production and extraction can have a significant environmental footprint. In contrast, the natural process of fermentation when used to produce cannabinoids requires less water, energy, and land resources than plant-based approaches. This gives you, our customers, the ability to develop innovative new products without causing unnecessary harm to the planet. And Creo's ingredients are of the highest quality, containing none of the contaminants often associated with plant-derived cannabinoids.

Creo CBG: product details

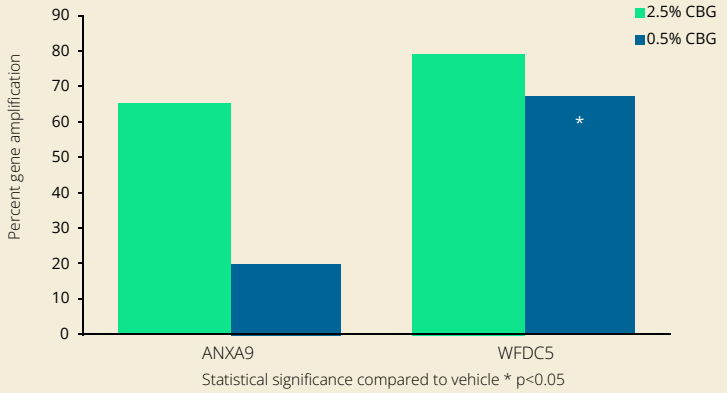
- Scientifically supported
- THC-free
- High potency and quality
- Assurance of purity, independently verified
- No heavy metals or pesticides
- Vegan
- Gluten-free
- Not tested on animals
- cGMP compliant
- Highly sustainable
- Consistent supply at scale
- Global regulatory advantages
- Made in the USA
- Made in an FDA registered facility
- Benefits from Creo's world-class partnerships

CBG: your next hero ingredient

There are only a few true hero ingredients that have a wide range of potential positive effects on the human body. Omega-3 fatty acids, magnesium, zinc, and vitamin D are examples. CBG can now be added to that elite list of exceptional ingredients.

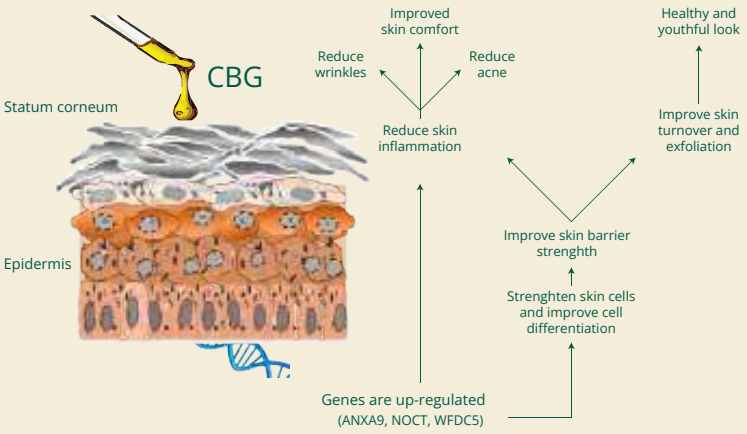
A growing body of studies is supporting CBG's ability to potentially reduce pain and inflammation, soothe and calm redness, combat acne, help protect from UVA damage, regulate circadian rhythm and detoxification, support wound healing, and help regulate pigmentation.

Effect of CBG on Gene amplification leading to potential reduction in skin inflammation



CBG has demonstrated the potential to significantly amplify the WFCD5 gene, which activates the suppression of inflammation leading to skin soothing and potential reduction in acne. CBG also shows promise for improving epidermal differentiation, thereby improving the skin barrier and the visual look of wrinkles. CBG also demonstrates the potential to amplify the ANXA9 gene, which encodes the annexin protein family, which strengthens the skin barrier.

Potential effect of CBG on skin inflammation



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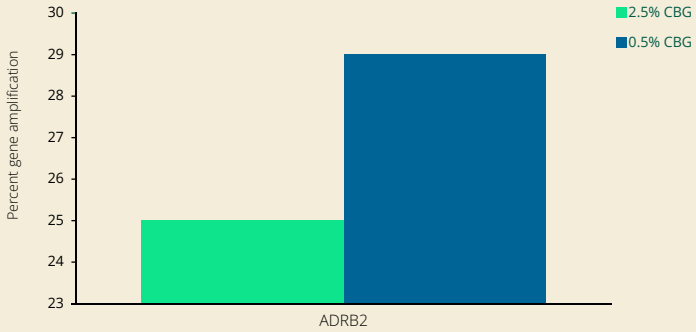


CBG upregulated ADRB2 implicated in tranport of oxygen and respiration and regulation of pigmentation.

ADRB2 is a member of the receptor family that mediates the physiological effects of the hormone epinephrine and the neurotransmitter norepinephrine. The beta-2 adrenergic receptor (β2 adrenoreceptor), binds epinephrine (adrenaline), a hormone and neurotransmitter whose signaling, via adenylate cyclase stimulation increases cAMP. cAMP controls oxygen metabolism in cells.

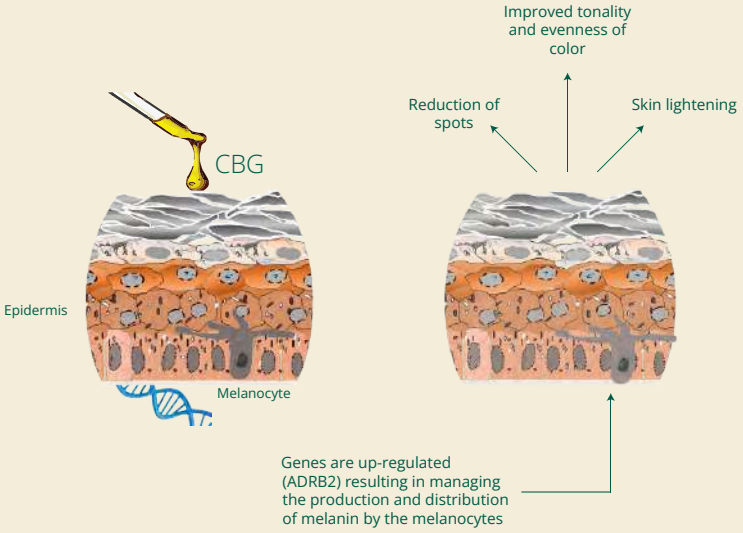
Oxygen balance is important in the control of inflammation. Post-inflammatory hyperpigmentation presents as irregular, darkly pigmented spots occurring after inflammation of the skin such as that caused by acne, folliculitis, eczema, or shaving irritation. These spots commonly persist for months but usually disappear eventually. Disfigurement may be severe in persons with highly pigmented skin.

Creo CBG may help regulate pigmentation/melanin synthesis and wound healing

Dark spots and hyperpigmentation issues related to everything from the aftermath of acne to the irregularities of general wound healing are a deep concern for many consumers and they underpin the growing global market demand for skin lighteners.

In fact, the demand for solutions to dark spots and hyperpigmentation drives the global market for skin lighteners which is “estimated at US $8.6 billion in the year 2020, [and] is projected to reach a revised size of US $12.3 billion by 2027, growing at a CAGR of 5.2% over the analysis period 2020–2027.” *Ref. Global News Wire*

The current topical options to regulate hyperpigmentation come with potentially toxic side effects and have been banned in many countries. CBG could potentially safely answer the call to support wound healing and subsequent pigment dysregulation by regulating melanin synthesis during the wound healing phase.



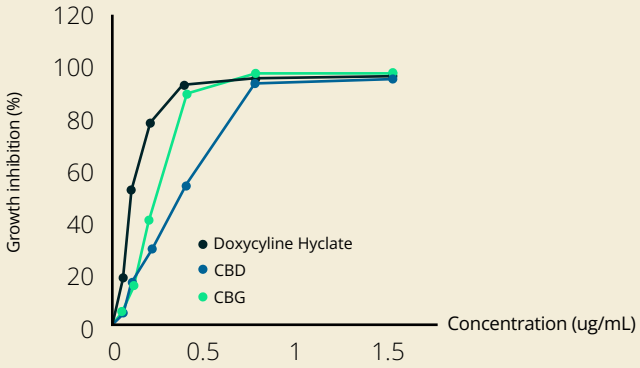
Creo CBG may help manage acne and atopic dermatitis (chronic eczema)

CBG is a potent anti-inflammatory, antimicrobial, and antioxidant agent with the ability to potentially protect the skin from various bacteria including *C. acnes and S. aureus,* both of which may play a role in the proliferation and pathology of these chronic skin challenges.

"Acne is estimated to affect 9.4% of the global population, making it the eighth most prevalent disease worldwide." *Ref. PubMed*
"The global acne medication market was valued at $11.86 billion in 2019 and is projected to reach $13.35 billion by 2027 at a CAGR of 3.8% (2020-2027)." *Ref. Allied Market Research*

CBG and CBD exhibit potent antimicrobial activity vs "bad" skin bacteria

(A)

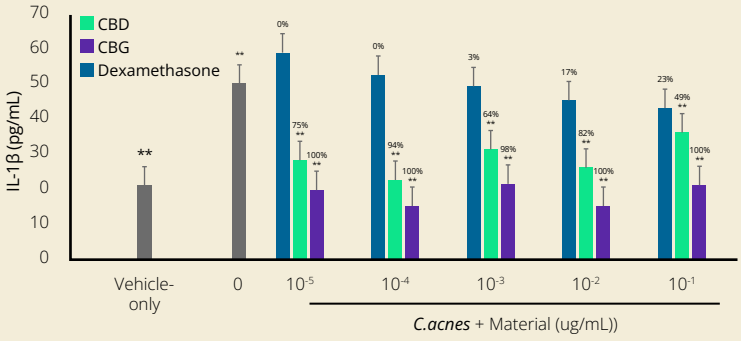


(B)

Bacteria strain	MIC, ug/mL ()% w/v) Doxycycline	CBD	CBG
S. aureus ATCC® 29213™	0.20	0.65	0.78
S. aureus MRSA ATCC® 335912	20.83	1.56	1.82
S. pyogenes ATCC® 19615™	0.11	0.65	0.59
C. acnes ATCC® 6919™	0.26	0.65	0.39
C. xerosis ATCC® 373™	0.33	1.11	1.17
C. granulosum ATCC® 25564™	0.13	2.08	1.56

(A) Growth inhibiton for C. Acnes ATCC® 6919™ (B) Summary antimicrobial results table in sking bacteria straings. Bacteria strains were cultured as recommended by ATCC®. Test Materials were incubated at 5% in DMSO vehicle and optical density (OD 595nm) measured to determine >90% growth inhibiton by broth trubidity. MIC = minimal inhibitory concentration. Data represents mean from three independent experiments.

CBG inhibits *C. acnes*-induced cytokine production more potently than CBD

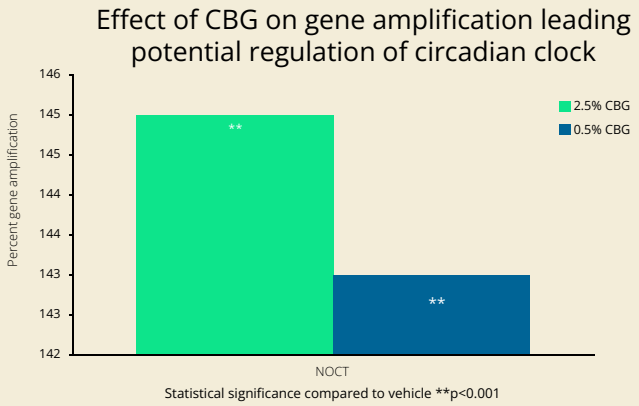


Normal Human Epidermal Keratinocytes (NHEKs) were pre-treated with CBG, CBD (<10-7 µg/mL) or Dexamethasone (<10µg/mL) for 1 hour, then co-treated with 107 CFU/mL of live *C. acnes* ATCC® 6919™ for 24 hours. Media supernatants were collected after incubation and analyzed by ELISA for Interleukin-1β (IL-1β) levels. Data represents mean ± SE from three independent experiments. *p < 0.05; **p ≤ 0.01 compared to *C. acnes* + vehicle group. Data labels represent mean % inhibition based on -/+ *C. acnes* control groups.

*Source

Creo CBG may help regulate circadian rhythm and detoxification

Environmental stressors, such as blue light from digital devices and jet lag can disrupt the natural circadian rhythm. The Nrf2 pathway, regulated by the circadian rhythm, is one of the ways we naturally detox through our skin cells. This detoxification pathway becomes inefficient when skin cells become overwhelmed and stressed.

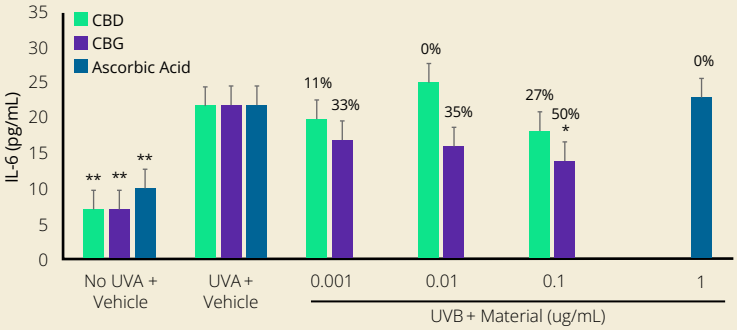


CBG significantly amplified NOCT gene which is a circadian clock gene involved in the skin repair processes.

Creo CBG may help protect from UVA damage

UV (ultraviolet) light exposure can cause skin discoloration, accelerated aging, and may lead to skin cancer.

CBG inhibits UVA-induced cytokine production better than CBD



Primary Human Dermal Fibroblasts (HDFs) were cultured in the presence of CBD (0.001-0.1 ug/mL0 or ascorbic acid (1 ug/mL) for 6 hours. Later, ingridents were removed, and cells were irradiated with 12.5 J/cm2 UVA. Media supernatents were collected after 24 hours and analyzed by ELISA for Interleukin-6 (IL-6). Data representd mean + SE from three independent experiments. *p < 0.05; **p < 0.01 compared to UVA + vehicle group. Data labels represent mean % inhibition relative to -/+ UVA control groups.

*Source

Additional potential health benefits of Creo CBG

Primary studies suggest that CBG may provide numerous additional health benefits including:

- Neuroprotective
- Supports immune response
- Regulate gastrointestinal processes (IBD/IBS)

Product name	Creo CBG
INCI	Cannabigerol
CAS number	25654-31-3
Chemical formula	$C_{21}H_{32}O_2$
Molecular weight	316.5 g/mol
Function	skin conditioning
Appearance @ 25°C	powder
Color	white
Odor	neutral
Solubility	oil, fat, alcohol
Melting Point	49-60 °C

Storage conditions

Store in a cool, dry place protected from direct light. Shelf life is 24 months unopened.

Citations

Brightfield US CBD Market Forecast (July 2020).

Differential effectiveness of selected non-psychotropic phytocannabinoids on human sebocyte functions implicates their introduction in dry/seborrhoeic skin and acne treatment.

Oral Care/ Hygiene Market by Product (Toothbrush (Manual, Electric, Battery), Toothpaste (Pastes, Gels, Powder, Polish), Breath Freshener, Rinse & Distribution Channel (Consumer Stores, Retail Pharmacy, E-Commerce), Region - Global Forecast to 2025.

Cannabinoids inhibit human keratinocyte proliferation through a non-CB1/CB2 mechanism and have a potential therapeutic value in the treatment of psoriasis.

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cGMP compliant Lab tested GMO free USA made

CREO

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